

**Shifting Currents:
A history of rivers, control and change**

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Certificate of Authorship / Originality

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Damian Lucas

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Abbreviations

CRCC = Clarence River Country Council - Flood Mitigation Authority
CSIRO = Commonwealth Scientific and Industrial Research Organisation
CVFN = Clarence Valley Field Naturalists
EPA = Environmental Protection Authority
GL = Giga litre (1000 mega litres)
MDBC = Murray-Darling Basin Commission
ML = mega litre (1000 litres)
NPWS = National Parks and Wildlife Service

Conversions

This thesis uses the measurements quoted in primary material. Conversions are provided below.

1 acre = 0.405 hectares
1 inch = 25.4 millimetres
1 foot = 30.5 centimetres
1 mile = 1.61 kilometres
1 pound = 0.45 kilograms

Abstract

The benefits and costs of controlling rivers – building dams, controlling floods, extracting water – are constantly contested.

Modifying rivers has brought great benefit to communities, fulfilling important community goals – supporting profitable commercial activities and providing a basis for vibrant communities. However modifying rivers has also had negative consequences – in particular, a decline in the quality and quantity of water. These impacts have undermined valued aspects of rivers (such as fish habitat) and have also caused decline in commercial activities (such as fishing and floodplain grazing).

This thesis explores the ways that these contending perceptions of modification work out on the ground in rural communities. How are the benefits of modification recognised? How are the negative consequences of modification noticed and measured? Under what conditions are the benefits of modification reassessed? These are important questions in the current moment as our society reassesses the past modification of rivers and attempts to move towards more sustainable use of natural resources.

This thesis explores this topic by undertaking in depth case-studies of two distinctive riverine environments: one coastal, the Clarence River in lush coastal northern New South Wales; and one inland, the Balonne River, at the top of the Murray-Darling Basin, in semi-arid south-west Queensland. The case studies explore responses to modification of the rivers in two periods: the post-war decades – a time of widespread support for modification, and recent decades – a time of widespread recognition of the negative consequences of development.

The thesis investigates perceptions of modification at three different scales: (i) groups within localities – the ways that modification is perceived by local groups with contrasting physical and conceptual interactions with the rivers (such as graziers, fishers, irrigators, Aboriginal people, ecologists and engineers); (ii) regional communities – which are constituted by groups with differing interests, and (iii) governments – which have the role of managing the long-term health of the economy and the environment, despite the long-term goals often being contested.

This thesis provides insights into the ways that our complex society grapples with the possibility, and effects, of modifying the natural environment. This thesis suggests that local conditions – the actual local physical environment and local social conditions – shape the ways that modification of rivers is supported, challenged and reassessed. However, both local social conditions and the environment are constantly changing, often in surprising ways. Therefore outcomes are always an interaction between different levels of interest groups and the environment itself.

Dedication

To Jess, the bravest person I know.

To my parents Ruth and Leo, both keen storytellers, who have always supported my storytelling endeavours.

Acknowledgements

A thesis is a big project, many people have contributed to this project or supported my work towards completing this thesis.

The basis of this thesis is a series of life history interviews with residents of the Clarence and Balonne regions, many people shared with me their experiences of living in these places and their analysis of how these areas have changed. The generosity and candour of the interviewees made this history possible. In the Clarence region in particular I would like to thank: Gillian Mears, Linki and Pauline Gordon, Roy Bowling, Stan Mussared, Greg Clancy, Peter Cummins, Bruce Salquist, Della Walker, Caroline French, Irene Daley, Megan Edwards, Diana Behanzie and Noeline Grace. In the Balonne region I would like to thank: Leith Bouilly, Reg Betts, Tom and Noel Crothers, Sandra Davis (now deceased), Kevin Waters and in Moree, John Williams and Susie Spencer. The bibliography lists all the people who contributed interviews to this project.

I would also like to acknowledge the support of a number of organisations: the Grafton Ngerrie Local Aboriginal Land Council, the Clarence Regional Library, the Clarence Environment Centre, the Clarence River Historical Society, Oceanwatch, and the Inland Rivers Network.

Heather Goodall has been the primary supervisor for this thesis. Heather has continually worked to find ways to make this intellectual work sustainable, meaningful and progressing towards completion. I thank her for her insightful and considered teaching.

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The Faculty of Humanities and Social Sciences at UTS, has provided a physical and intellectual home for this work. I would like to acknowledge the support of all my colleagues there. UTS has provided an environment interested in academic scholarship that engages with contemporary politics, and supportive of innovative ways to communicate scholarly research. In particular, I would like to acknowledge the support of fellow post-grads – Kate Evans, Stephen Gapps, JoAnne Dungan, Yuji Sone and Natalie Apouchtine – who have a shared interest in this particular kind of intellectual work.

Fellow researchers, from around Australia with a shared interests in history, people and place – Jo Kijas, Ruth Lane, Paul Sinclair and Sam Wells - have provided consistent support for this project. Early drafts of this thesis were workshopped at the 'Writing Histories: Imagination and Narration' Visiting Scholars Program at the Centre for Cross Cultural Research, ANU. I thank the convenors, Ann Curthoys and Ann McGrath and participants for their comments.

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My family have always supported my academic endeavours. My parents Ruth and Leo have provided much emotional and practical support, and have provided a place to work. My siblings and their partners – John and Jo, David and Jo, Rebecca, Ben and Emily and Patrick – have also supported this work in many important ways. My brother John drew up the maps, located the satellite imagery and commented on draft chapters. My extended family – in particular my cousin Chris Sidoti and Fay and David Mander-Jones – have also supported this project. In particular, I thank them all for rallying around and offering support in the final phases. Their support has given me a secure base from which to undertake such a large project.

Above all I am grateful to my partner Jessica Mander-Jones. Jessica, in her own way a keen storyteller and analyst, has given compassionate support to my work on this project, and all it has involved – providing guidance, cash and much needed mini-breaks. This sustaining support is all that a writer could ask for. Our daughter Ava Myfanwy has provided much joy, a welcome distraction from writing, a good reason to finish and new questions for the future.

Introduction

Rivers, meanings and modification

The simple act of driving around places with people brings the country, and their experience of it, to life. Hearing their stories unravel as the landscape flashes by the car window – the memories of lives lived on this landscape, the comparison between the past and present, the hopes for the future - gives a sense of what they value about the place and how they have seen it change. I've driven around the Clarence River floodplain in northern New South Wales many times, but three journeys with long term residents stay in my mind. Each reveals the same landscape, and modification of it, in very different ways.

An older farmer points out the fields of sugar cane growing across the low flat floodplain, stretching kilometres from the river bank to the low foothills. He says that you wouldn't believe that forty years ago this used to be swampy country, troubled by even the smallest floods. Following a flood, the low-lying area he points to would be inundated for months or even years, making it impossible to grow any crops. Back then it was known as a poor area, there wasn't much money around, and people couldn't make much of a living from the land. Thirty years ago that all changed. The local council constructed a sophisticated system of drains to rapidly carry the floodwater away, creating good conditions for cane growing. Now, by growing cane, farming families are able to make a good return from the land, and there is a vibrant community. The farmer tells me that it's been a good season this year. If the sugar content of the cane stays up, and international prices remain high, they should get a good return. Taking in the scene from where he stands, he

explains that what was a waste land has been transformed into something much more valuable.

Another older male farmer speaks of what has been lost in the modification of the floodplain. We drive through sugar cane fields to a small nature reserve on a tributary, some distance back from the main river. He points out the richness of bird-life. All kinds of native and migratory birds live and nest here – jabirus, brolgas, storks, whistling kites. He calls this reserve a ‘remnant.’ It is a small and valued reminder of the diverse wetlands he knew decades ago when he grazed cattle across this part of the floodplain, before it was drained and before cane expanded. He remembers the old stockmen he worked with who, while mustering cattle, taught him the names of all the different birds and their habits. He says that you would have to use your imagination to picture what this was like before European settlement: one large wetland complex with a huge range of birds nesting here. Looking across to the sugar cane he describes it now as a sterile monoculture; what was alive and abundant is now depleted, fragmented.

As we drive around the floodplain an older Aboriginal woman points out the places where she lived in camps while growing up, the sites of old government missions, the farms and guesthouses where Aboriginal people worked. When we get to a favourite fishing spot on the edge of the river she speaks of the richness of fishing when she was growing up – during tough times, when work was hard to find or mission rations lean, a family could always rely on the river for a feed. The river also provided bushfoods, such as cobra, a long wormlike creature considered a delicacy. Now she says that that richness and abundance isn’t available from the river any more. Fish are now scarce, bushfoods harder to get, all depleted by too much fishing, by pollution from sewerage and by chemical run off from farms. She says that the river is *too busy now*. The lack of fish makes it harder to feed a family when there is not much money around, *no more nothing for nothing*. The river that was known as rich and sustaining for her family and community is now seen as diminished, no longer a rich place for fish or fishing.

In each of these three journeys we travel along the same roads, however very different landscapes are revealed to me - each person ‘maps’ this landscape,

and changes to it, through the prism of their own experiences and their physical and conceptual interactions with the landscape. Different dimensions are pointed out, or ignored. Modification of this environment – the intentional changes to it – are also explained in differing ways. For some, modification of the landscape is seen to bring benefits, improving the landscape and making it into a richer place. For others, however, modification of the landscape, while it may have brought benefits, has also damaged and undermined rich and valuable aspects of this landscape.

* * *

This thesis explores the ways that contending perceptions of modification work out on the ground in rural communities. How are the benefits of modification recognised? How are the negative consequences of modification noticed and measured? Under what conditions are the benefits of modification reassessed?

Understanding these perceptions of the benefits and negative consequences of modification is important because these perceptions inform actions, or support for actions, in relation to the environment. Perceptions of the benefits of modification drive efforts to modify riverine landscapes – such as building of dams and controlling of floods. And perceptions of the negative consequences of modification, in turn, drive actions to limit modification – efforts to protect natural systems and rehabilitate areas that have been damaged.

These questions are important in the current moment, when there is a widespread reassessment of past modification of rivers - a heightened awareness of damage caused by controlling rivers and increasing efforts towards environmentally sustainable use of rivers. At the same time, there is a persistence of ideas that affirm the wide-ranging benefits from modification – particularly of benefits in terms of facilitating profitable commercial activities, which in turn support vibrant communities.

This thesis explores this topic by undertaking in depth case studies of two distinctive riverine environments: one coastal, the Clarence River in lush

coastal northern New South Wales; and one inland, the Balonne River, at the top of the Murray-Darling Basin, in semi-arid south-west Queensland. The case studies explore responses to modification of the rivers in two periods: in the post-war decades, a time of widespread support for modification, and recent decades – a time of heightened recognition of the negative consequences of development.

Coastal and inland regions contrast in ways that are important for this thesis. There are contrasts in terms of water: the coastal fringe has an abundance of water; the further inland one goes the more rainfall decreases and the conditions become more arid. There are also contrasts in terms of social conditions – over the recent decades there has been a rapid growth of population in coastal regions. Over the same period most inland areas have experienced a decline in population. These factors – the availability of water and change in population – shape the ways that modification is perceived and contested. These two areas also allow for exploration of differences in government management in two states – NSW and Queensland – as well as revealing aspects of intergovernmental management. The Clarence catchment is contained within NSW, whereas the Murray-Darling Basin, of which the Balonne is part, covers four states.

The thesis investigates perceptions of modification on three different scales. Firstly, groups within localities – the ways that modification is perceived by local groups with contrasting physical and conceptual interactions with the rivers. These groups include graziers, fishers, irrigators, Aboriginal people, ecologists and engineers. People however often have multiple identities, and multiple interactions with rivers, and may identify with more than one group. Secondly, the scale of the regional community – the Clarence region and the Balonne region. These localities are constituted by groups with differing interests and there is ongoing contest between these different groups; only a narrow band of interests becomes dominant, while other interests become marginalised. Thirdly, governments, which have the role of managing the long-term health of the economy and the environment, despite the long-term goals often being contested.

Life history interviews with a range of community spokespeople provide the primary source of research for this thesis. These interviews focused on what people valued about the region, how they have seen it change and how they have acted to protect what they value. This oral history research was complemented by documentary research to analyse the ways that debates over modification played out and the role of governments in these debates.

The approach of this thesis is informed by environmental history. Environmental history is a field of research, within broader cultural history, that is concerned with the relationship between people and their environment in all their complexity. Environmental history draws attention to the fact that the physical environment is not just a stage for human actions, but is itself constantly changing. The concerns of environmental history have been informed by contemporary environmental concerns, and environmental history seeks to engage with current debates over environmental management.¹ The approach of this thesis is also informed by work on experience of place. This growing area of inquiry emphasises the ways in which people experience the same place, and changes to places, in differing ways depending on their backgrounds, experiences, values, intentions and interactions with the landscape. This literature also highlights the ways in which the meanings of places are constantly contested.²

These intersecting bodies of work provide important tools for understanding the meanings of place and environmental change. Overall the approach of this thesis may be described as 'humanistic environmental history', illuminating not only the meanings of places, but the politics of how contesting meanings of places interact and shape environmental decision making.³

¹ Tom Griffiths 2003, 'The nature of culture and the culture of nature,' in Hsu-Ming Teo and Richard White (eds) *Cultural History in Australia*, UNSW Press, Sydney, Richard White 2001 'Environmental History: Watching a Historical Field Mature,' *Pacific Historical Review*, Feb, vol. 70, issue 1.

² Veronica Strang 1997, *Uncommon Ground: Cultural Landscapes and Environmental Values*, Berg, Oxford, Barbara Bender (ed) 1993 *Landscape: Politics and Perspectives*, Berg, Providence, Peter Read 1996 *Returning to Nothing: The Meaning of Lost Places*, Cambridge University Press, Cambridge.

³ 'Humanistic environmental history' is used in, Tim Bonyhady and Tom Griffiths 2001, 'Landscape and Language,' in Tim Bonyhady and Tom Griffiths (eds) 2001, *Words For Country: Landscape and Language In Australia*, UNSW Press, Sydney, p 6.

In addition, two other bodies of scholarship provide important contexts for this thesis. Analysis of contemporary social and economic changes in rural Australia illuminates the context of contemporary change in rural communities.⁴ The growing body of literature from river scientists illuminates the ways in which the actual biophysical rivers respond to modification.⁵ These areas of literature are discussed in more detail below.

This thesis provides a grounded study of the ways in which the modification of rivers has been supported and challenged in the post-war period and in contemporary decades. It outlines the desires which inform the modification of rivers, the ways in which these were dominant in the 1950s and 1960s and ways in which these perceptions remain today, in the face of heightened awareness of the damage from modification. This thesis also provides insights into the ways in which modification was contested in the 1950s and 1960s, a time when there was only limited support for these ideas. It also provides insights into the ways in which the contemporary concern with sustainability is localised in two distinct rural communities, one coastal and one inland.

Overall this thesis suggests that local conditions – the actual local physical environment and local social conditions – shape the ways that modification of rivers is supported, challenged and reassessed. However, both local social conditions and the environment are constantly changing, often in surprising ways. Therefore outcomes are always an interaction between interests at different levels and the environment itself. And to understand the outcomes of these debates further it is important to be attentive to the local conditions.

The remainder of this introduction outlines some of the key elements framing this study: the period; the two regions; the influences which guided the approach in this thesis and the methodology used.

⁴ See for instance Frank Vanclay and Geoffry Lawrence 1995, *The Environmental Imperative: Eco-Social Concerns for Australian Agriculture*, Central Queensland University Press, Rockhampton.

⁵ David Mussared 1997, *Living on the Flood Plains*, Co-operative Research Centre for Freshwater Ecology and the Murray-Darling Basin Commission, Canberra, W. J. Young, CSIRO Land and Water 2001, *Rivers as Ecological Systems: The Murray-Darling Basin*, Murray-Darling Basin Commission, Canberra.

Shifts in perceptions of modification and rivers – 1950s to the present

In the fifty or more years since the 1950s there has been a great shift in community and government perceptions of rivers and modification of them. In the post-war decades there was strong support for the modification of rivers. Federal and state governments saw water resource development as a key strategy for regional development in those years. Governments across south-eastern Australia built dams and conducted flood control programs in order to provide additional opportunities for agricultural development. Water storages and flood control were critical for agricultural development in Australia.

The Federal government initiated the Snowy Mountains Scheme as a key part of the post-war reconstruction and nation building. This was a bold engineering scheme that diverted the snow melt from Australia's highest mountains inland, to be used for generating electricity and irrigation on the inland plains. State governments followed this pattern of development, constructing water storages and flood control schemes. By the 1970s there were few rivers in south-eastern Australia which were not modified by a major storage dam.⁶ This wave of development was informed by the perception that rivers were robust in the face of modification – that if there was any environmental decline it would be limited, incremental and outweighed by the benefits of development.⁷

In the 1980s, however, there was a fragmenting of support for the continued modification of rivers. In this decade, increasing evidence showed that the scale of development of rivers had lead to a decline in the quality and quantity of water in major river systems. The increasing salinity in inland rivers was a sharp indicator of the deterioration of river health. Inland rivers had always

⁶ See Peter Crabb 1997, *Murray-Darling Basin Resources*, Murray-Darling Basin Commission, Canberra, pp 36-37 for a table of the major storages in the Murray-Darling Basin.

⁷ Discussed in Paul Sinclair 2001, *The Murray: A river and its people*, Melbourne University Press, Melbourne, pp 58-75.

been salty to a degree, but with the levels of extraction and widespread land clearing, the salinity levels increased to the extent that water in some rivers became too salty for drinking and for agriculture. Scientific research indicated that the severity of salinity would increase greatly over the next 50 years if the current rate of development was continued.⁸ Salinity and other indicators of deterioration of river health led to a growing recognition that the environmentally sustainable limits of rivers had been reached, or exceeded. Maintaining the health of rivers began to be recognised as not only important for ecology but also for the economy. As a leading CSIRO scientist famously said, 'We cannot run a first world economy with a third world environment.'⁹

In this context there was increased interest in limiting the levels of modification and rehabilitating natural river conditions. For instance, from the mid-1990s a limit was set on extractions from rivers in the Murray-Darling Basin and the government began to return water to the rivers.¹⁰ This reassessment of modification was based on the perception that rivers were in fact fragile in the face of modification and that riverine ecosystems do not change incrementally but can decline exponentially. In this context, dams, weirs and flood control systems that previously had been unambiguously seen as assets were now seen as liabilities.

Two rivers – one coastal, one inland

The Clarence and the Balonne Rivers are at similar latitudes but are very different rivers – the Clarence River has an abundance of water while the Balonne has highly variable flows and often does not flow for a period of years (Figure 1). All European settlement on the Clarence has been informed by a perception of abundance of water; by contrast all European settlement on

⁸ Murray-Darling Basin Ministerial Council 1999, *The Salinity Audit of the Murray-Darling Basin: A 100 year perspective*, Murray-Darling Basin Ministerial Council, Canberra.

⁹ Dr Graham Harris, Chief of CSIRO Land and Water, speech National Press Club, Canberra, 25 September, 2001. Quoted in CSIRO media release, 'Call for national action on the environment', CSIRO ref 2001/210, www.csiro.au/index.asp?type=mediaRelease&id=NPCHarris.

¹⁰ Murray-Darling Basin Ministerial Council 1996, *Setting the Cap, Report of the Independent Audit Group*, Murray-Darling Basin Ministerial Council, Canberra.

the Balonne has been informed by a perception of scarcity of water. These two rivers are linked by recurring plans to redress the hydrological imbalance between the coast and inland. Since the 1930s, engineers and others have put forward proposals for damming the Clarence River and diverting its water inland. The Condamine River, which feeds the Balonne, was projected to be one of the rivers to benefit from the Clarence Diversion. This scheme was fuelled by the idea that the abundance of water in the Clarence could be put to good use in the inland regions. Even today this plan is periodically revived, particularly during times of drought.

The sub-tropical Clarence region has a high and regular rainfall. The average rainfall is 45 inches (1125mm) per year, though some parts of the mountainous upper catchments receive up to 70 inches (1750mm) per year. With such high rainfall the river has a consistent flow and floods frequently race off the mountains and spread across the floodplain (Figures 2 - 4). The Clarence catchment is made up of a number of distinct landforms: a mountainous upper section; a middle section of undulating hills; then a flat floodplain where the river widens and is a mix of salt and fresh water. Close to the coast the river forms a complex estuary. Along the floodplain are large wetlands and the estuary has mangroves, salt marshes and brackish lakes.

The semi-arid Balonne region has an average rainfall of 16 inches (400mm) per year, though the rainfall is highly variable and long periods without rain are a common occurrence. The river flow in the Balonne is also highly variable and often the river will not flow for three years or more. During these situations only the largest waterholes and wetlands will hold water. At other times, when there are good falls of rain in the vast catchment, slow moving floods cover the whole floodplain with a few feet of water. The ecology of the Balonne floodplain has developed around the river's variable flows. The native plants and animals have ways of surviving long dry periods - once flows come down the river everything blooms into life. For instance, frogs live in holes in the ground during the dry times and awaken from hibernation with river flows. Migrating water birds flock to the wetlands and feast on the explosion of life.¹¹

¹¹ David Mussared 1997, *Living on the Flood Plains*.

The Balonne River sits at the bottom of the Condamine catchment and at the top of the vast Murray-Darling Basin. The Balonne River proper is formed by the joining of the Condamine and Maranoa Rivers above the current town of St George. The Balonne River travels through slightly undulating country until it reaches flatter country above the current town of Dirranbandi (Figures 5 - 7). On this flat country, the river bifurcates time and again forming a number of smaller rivers that are no more than large channels - the Culgoa, the Ballandool, the Braire, the Bokhara and the Narran. In turn, these small rivers form a host of braided, interconnecting smaller channels that spread flows across the floodplain. The Bokhara and Culgoa Rivers flow into the Darling River, between Brewarrina and Bourke. The Narran River flows into the complex of wetlands known as Narran Lakes, a large wetland that holds water even during the longest droughts.

Before European settlement, the rivers in both regions were deeply important for Aboriginal people: Bundjalung, Gumbayngir and Yaegl people on the Clarence, and Gamilaroi people on the Balonne. Aboriginal people used sophisticated methods to live with variability in these river systems. As well as being important for material life, the rivers in both regions were of deep spiritual significance; in both areas the rivers were pathways for important creation stories and creation spirits have continuing presence in sections of the rivers.

After settlement, the rivers remained important for Aboriginal people in both regions. The rivers were important in a material sense, missions and camps in both areas were located along the rivers and Aboriginal people continued to use the rivers for fishing and collecting bushfoods. In addition the creation stories, in which rivers played a central role, continued to be told and retold; even as the surrounding landscapes change with settlement the physical rivers remained as markers for these important creation stories.¹²

¹²Heather Goodall 1996, *Invasion to Embassy: Land in Aboriginal Politics in New South Wales, 1770-1972*, Allen and Unwin, Sydney, pp 1-22.

Floodplains focus of settlement

In both the Clarence and Balonne regions the floodplains have been the focus of European settlement. The major towns are located along the rivers and centuries of floods have deposited rich alluvial soils on the floodplains, making these the richest areas for agriculture.

Settlement on the Clarence floodplain developed as a pattern of small farms used for a mixture of land-uses: dairy farming, sugar cane, small cropping (including maize and potatoes) and grazing. With the highly fertile soils and the high rainfall, properties on the floodplain were relatively small, generally between 50 and 200 acres (Figure 4). Floods were a constant problem for farming with regular floods inundating the whole floodplain. Following a flood, water would inundate low lying areas of the floodplain for months, drowning crops or pasture.

Besides agriculture a number of other significant industries developed in the Clarence. The river supported a significant commercial fishing fleet – the Clarence was the major supplier of estuary fish to the Sydney market. Timber and grazing were also major industries in the region. From the turn of the century, tourism also developed in the area. The major towns and villages in the region were support towns for the range of industries in the region.

Grazing was the dominant land-use in the Balonne region with the floodplain providing the richest grazing. The floodplain's heavy, sticky, black soils provided for good conditions for pasture growth, as opposed to sandier red soil away from the floodplain. Mitchell grass, a drought tolerant floodplain grass, was the most highly desired pasture. The Balonne region was known as good country for wool and sheep. Since settlement, a steady stream of bales of wool had been transported from properties in the region to distant markets. With the dry conditions grazing properties were very large; a small property was 10 000 acres and the largest properties in the region would be up to 100 000 acres or more. The towns in the region – St George, Dirranbandi and Hebel – developed as support towns for the grazing industry and their fortunes depended on the fortunes of the grazing industry – boom times for grazing meant good times for towns as well.

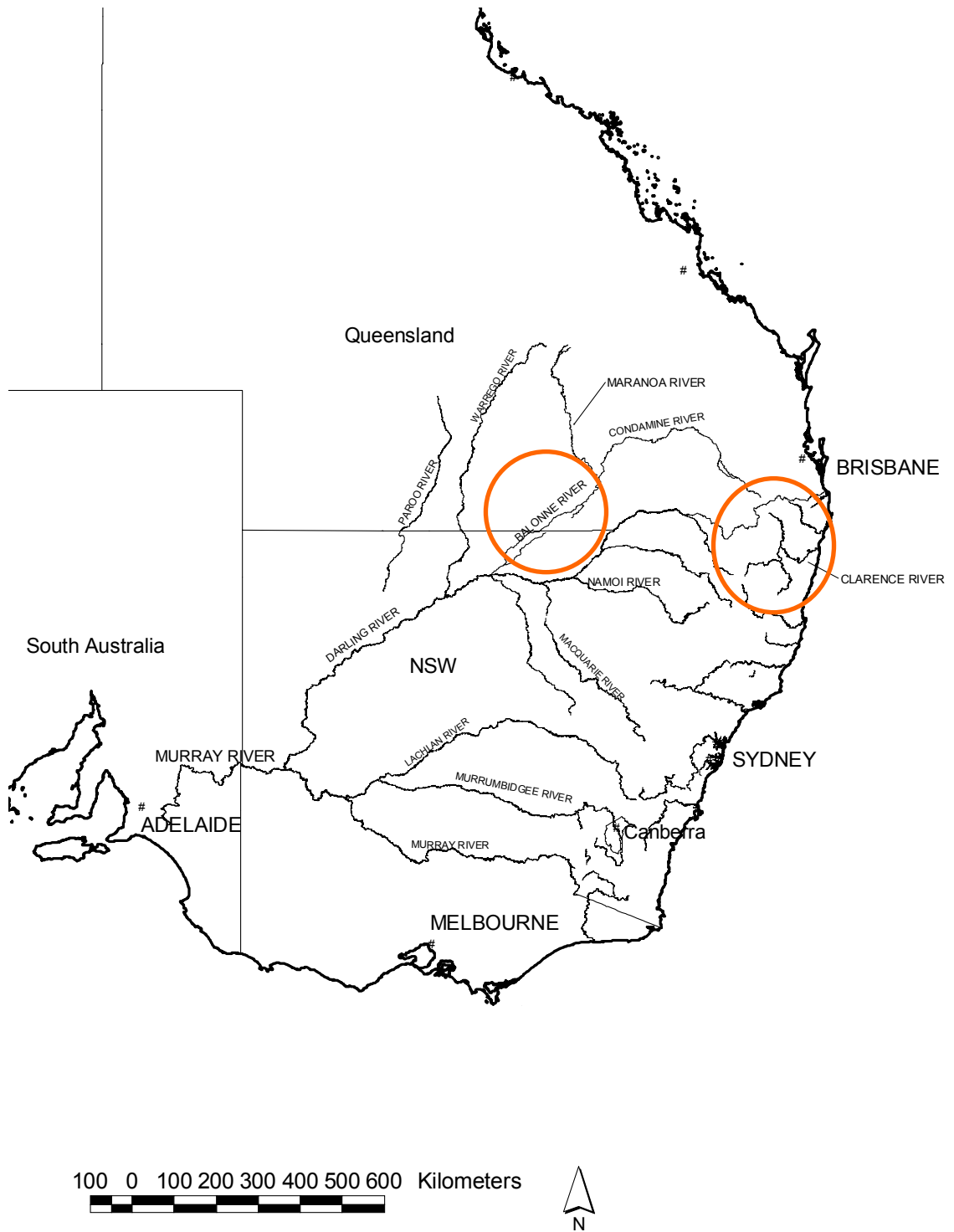


Figure 1: Rivers of south-eastern Australia

The Clarence and Balonne Rivers are at a similar latitude but are very different rivers.

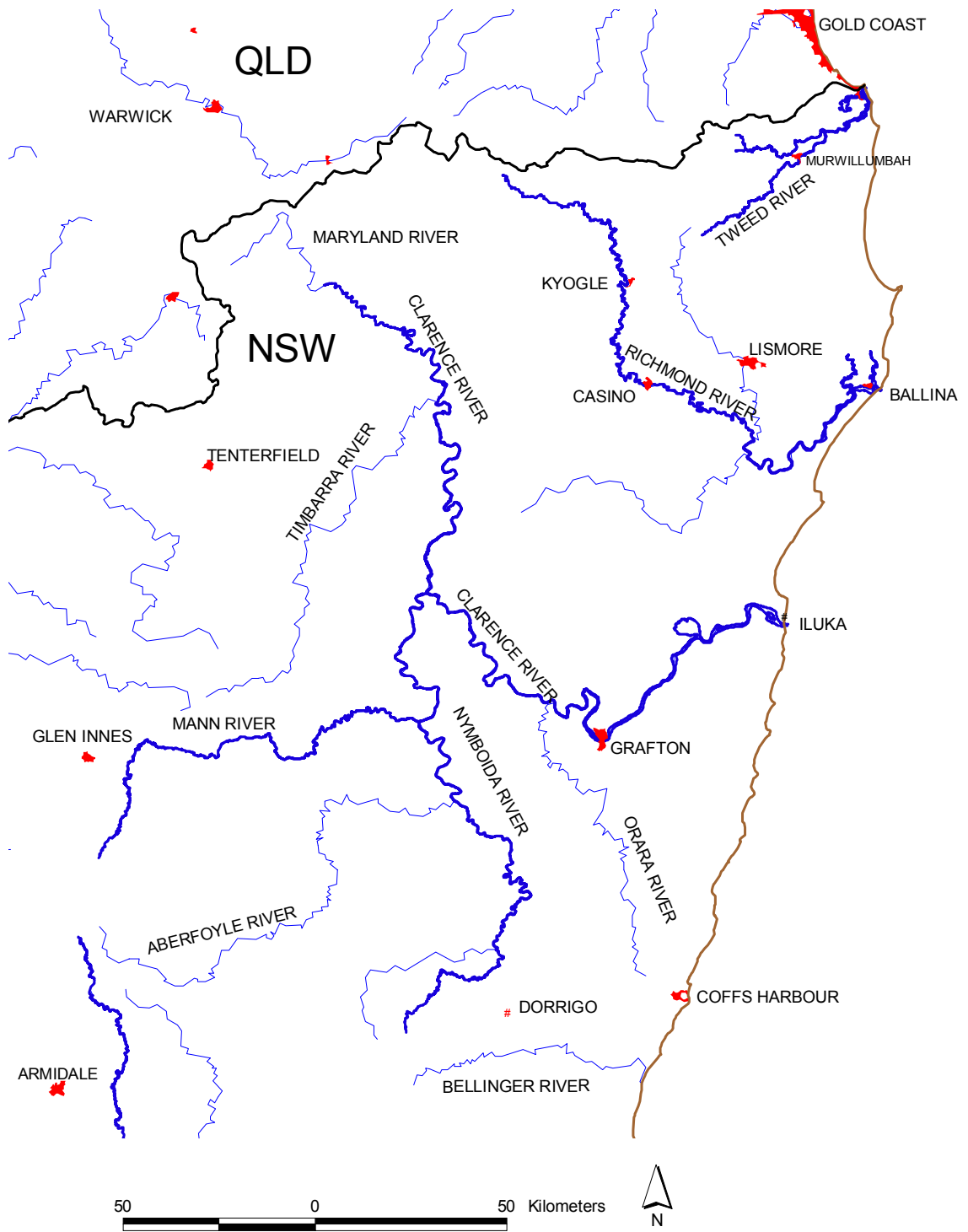


Figure 2: Clarence River Region

The Clarence River is a large coastal river and is part of the northern rivers region

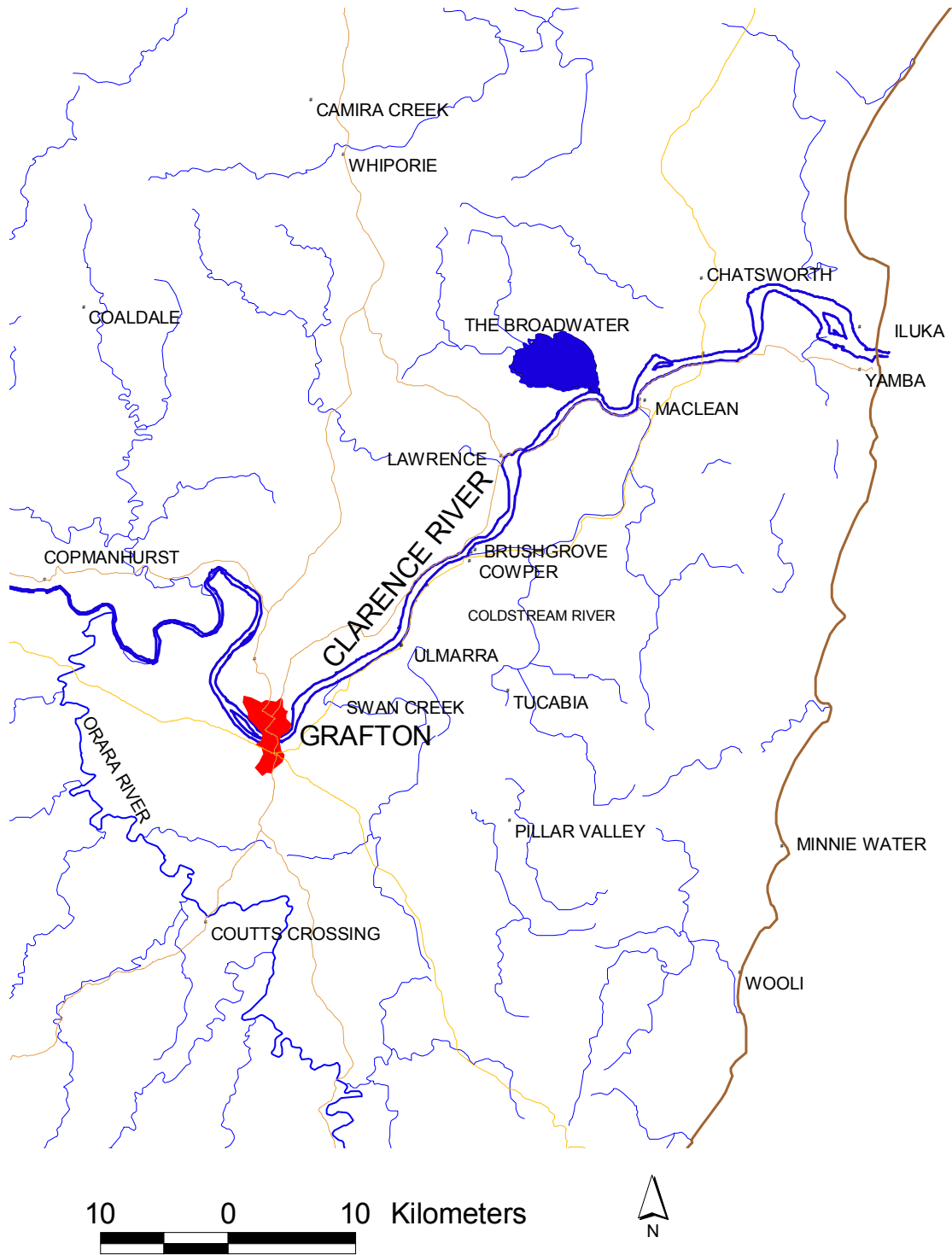


Figure 3: Clarence floodplain

The Clarence floodplain is the focus of settlement in the Clarence region



Figure 4: Satellite image of the Clarence floodplain

The floodplain has been used for intensive agriculture; land-use on the floodplain is a pattern of a large number of small properties.

[Landsat image 1999/2000]

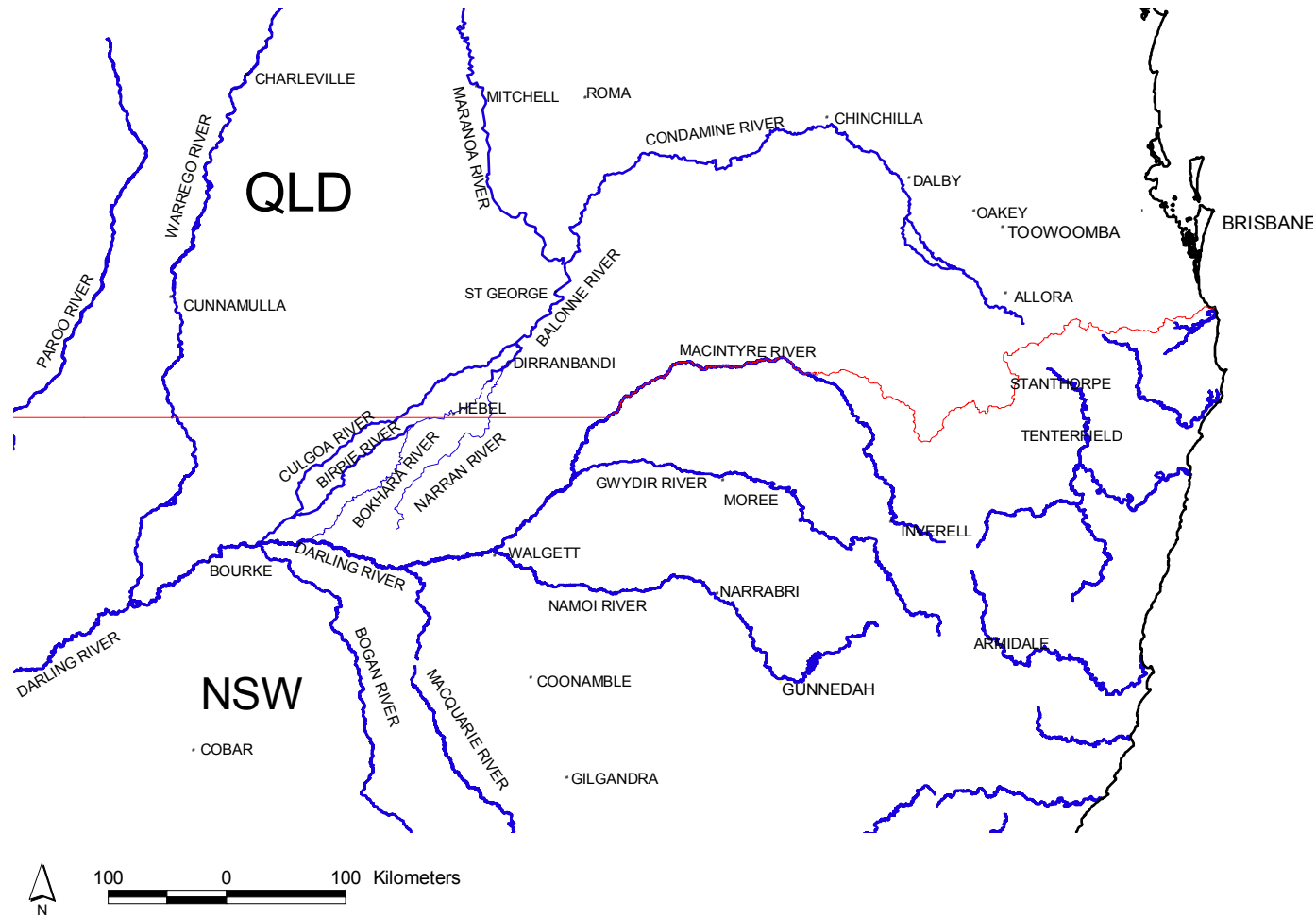


Figure 5: Condamine-Balonne Catchment

The Balonne River sits at the bottom of the Condamine Catchment and the top of the Murray-Darling Basin. It is one of fan of rivers which flow into the Darling River.

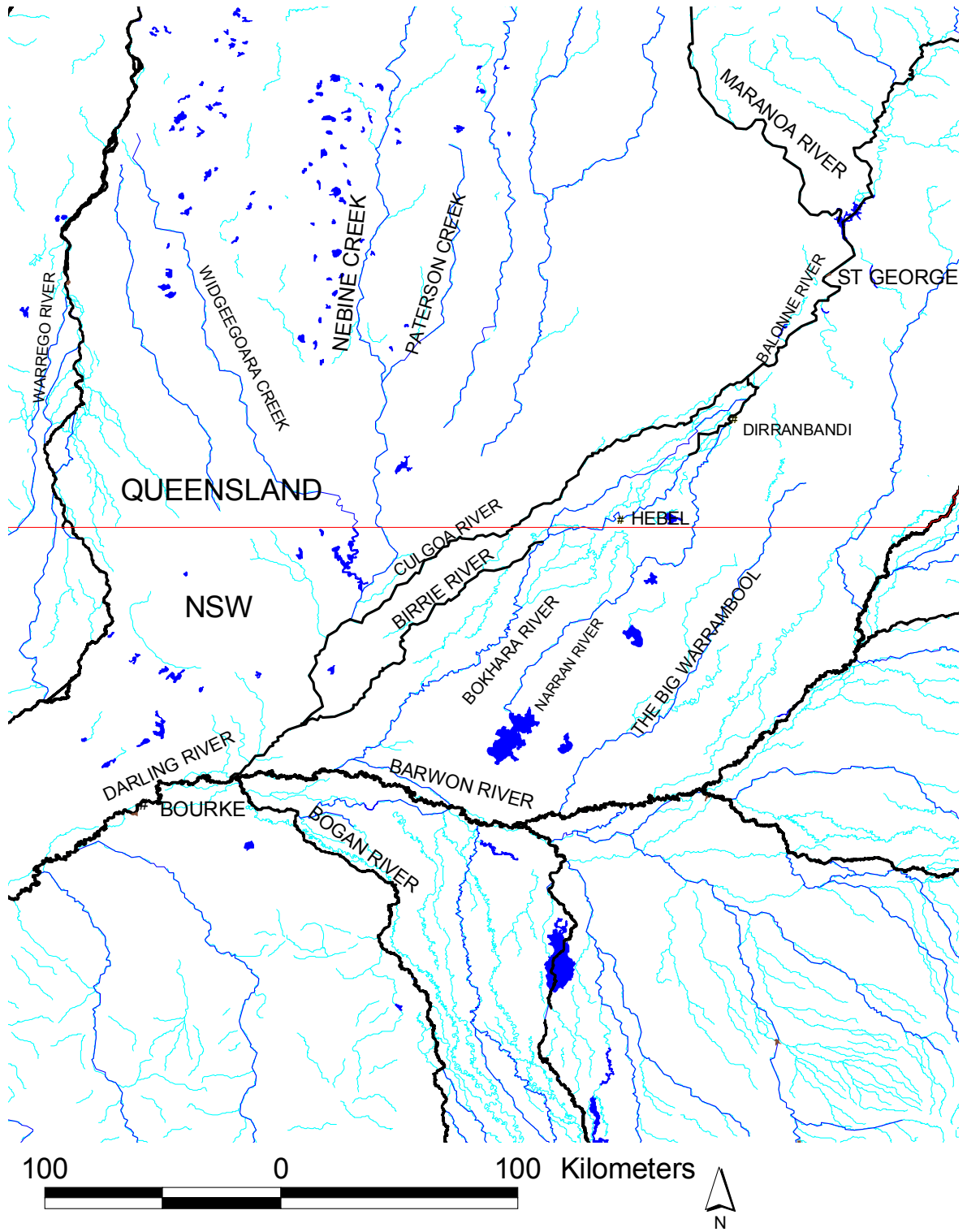


Figure 6: Balonne floodplain and region

The Balonne floodplain, similar to the surrounding floodplains, is a complex system of intersecting streams. Narran Lakes is a major wetland.

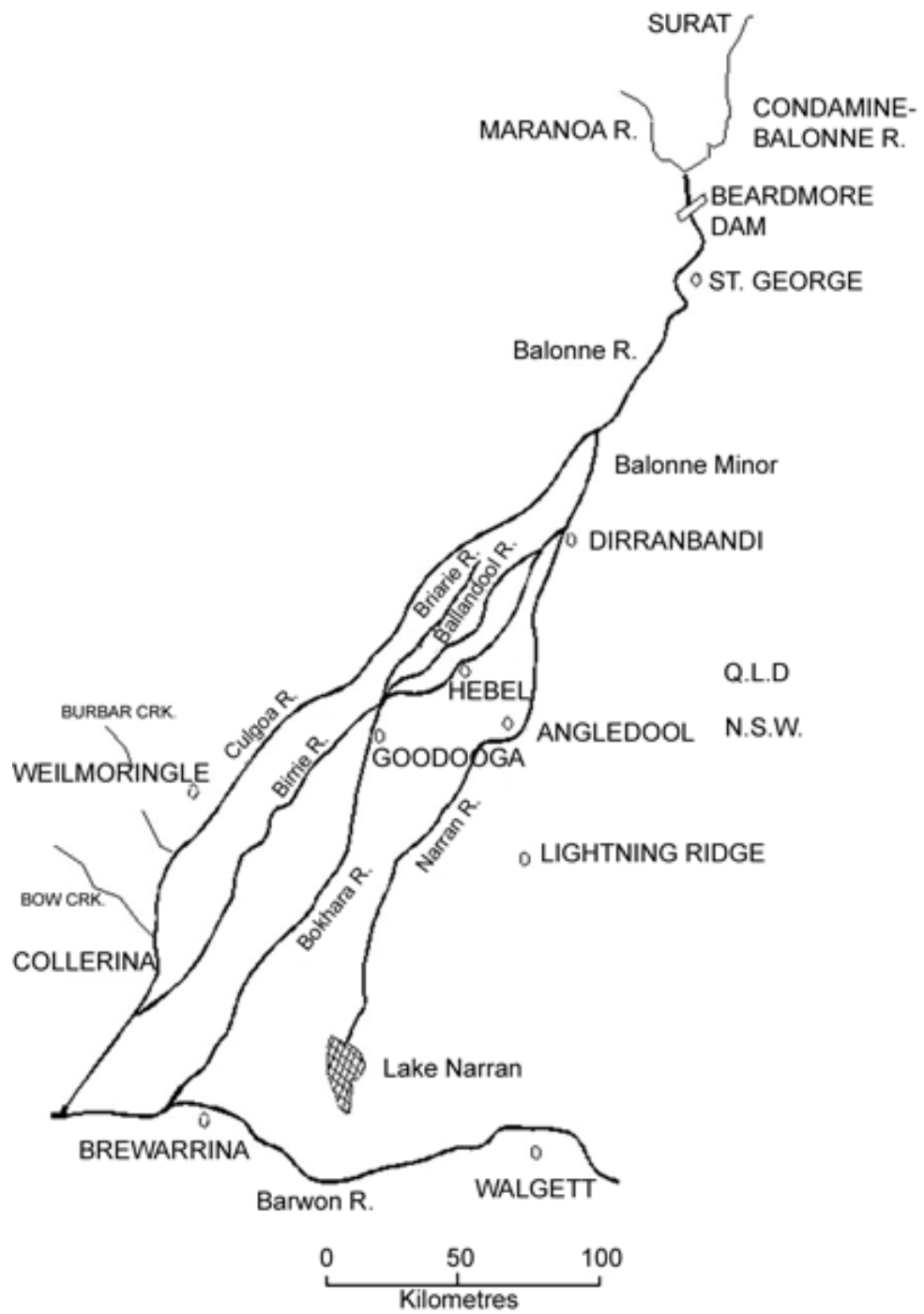


Figure 7: Sketch map of the Balonne floodplain

This map shows the major rivers and towns on the floodplain.

In the Balonne Region the slow moving floods which ran across the floodplain were seen as a blessing rather than a curse. The heavy black floodplain soils needed the soaking from floods to rejuvenate the soil and promote pasture. While floods may have inundated land for a time, and made it difficult for people and stock to move around, the benefits in terms of pasture growth were seen to far outweigh the short-term costs.

Before the 1950s both the Clarence and Balonne Rivers were relatively unmodified. On the Balonne there were small town weirs at Dirranbandi and Hebel but few other major modifications to the river. On the Clarence floodplain the government had constructed some flood control work and 'farmers unions' made up of groups of farmers had constructed some drainage works. In addition there was a small dam on the Nymboida River. The limited modification of the two rivers reflected the limited capital that land-holders had to spend on development, and the limited government focus in developing water resources in these areas.

1950s similar paths of development

In the 1950s and 1960s, however, major development came to both of the rivers. The developments on both rivers were undertaken by governments and private land-holders to provide more security and opportunity for agriculture in the areas. While similar intentions drove the developments, the type of development reflected the local conditions: on the coast there was a scheme to drain floodwater off the floodplain, and in the inland there was an increase in the capacity to store the river's variable flows.

In the late 1950s a major flood mitigation scheme was undertaken on the Clarence floodplain, which involved digging miles of drains and constructing levees along the river banks. Before the scheme the richest agricultural land of the floodplain was inundated for weeks or months following floods. After the scheme these areas were drained in a matter of days, providing more secure conditions for cropping and dairy farming. As part of the scheme large areas of swamps, or wetlands, were also drained. This scheme was the largest of its type in NSW and the Clarence floodplain became the largest regulated coastal floodplain in coastal NSW.

On the Balonne River from the 1950s to the 1970s there was a rapid increase in the capacity to store water. Private landholders, buoyed by the good prices for wool, invested in dams and weirs to provide for stock and small scale irrigation. In 1948, the Queensland Government began construction of a large weir at St George to supply water for an area of irrigated cropping. This was a pilot project, with the government testing the possibilities of irrigation in these semi-arid western regions. In the mid-1960s, following the success of the irrigation scheme, the government began construction of a dam ten times larger than the initial weir and expanded the irrigation area. The increased storage allowed the region to further diversify from grazing into irrigated cropping, mainly for cotton.

1980s and 1990s divergent directions

In recent decades the two areas took divergent paths in terms of modification. The Balonne region continued on the previous trajectory of further large-scale modification of the river while the Clarence experienced a turn-around, moving away from large-scale modification of the river.

In the 1990s in the Balonne Region there was a rapid expansion in irrigated cotton cropping. With the growth in irrigation came a massive increase in private water storages and extractions of flows from the river. The area became one of the leading irrigation areas in Australia; one property, Cubbie Station, became the largest private water owner in Australia. With the expansion of cropping the region turned around a long running decline in population. This expansion of water storage took place at the same time that parts of the Murray-Darling Basin were moving towards limiting extractions of water, and returning water to the river, in order to restore health of the river-system.

In the 1980s and 1990s, there was a change in direction in the Clarence region - from strong support for large-scale modification of the river to strong support for limiting large-scale developments, and increased efforts to rehabilitate and repair aspects of the river that had been damaged in the past. This change in direction reflected a heightened awareness of the damage from past

developments and also a social change in the region. In the 1980s the Clarence region, along with the wider north coast of NSW, experienced an influx of new residents seeking a 'sea-change'. It also experienced an expansion of the tourism sector. The region changed from a mixed agricultural area to a 'lifestyle' region. So in recent decades there has been a divergent experience of modification of rivers in these two areas, and divergent social changes, the Balonne becoming a leading area for irrigated agriculture and the Clarence transforming into a tourist and lifestyle region.

Rivers, place and change – approaches informing this thesis

This thesis is informed by two intersecting bodies of scholarship: contemporary environmental history and work on experience of place. Environmental history is concerned with broad questions of human relationships with the environment.¹³ Environmental history has an overlap with other disciplines that look at questions of people and place – such as geography. Environmental history, however, is rooted in the humanities disciplines and history especially, and holds strongly to narrative – the rigour of telling 'true stories' – as its form of exposition. Environmental history, with the broader discipline of history, engages with scientific material but resists using the scientific method. In telling 'true stories' it presents the relative, the contextual and the particular about human relations with environment.¹⁴

Environmental history as a discipline has a strong relationship to the contemporary environmental movement, which is based on a recognition of the limits of the natural environment; environmental history is sometimes referred to as 'a child of the environment movement.'¹⁵ Within environmental history, some work takes the position of informing current environment management. A recent collection edited by Stephen Dovers, for instance, seeks

¹³ While environmental history is a new sub-discipline it builds upon the work of other disciplines such as historical geography, see for instance R. L. Heathcote 1965, *Back of Bourke: A Study of Land Appraisal and Settlement in Semi-Arid Australia*, Melbourne University Press, Melbourne.

¹⁴ Tom Griffiths 2003, 'The nature of culture and the culture of nature.'

¹⁵ Lowenthal, David 2001, 'Environmental History: From Genesis to Apocalypse', *History Today*, April, vol.51, issue 4.

to provide historical perspectives to inform current policy making.¹⁶ Other work has a more critical relationship to the concerns of the current environmental movement, such as a recent collection edited by William Cronon, which interrogates the essentialist ideas of nature that inform the contemporary environmental movement.¹⁷ This thesis, in conducting localised studies of contest over modification, seeks to further understand the ways that the broad dynamics of development and sustainability play out in rural communities.

The contemporary modification of rivers has been a focus for work within environmental history. Three works illuminate the ways that this topic has been engaged with, and each illustrates different approaches developed within environmental history. Donald Worster, in *Rivers of Empire: Water aridity and the growth of the American West*, has explored development in the American West, where rivers have been dammed and diverted to irrigate land since the mid-nineteenth century. In the 1930s, another wave of development by the US Federal Government built hundreds of dams on every major river, building the cities and farms of the current American west. Worster explores how irrigated agriculture promised security of settlement for arid regions, but has had ambiguous outcomes for the region, creating severe environmental degradation, a powerful lobby of large-scale irrigators and class conflict. Worster illuminates the ways in which irrigation promises a lot and yet delivers uncertainty – increasing demand on a limited resource, fractious politics and declining river quality.¹⁸ The semi-arid west, in its physical characteristics and the history of expansion of irrigation (on a much smaller scale) bears some similarities to the inland area of this study.

In *The Organic Machine: The Remaking of the Columbia River*, Richard White explores the ways that this major river, in the northwest of the USA, has been transformed: through dams, diversions (for hydro electricity), and pollution

¹⁶ Stephen Dovers (ed) 2000, *Environment History and Policy: Still settling Australia*, Oxford University Press, Melbourne.

¹⁷ William Cronon (ed) 1996, *Uncommon Ground: Rethinking the Human Place in Nature*, W. W. Norton, New York.

¹⁸ Donald Worster 1985, *Rivers of Empire: Water, aridity and the American West*, Pantheon Books, New York.

(including nuclear pollution). He explores the ways that the Columbia River is the site of conflicting human and natural claims. He does not present this as a history of the destruction of nature, however, but focuses on what brings humans and nature together. In particular, he focuses on the ways that the river is known through work – particularly the work of fishing and the work of building dams – even if this work transforms the river. White argues that the transformed river is an ‘organic machine’ that, even in its transformed state, is natural.¹⁹ In this way White illuminates the ways that work connects us to nature, and that transformed rivers remain natural systems.

Paul Sinclair, in *The Murray River: Its People and Ecology*, explores contrasting conceptual and physical interactions with this iconic river. Sinclair explores the ways that people have sought to regulate the Murray, from efforts in the late-nineteenth century to massive post-war engineering projects. Sinclair also illuminates contrasting experiences of the river, in the ways that people have continued to feel a strong connection to the natural river, even while it is changing. He focuses on the connection to the river from artists, poets, people who camped by the river and particularly people who are drawn to the life of the river through fishing for Murray Cod. Sinclair notes that recent social changes, such as the shift to swimming in pools rather than the river, have taken people away from the river as its ecological health is deteriorating. Sinclair’s work illuminates, on a catchment-wide scale, the range of cultural and physical connections to the natural river and the persistence of the desire to develop the river.²⁰ This thesis, while it explores similar themes and concerns as Sinclair, differs in that it provides more localised studies of associations with recent changes to rivers. In addition, this thesis undertakes a comparative analysis, exploring how similar dynamics of modification play out in a coastal and inland river.

This thesis joins this tradition of exploring rivers and their transformations. To the tradition, it contributes a study of the ways in which desires to transform

¹⁹ Richard White 1995, *The Organic Machine: The remaking of the Columbia River*, Hill and Wang, New York.

²⁰ Paul Sinclair 2001, *The Murray: A river and its people*, Melbourne University Press, Melbourne.

and conserve rivers circulate and are contested in rural communities, as well as the ways that locality shapes the outcomes of these contests.

Explanations of environmental change

William Cronon, an American environmental historian, explores perceptions of environmental change in ways that are useful for this study.²¹ Cronon has analysed the accounts of the history of the Great Plains in the United States; the Great Plains experienced an expansion of agriculture followed by a 'dust bowl' in the 1930s. From an analysis of histories of this event, Cronon notes that all the histories of the Great Plains fall into one of two patterns. They are either (i) narratives of progress, in which European farmers use their knowledge and technology to make the land profitable after many hardships; or (ii) they are narratives of decline and failure, in which European farmers misread the environment, damaging it with their technology and farming methods, until they are left with a depleted and decaying environment where profitability is limited and transitory.

Cronon points out that each of these narratives, or plots, demands a particular view of the landscape on which the drama is played out, a particular view of the environment which is consistent with the unfolding of the plot. If the plot is one of progress, then the land at the beginning of the account must be seen as lacking something, either as just unproductive, or at worst, as dangerous wilderness, and it must be described as changing over time to blossom into a successfully tamed and productive garden. For the historians to identify the plot of decline, then the land must be described as having been productive and rich initially, and then to have suffered loss and damage as it was modified through farming. So these two narratives are based on a set of relationships - ideas of nature, either robust or fragile in the face of change, and ideas of human action, be it wise or unwise.

Cronon points out these narratives are not just passive explanations of events, but provide a 'moral compass', orienting people to act in certain ways. Where

²¹ William Cronon 1992, 'A place for stories: Nature, History and Narrative,' *Journal of American History*, vol 78, no 4.

it is interpreted that modification improves an area people then would support further development, alternatively where it was seen to have negative consequences, people then would act to limit modification. This study by Cronon is useful for interpreting perceptions of environmental change. In this study the points that Cronon makes about historian's explanations are particularly useful for interpreting the explanations of environmental change revealed in oral history interviews.

Contested place

The approach of this thesis also draws upon a body of literature about the experience of place and landscapes. This body of work highlights that groups with different backgrounds experience the landscape in differing ways, and that because of this difference meanings of place are contested. This work explores the ways in which our background, our values, our training, our intentions, our world views, shape the ways that we experience landscapes, and the ways that we experience changes to those landscapes as well.²² This literature is useful for understanding the ways that different groups experience changes to these rivers and understanding interaction and contestation between different views. This body of work differs from environmental history, in that ecology, and changes to ecology, is taken as just one dimension of landscape, and just one dimension of people's experience of landscape.²³

There have been a number of grounded studies of meanings of place in Australia. A rich strand of work has explored the ways that Aboriginal people and pastoralists experience the landscape. These are two groups who have close ties to land, but as groups have very different backgrounds. Veronica Strang has explored the differing ways that Aboriginal people and pastoralists

²² Bender Barbara 1993, 'Introduction: Landscape – Meaning and action.' in Barbara Bender (ed) *Landscape: Politics and Perspectives*, Berg, Providence.

²³ These ideas are also developed in work around 'social significance' in the field of heritage management. See Dennis Byrne, Helen Brayshaw and Tracy Ireland 2001, *Social Significance: A discussion paper*, Research Unit, Cultural Heritage Division, NSW National Parks and Wildlife Service, Sydney.

experience the landscape in Cape York in far north Queensland.²⁴ Strang outlines that Aboriginal people's experience of the landscape is shaped by their deep history in this same place. For pastoralists, by contrast, their interaction with the landscape is shaped by the often combative work of pastoralism. Heather Goodall's work, also looking at differences between pastoralists and Aboriginal people, shows that Aboriginal people in more heavily settled south-eastern Australia also continue to have distinct relationships to land.²⁵ Peter Read has explored the emotive dimensions of relations to place and ways that personal biography shape the meanings which place hold.²⁶

Scholars working in this area have drawn out a number of important dimensions about the ways that these meanings are contested, and the ways that groups respond to changing circumstances. Nick Gill, looking at pastoralists in central Australia, has argued that in the face of challenges from conservationists and Aboriginal people, pastoralists have actively attempted to reposition themselves and refashion their history in order to face these challenges.²⁷ Veronica Strang has also explored the ways that Aboriginal people actively position themselves in negotiations over environmental management mobilising different positions depending on the situation.²⁸ This work draws attention to the ways meanings of place are actively constructed by groups, particularly in the face of conflict and challenges.

²⁴ Veronica Strang 1997, *Uncommon Ground: Cultural Landscapes and Environmental Values*.

²⁵ Heather Goodall 1999, 'Contesting Changes on the Paroo and Its Sister Rivers', in Richard Kingsford (ed), *A free-flowing river: the ecology of the Paroo River*, NSW National Parks and Wildlife Service, Sydney, pp 179-200, Ruth Lane 1997, 'Oral Histories and Scientific Knowledge in Understanding Environmental Change: a case study in the Tumut Region, NSW', *Australian Geographical Studies*, July, vol 35, no 2.

²⁶ Read, Peter 1996, *Returning to Nothing: The Meaning of Lost Places*, Cambridge University Press, Cambridge.

²⁷ Nick Gill 1997, 'Pastoralism, a contested domain', in Deborah Bird Rose and Anne Clarke (eds), *Tracking Knowledge in North Australian Landscapes: Studies in indigenous and settler ecological knowledge systems*, North Australian Research Unit, School of Pacific and Asian Studies, The Australian National University, Canberra and Darwin.

²⁸ Veronica Strang 2001, 'Negotiating the River: Cultural tributaries in Far North Queensland,' in Barbara Bender and Margot Winer (eds) *Contested Landscapes: Movement, Exile and Place*, Berg, Oxford.

Work in this area has also focused on the factors which shape contests over different experience of place; that is, which interests in place gain recognition and which are marginalised. Writing about the upper Darling River region, an area which takes in the Balonne region, Heather Goodall has noted that while there are a diversity of interests in rivers, race and class shape which ideas are recognised in environmental and political decision making.²⁹ Johanna Kijas has explored the ways that changes in communities, specifically demographic change, shape contest over place.³⁰ Kijas has examined conflict over coastal development in the Coffs Harbour region, just south of the Clarence River region. This area experienced a rapid growth in population in the 1980s, transforming the region from mixed agricultural area to a 'lifestyle' region. Kijas explores the ways that this new group of residents value place in ways that was different to the long-term residents. This work in particular is useful for interpreting change in the Clarence region, which experienced a similar growth in population.

Taken together this literature about experience of place is useful for understanding differing meanings of the same place and some of the factors which shape contest over place. This body of work draws attention to the importance of oral history as a methodology for studying the meanings of place – each of these studies rely on oral history for accessing different meanings of place. To this field of research this thesis contributes a detailed study of the contrasting meanings that rivers hold for people in rural areas, and the ways that these meanings interact in different times and places.

Environmental management and river science

Two additional bodies of scholarship are important for the context of this thesis: work on the social and political aspects of environmental change, and work on the biophysical process of riverine change.

²⁹ Heather Goodall 1999, 'Contesting Changes on the Paroo and Its Sister Rivers', in Richard Kingsford (ed), *A free-flowing river: the ecology of the Paroo River*, NSW National Parks and Wildlife Service, Sydney, pp 179-200.

³⁰ Jo Kijas 2001, 'Contested Landscapes: The battle for Look-at-me-now Headland', in M. Cotter, W. Boyd and J. Gardiner (eds), *Heritage Landscapes: Understanding, Communities and Place*, Southern Cross University Press, Lismore.

Work in the area of environmental politics and governance is useful for understanding the management of rivers in the post-war period. Jo Powell's work provides insightful scholarship on the history of water management. Powell's work illuminates how river management agencies have responded to conflicting pressures from social, economic and environmental change.³¹ Work on environmental governance, and contemporary policy debates, is useful for understanding the current directions, and conflicts, in river management.³² Literature from rural sociology is useful for understanding the social and political dimensions of contemporary environmental change. In particular, this work draws attention to the changing patterns of agricultural production and the social dimension of agricultural production.³³

Work by river ecologists is useful for understanding the biophysical dimension of modification of rivers – rivers are complex ecological systems and they respond to change in complex ways. This research provides insights on the ways that riverine environments have responded to modification. A key point in this research is the importance of natural flow regimes for maintaining the ecological health of inland rivers, and the importance of maintaining the interconnections between rivers and their floodplains.³⁴

Reflective use of oral history – methodology

The research process for this thesis involved interacting with residents of the two areas to gain an in depth understanding of their responses to the rivers and modification of them. Conducting life history interviews was the main

³¹ J.M. Powell. 1991, *Plains of promise, rivers of destiny: Water management and the development of Queensland 1824-1990*, Boolarong Publications, Brisbane.

³² Jenny Stewart and Grant Jones 2003, *Renegotiating the Environment: The Power of Politics*, Federation Press, Sydney, Daniel Connell, (ed) 2003, *Unchartered Waters*, Murray-Darling Basin Commission, Canberra, Ticky Fullerton 2001, *Watershed: Deciding our water future*, ABC Books, Sydney.

³³ Frank Vanclay and Geoffrey Lawrence 1995, *The Environmental Imperative: Eco-Social Concerns for Australian Agriculture*, Geoffrey Lawrence, Frank Vanclay and Brian Furze 1992 (eds), *Agriculture, Environment and Society: Contemporary Issues for Australia*, MacMillian, Melbourne.

³⁴ David Mussared 1997, *Living on the Flood Plains*, W. J. Young, CSIRO Land and Water 2001, *Rivers as Ecological Systems: The Murray-Darling Basin*.

method I used to access local residents' responses to rivers and modification. In all I conducted over fifty formal interviews.³⁵ I attempted to interview people from the range of groups who had specific interests in the river system. These formal interviews were complemented by numerous informal interviews, and attendance at events and meetings in the regions, including meetings of catchment groups, water-users groups, industry groups, conservation groups, reconciliation groups and other community events, such as art exhibitions.

In the formal interviews, I asked people to reflect on their early memories of the river and the wider landscape. I asked about how they had seen it change through their lifetimes and for their analysis of these processes of change. Beyond wanting to cover these basic points, the interviews were unstructured to allow interviewees the opportunity to frame their reflections about landscape within a context which was appropriate to them – reflecting their specific interactions with the landscape and their specific personal biographies. Interviews typically went for an hour and half or more. Formal interviews were often complemented by driving around areas with interviewees, flicking through scrapbooks and photo albums or viewing home movies. Each of these activities would lead to another set of stories. I often conducted repeat interviews with people in order to follow up on particular questions or reflect on particular points in the first interview. Following the interview I would return a copy of the tapes and transcripts.

In the written word it is difficult to convey the quality of these interactions and what they revealed about the richness of relationships to landscape. It is easier to convey through spoken word recordings. Using interviews recorded for this thesis I produced a radio feature 'Five Feet High and Rising' about the experience of flooding on the Clarence River (Appendix 1).³⁶ The program also demonstrates the reflective quality of the interviews. The interviewees speak about the landscape in ways that are meaningful to them and connect with their wider world views, and personal biography – as farmers,

³⁵ The full list of interviews is included in the bibliography.

³⁶ Damian Lucas 1999, *Five Feet High and Rising – Experiencing the Mighty Clarence River*, Radio Eye - ABC Radio National, forty minute radio features, first broadcast 13 March. Addition production by Elisia Yeo, Nick Franklin and Andre Shabinov.

conservationists, Aboriginal people or young people. The program gives a sense of the ways that the landscape is experienced through the prism of each interviewee's particular experience.

The process of broadcasting this program also mirrored this reflective use of oral history. As well as being broadcast on ABC Radio National, the national broadcaster, the program was broadcast on the local northern rivers ABC radio station, serialised in five parts on the popular morning program. This broadcast included a talkback session about stories of floods, which I took part in. Response to the radio program – from interviewees and other people in the area – further informed my research in the area.

Archival and documentary research

The material from life history interviews was complemented by detailed examination of a rich body of documentary and archival material – archives of local political campaigns, local histories, documents from governmental management process, media reports and scientific reports. The archives of local political campaigns were useful for revealing residents' responses to change. The media and government material was useful for charting government decision-making and the range of views taken into account in governmental process. The scientific reports were useful for charting the growing scientific interest in modification of rivers and also for documenting the actual biophysical changes which were occurring.

As this was retrospective research, accessing archival and documentary resources depended on what was available. In the Clarence Region there are rich resources in a number of areas: archives of the flood mitigation scheme; two publications of oral histories from commercial fishers and documentation of the management of fish in the estuary.³⁷ This reflects the existence of long-

³⁷ Note: Throughout this thesis two terms are used to describe groups engaged in fishing: fishermen and fishers. 'Fishermen' has currency in communities and publications, to describe people involved in both commercial and recreational activity. However, as a gender specific term it hides women's involvement. The term 'fishers' is a non-gender specific term increasingly used in literature about fishing, however fishers does not wide currency within communities. Given this situation both terms are used in this thesis.

running environmental and professional groups which have held records. In the inland area there were very good published local histories. The recent conflicts and government processes also have generated a rich source of documents (often available on the web). In both areas I had good access to a range of people for oral history interviews. So while there were some differences in access to written resources, there was overall parity in access to research material.

Structure of the thesis

The body of the thesis has four sections. Each section deals with one locality in a particular time period and each section has two chapters. This structure offers a way for key themes of this thesis to be explored – how the benefits, or negative consequences, of modification are perceived in particular times and places. The rivers and the issues affecting them are not the same, so the sets of chapters are not mirror images but pick up and explore key parallel themes in each area.

Section I on the Clarence River and Section II on the Balonne look at the two areas in the 1950s and 1960s, when there was widespread support for modification of rivers and major developments were undertaken in both areas. Section I explores a major project to mitigate the effects of floods on the Clarence floodplain, so chapter 1 looks at the ways that scheme was seen as beneficial for the area, and chapter 2 looks at the ways that this scheme was seen to have negative consequences for the region. Section II explores the expansion of water storages on the Balonne River, both small storages on private properties and a series of large public dams built to support irrigated cropping. Chapter 3 looks at the ways that this process was supported in the area, and chapter 4 at the ways it was seen as having negative impacts on valued aspects of the river system.

The last two sections, Section III on the Clarence River and Section IV on the Balonne River look at the two areas from the 1980s to recent years, a period during which there has been fragmenting support for large scale modification. From the late 1980s, large scale development continued on the Balonne River, in the form of large scale irrigated cropping for cotton. On the Clarence,

however, there was heightened recognition of the negative consequences of development. The region turned away from large scale modification projects and increased efforts to restore the health of the river.

Chapter 5 (Section III) takes a micro approach to this turn around on the Clarence River and looks at debates surrounding a large-scale outbreak of fish disease on the Clarence River in the 1980s. The outbreak of this fish disease served as a strong indication that the health of the river had declined. Chapter 6 takes a broader view, exploring the ways that the area turned away from a path of continuing modification and towards attempting to repair past damage. Chapter 7 (Section IV) looks at the continued support for large scale corporate irrigation development in the Balonne region. Chapter 8 explores the opposition to this wave of modification. In this period there was increased involvement of interests from outside the area and interventions from the Murray-Darling Basin wide reform agenda. The conclusion draws together the themes which have been developed in these comparative sections.

Section I – Controlling Floods, Clarence River 1950s and 1960s

Chapter 1

Transforming the floodplain

You see I've been interested in drainage all my life.

John Ensbey, Dairy Farmer, Lawrence 1998¹

The seeds of national disaster lie in Australia's present neglect of the science and technology of water use.

C. H. Munro, Director of the Water Research Foundation of Australia, Grafton 1959.²

There are these great entangled stories within stories when you begin to look into the archives of flood mitigation on the north coast.

Gillian Mears, writer³

¹ John Ensbey, Interview, 24 July 1998. Note: Quotes from interviews are presented in *italics*.

² C.H. Munro 1960, 'Problems of Planning in Valley Development', in A. Dunton (ed) 1960, *Clarence Valley Development, Problems of Water Utilisation Communications and Populations, Proceeding of Conference, Grafton, October 23-25 1959*, Clarence Regional Office, Department of Adult Education, University of New England, pp3-4.

³ Gillian Mears 1998, *Clarence River – A contribution by Gillian Mears for Radio Eye*, (in possession of author).

In the decade from the early 1960s the Clarence floodplain was greatly transformed. A large-scale engineering project was undertaken to reduce the negative effects of flooding on agricultural land and reclaim swamps for agriculture. The alluvial floodplain soils provided the richest agricultural land in the region, however this land was also frequently inundated by floods. With each flood massive volumes of water would rush down from the mountains, rise up over the river banks, push out to the edge of the floodplain inundating all low lying areas. Before the massive engineering scheme the low lying agricultural and grazing land would be submerged for weeks, or even months; only the higher ground would stand above the sea of brown floodwater. The lowest points of the floodplain were never dry – they formed wet pastures and wetlands, which were used occasionally for grazing and provided a breeding ground for a range of water-birds. On the Clarence floodplain turning a profit from farming was always difficult. Profit margins in dairying, sugar cane, grazing and mixed cropping were very tight – the damage from floods adding another burden to the job of running viable properties.

After the engineering works the effect of flooding was greatly altered. Flood water was quickly drained off agricultural land, most land would be dry within a matter of days, instead of weeks or months. In addition, levees built on top of the river bank kept small floods within the river channel and out of agricultural land. Low-lying wet pastures and wetlands, such as the Everlasting Swamp and Harrington Swamp, were also drained, reclaiming these areas for agriculture and grazing. The engineering works provided much more secure and reliable conditions for dairy farming, grazing and cropping on the floodplain, taking some of the flood risk out of farming on the floodplain.

This engineering work was carried out by the Clarence River County Council – Flood Mitigation Authority (CRCC), which was formed in 1959. At its peak the County Council employed over 100 field staff and seven large dragline excavators worked seven days a week digging out drains. In some cases the draglines travelled on log rafts in order to drain wetlands, which were planted

with sugar cane just weeks later.⁴ Before the work by the CRCC individual farmers and groups of farmers had carried out some drainage work; however these groups had very limited resources. The Flood Mitigation Authority, brought a much greater degree of resources, professional expertise and technology to the task of flood protection. In all it constructed over 100km of drains and 270km of levees. After these engineering works the Clarence floodplain became the largest managed coastal floodplain in NSW, covering 600km² with 160 different drains.⁵ The Flood Mitigation Authority also carried out extensive works to protect the major towns in the region, all of which were built along the river.⁶

This section, made up of two chapters, explores the ways in which the modification of the floodplain was supported and challenged. This first chapter explores the range of interests which supported this transformation of the floodplain, it explores the interests of local land-holders, government agencies and the engineers responsible for implementing the scheme. The following chapter focuses on the concerns held at the time about negative impacts from this development; it also explores the recognition which these concerns gained at the time. Both chapters are attentive to the particular experience of the landscape which informed these perceptions of modification; these two chapters are also attentive to the broader context of strong support for modification of rivers which framed public debate at this time. These chapters provide insights into the perceptions of the floodplain landscape, and modification of landscape, which circulated in this time and place.

Damaging floods, difficult times

A series of floods in the 1940s and 1950s heightened the difficulties of farming on the Clarence floodplain. Farming had always been difficult in this region; farming families gained small financial returns for the effort farming demanded. However a string of floods in the 1940s and 1950s made the

⁴ Ian Dinham 2001, 'The Clarence Floodplain Project', Stuart Blanch (ed), *The Way Forward on Weirs Conference Proceedings*, The Inland Rivers Network, Sydney, Proceedings of Conference, 18-19 August 2000, Sydney, pp177-178.

⁵ Ibid.

⁶ This chapter focuses on the changes to agricultural land.

situation even more precarious. With the bout of flooding it was even more difficult to maintain viable commercial land-use, and to sustain vibrant rural populations on the Clarence.

There hadn't been a big flood in the region since 1928; then from 1945 there were a run of them. The river flooded nineteen times in a period of ten years, with the 1954 flood being the highest recorded to that time, larger than the monster flood of 1893. Older people in the area still recite the big flood years – 1945, 1948, 1950, 1954, 1955, 1956, 1959 – each one a peg for a host of shared memories.

The richest land was on the fertile alluvial floodplain soil; this was also the land which was affected by floods. These coastal floods came up quickly, just a few days after heavy rainfall in the mountainous catchment. During these large floods the usual markers of settlement on the floodplain – roads, railways, fences, creek – would be covered by floodwater. Only the higher ground – the high river banks, some lines of trees, the roofs of houses, towns built on high ground – would be visible; islands with the normal connections between them covered by a sea of brown water. A complex maze of currents formed in old depressions on the floodplain as water sought out the lowest ground. Floodwater would cover crops of maize, potatoes, sugar cane and the improved pasture relied on for grazing and dairy farms. Continuing rainfall in the mountains would hold the flood level up for days.

As the flood peak passed and the river level fell, water ran off the floodplain, draining down creeks back into the main river channel. Slowly the roads, pastures, houses, fences and cane fields, emerged from the floodwater. However low lying areas, such as the 'back swamps' on the edge of the floodplain and the depressions at the foot of the high river banks, would be submerged for weeks or months.

For farmers on the floodplain the effects of flooding lasted long after the initial flood peak passed. Some crops and improved pastures could survive being submerged for a few days, but anything longer and the quality of the crops and pastures would be severely damaged. For instance, sugar cane could survive inundation for three or four days, however after this time it would

become stressed reducing its growth and sugar content. With the frequency of flooding in the 1940s and 1950s many areas did not dry out before the next flood broke over the river banks and spread across the floodplain.

Media reports of the 1950s floods emphasised the drama of floods, their destructive nature and the disruption to the community. A Cinesound Newsreel from 1954 focuses on the destruction to communities and agriculture caused by the flood. Over visuals of people loading dead cattle onto a truck, rebuilding a bridge and cleaning up mud from a town the deep-toned narrator says,

Grim havoc in the wake of the worst flood disaster in the history of the New South Wales north coast. . . . 23 people died, millions of pounds of damage, homes washed bodily away.

Now these stricken people are struggling to start all over again – that takes courage.

Cattle losses are appalling, foul mud and slime covers everything.⁷

This Newsreel, broadcast across Australia, presented coastal flooding as a natural disaster and noted the resilience of rural communities in responding to its damaging effects.

Many people from the Clarence have their own memories and stories of the floods of the 1950s. These stories include recollections of hardships and the closeness of the community in coping with disaster. When I say to local people from the Clarence that I'm interested in researching people's experience of floods and flood mitigation, numerous people tell me that John Ensbey would set me straight on a farmer's perspective on floods and flood mitigation. They say that he was actively involved in flood mitigation in its early days. I take up this advice. John Ensbey and his partner Norma are generous with their time and memories of the past, happy to speak about events from years ago, occasionally pointing to maps and old reports to illustrate a point, or gesturing down toward the river, which is visible from their house on the hill in the village of Lawrence. John Ensbey says that he has often been

⁷ 'Grim Floods', Newsreel, 1954, National Film and Sound Archive n.d. *Clarence River District: Moving memories 1920s - 1970s*, National Film and Sound Archive, Canberra.

interviewed by researchers, usually about changes in the dairy industry, because of his profile as a leading dairy farmer. When I ask him about flood mitigation he says, that if you want to understand it you have to understand the experience of the floods of the 1950s and the damage these floods caused to farming.

Experience of destructive flooding

John Ensbey tells me that he has seen a lot of floods. Every flood, small or large, would wash over his family's dairy farm right on the banks of the Clarence River at Lawrence, down river from Grafton. John is the fifth generation of his family to manage this land, it was part of a block which his great great grandfather had selected in the 1850s. John has seen more than fifty floods – the 1928 flood was his first big flood, which he thought was really fun. Then there was a break until 1945, which was the beginning of the string of floods,

My memories of those floods started with the one in 1945, I wasn't married then, I was still single, and I thought that first flood in 1945 was really nice, we had quite a bit of fun in it.

Then we had another in 1946, then I began to think that this was not as good as it first looked. They continued into the early 1950s when we had two really big floods one in 1950 and one in 1954.

John's experience of floods was shaped by his experience as a dairy farmer and the difficulties in maintaining production and productivity following a flood. With pasture and milking sheds under water he would have to take his dairy herd to higher ground. With this moving about and poor quality feed, his cows would not produce as much milk, resulting in less income. John Ensbey remembers floods as a time of hardship for himself and the wider community,

And on my own particular farm, when we had a flood, we'd take the cattle away to the hill, the hills at Lawrence.

We'd try and milk them there, but you would get no income from them.

And it'd be probably six or eight months before you ever got any income back from the dairy. So that made it very hard.

I mean you . . . So you're all this period of time without any income at all.

And then I think that you've got to give credit to the little township of Lawrence, where you had a butcher and a baker and store and a petrol station.

And these people had to stand to you for that nine months or so, because you had no money to pay them. And you still had to get your groceries, and what have you, and it wasn't easy to go along to the local establishments and say well I can't pay you for this, it will be probably six months. . .

And without them we wouldn't have existed.⁸

Norma, John's partner, remembers the mundane hardship of living with continual inundation. With parts of their property underwater, milking cows in the morning meant bundling up her two young babies, placing them in an unstable river punt and rowing across ponded water to the milking sheds, repeating this process each day that water inundated their property. There was no relief once she returned home with water and mud throughout the house, up to the windowsills at times, they both joke. Gumboots had to be worn inside the house as well as outside. Recalling this time she remembers staying awake through long nights listening for the updated river heights and flood warnings on the local ABC radio station. One particularly tense night the only song the announcer played between flood reports was the popular song *She Wore a Ruby Red Dress*. Even now, over 40 years later whenever she hears that song her body shivers, she says.

For dairy farmers on the banks of the Clarence river, floods were experienced as challenging the very existence of farming communities. In times of hardship the support of the local community was relied on, and tested. With

⁸ John Ensbey, Interview, 24 July 1998.

less income from farms there was less money circulating around the whole community.

The areas of the floodplain closest to the riverbanks had the richest soils for dairying and cropping but were prone to flooding and the effects of lingering inundation. The break in continuity of production from flooding compounded the difficulties of running a viable property. Dairying on the north coast was a tough industry with tight margins and low returns. Dairying had peaked in the Clarence in the 1930s with over 300 farms. By the mid 1950s it was down to 150, with land use switching to a mixture of grazing and cropping. Floods added to the problem of maintaining adequate farm income to support a family and service any farm debts. Farming families relied on long hours of family labour to keep costs down, children would often have to tend to milking cows before school. Women from this generation joke that the only break they had from the farm was going to the local hospital for childbirth. Childbirth and the short time recovering afterwards was often called 'mother's holiday.' Local residents emphasise the ways in which they 'made do' under these difficult circumstances.

John Ensbey remembers this as a period when many people left the area, pushed away by floods and poor prospects, pulled towards the cities where there were more stable work opportunities:

From 1945 to the mid 1950s, people of my age who had just married, and had just come back from war, found that there wasn't sufficient income because of floods, they sort of decided that they would have to look further afield. . . .

There was a lot of people that went away from the area, that went to the cities, mainly because there wasn't sufficient income to keep them here. And there was literally hundreds of them.

And that was when dairying on this river collapsed, because people couldn't manage to milk cows in flood periods; the space of time of not having an income, they couldn't sustain that, so they left. And you find that dairying sort of collapsed in those years.

In this way the floods were experienced as a threat to viable properties and vibrant communities.

John Ensbey says that he too felt this pressure to leave the district. However he says that he made a strong decision to stay in this place, where for decades his family had made a home, had been part of the community and had worked the land,

*I decided to stay simply because I felt that the area still had a future.
And I had to plan that the flood wasn't going to destroy me, that I was going to stay up on top of the flood.*

Doing something about flooding — local farmers

John Ensbey says that if he wanted to stay in this place, on this farm, he knew he had to do something about flooding on his property. His way of maintaining continuity of production focussed on two solutions, finding ways to stay productive during a flood and working on drainage to get water off the land. John Ensbey's efforts in improving his farm are indicative of wider ideas of progressive farming during this period – continually applying new methods and technologies to farming.

To keep producing during a flood he rebuilt his milking and feeding sheds above the flood level, positioning them on top of high mounds of earth. He also shifted to grain feeding his herd, rather than relying on his own pasture. Grain could easily be stored and then fed to his herd through the period of floods. In this way he could *produce above a flood*, and not need to move his herd to higher ground. Switching to grain feeding also increased his milk production by 130%. He says that he was the first in the valley to try this innovation.

John Ensbey also set about working on a drainage system to remove floodwater from his property. Floodwater would inundate much of his 60 acre property, making it difficult to use the low-lying areas productively. One of the lowest areas of the farm was a depression at the foot of the river bank which was almost continually swampy. In 1954 he persuaded his father and his neighbour to work with him to construct a drainage scheme for their adjoining properties, *My great grandfather started draining when he first settled*

here. Now I convinced them [my father and neighbour] to undertake more drainage work to get rid of this flood water.⁹ John Ensbey, his father and his neighbour, used the knowledge and resources at their disposal to reclaim this swampy land and improve their drainage.

Working on this drainage project was fulfilling a long held desire,

I've been interested in drainage all my life.

From the first flood I saw in 1928, I felt you had to overcome flooding if you wanted to stay in production.¹⁰

An agricultural report from 1968 also noted John's long-held interest in drainage, 'by his own admission he has thought and dreamed of drains as far back as he can remember.'¹¹ The destructive effects of the 1950s floods provided the impetus to put focused effort into these plans.

Experimenting with drainage was just one part of a broader strategy for increasing farm productivity. In the early 1940s he had spent some years serving in the army, in the 15th Motor Regiment. During his army service he became aware of some new possibilities, particularly with mechanisation, which he wanted to apply to his own farm and the share farming which he was also doing at the time,

Some of the things I saw around Australia during my army career I wanted to put into practice when I came home. So I bought a tractor, which was something out of the norm, because we worked the farm with horses, you'd follow a pair of horses all day long. But I wanted to be a bit more progressive and do more work.

And that was a trial on its own. The first tractor was on steel wheels. And if anything went wrong with the tractor you'd have to fix it yourself, there was no servicemen to service it.

⁹ Ibid.

¹⁰ Ibid.

¹¹ G.J Shaw and B.F Fitzgerald 1968a, *A report on the effects of flood mitigation work works on four farms in the Clarence Valley*, Clarence River County Council - Flood Mitigation Authority, Grafton, p 1.

And so that taught me quite a lot. I studied quite a lot about engineering and mechanics, and that has been an advantage to me through my life.

In the 1940s and 1950s applying mechanised technology to farm production was a major innovation in agriculture – shifting from horse and human labour, to machinery powered by internal combustion engines. John Ensbey says that he always had a knack for working with metal and machines. He says that learning metal work at school set him up well for the years of working with machinery and metal around the farm – tractors, pumps, grain feeding systems – he could fix them all. During the 1960s sugar cane harvesting also became mechanised, the back breaking work of cutting cane, usually carried out by gangs of seven men, could now be carried out by one machine. John Ensbey remembers that when he was young and cutting cane he never thought it would be mechanised because it was such a difficult job. Machine harvesters along with frost resistant varieties, he says, allowed cane to expand greatly on the Clarence. Farmers valued this shift from horse power and human labour to machine power because it offered ways to increase production and productivity.

However John Ensbey was not satisfied with his attempt at drainage, *But these drains we built, with our engineering skills of the time, we didn't understand drainage well enough, and they weren't very successful, though we spent a lot of money on drainage.* The drains reduced the time of inundation for the high areas from seven weeks to two weeks; however they could not remove the lowest 18 inches of water which covered the lowest 'swampy' part of the farm.

Many floodplain land-holders, similar to John Ensbey, also attempted drainage works on their farms. Along with work on individual properties groups of land-holders were actively involved in Drainage Unions, which worked co-operatively to build, maintain and operate drainage systems. There were 15 Drainage Unions on the Clarence River in the late 1950s. However the Drainage Unions had limited skills and resources; and the string of floods in 1950s highlighted their limitations.¹²

¹² Ibid, p 8.

Government support for drainage works

The drainage works of individual farmers and Drainage Unions were enhanced in 1959 with the formation of the CRCC. The CRCC brought greater resources to drainage than local land-holders could previously muster.

Gordon Macartney, the first chairman of the CRCC, is strongly associated with making the scheme a reality. He was a councillor on the Grafton City Council and the manager of the Peters Dairy factory in Grafton. John Ensbey clearly remembers Gordon Macartney's crucial role,

He saw the 1950s floods and he thought that something should be done about them. He got around to organising meetings up and down the river, to find out what people felt. Of all the proposals put forward the thing that people were most worried about was floods. As far as pastures and what have you on the agricultural side, floods were number one.

So after a lot of meetings they formed a County Council, a Flood Mitigation County Council, and this came into being in the '60s and they started to drain some of the areas around Ulmarra and around Sportsman's Creek. And the results of this drainage was really beneficial, because these areas that were drained would have water on them for quite a long period of time, up to nine months, after a flood.

Many land-holders welcomed this drainage scheme, seeing it as offering freedom from the damage caused by floods. In 1959 a correspondent wrote to the local newspaper supporting this work,

The cowcockies are still dwindling in numbers as more and more are forced off their land by the flood, drought and price factors. The residue, weary of limb and light of pocket, are battling on hoping the flood mitigation works will improve their lot.¹³

The work of the CRCC was strongly supported by local, state and federal governments. The CRCC was formed by the four local councils which covered the Clarence floodplain.¹⁴ The NSW Department of Public Works (DPW) assisted the County Council with its skills in investigating, designing and

¹³ Lien Chi Crow, letter to editor, *Daily Examiner*, 19.4.59

¹⁴ Grafton, Nymboida, Copenmanhurst and Maclean local councils.

constructing civil engineering projects. Much of the scheme was funded by a 'four to one' funding model, for every dollar the local councils contributed the state and federal governments each contributed two dollars.¹⁵

The flood mitigation project encompassed the whole floodplain. The CRCC, with the support of the DPW, mapped the floodplain through a series of aerial photographs, monitored the complex flood flows, and created scale models of the floodplain to test out levees and drainage strategies. It divided the floodplain into twenty one 'maintenance areas' and developed plans for the best way to drain each area. The CRCC employed engineers to design and construct levees, drains and floodgates. It hired contractors with large earthmoving and construction equipment to dig out the drains and construct levees, floodgates and rock walls. The CRCC had the overall intention of draining all water within three days of a flood, a timeframe which suited crops such as cane.

Along with rapid drainage of floodwater, the CRCC also drained the permanent and semi-permanent freshwater swamp lands, such as the Everlasting Swamp, behind Lawrence. These areas were very low, many only a few feet above sea level, which meant that local rainfall and floodwater collected there. It also meant that draining them was a complex task. The CRCC drained these areas to reclaim this land for agriculture and grazing. The CRCC also intended to use these areas as 'temporary storage areas' during floods. Having these areas dry before a flood came allowed some capacity for storage of flood water, limiting levels of floodwater in other areas of the floodplain. Once the flood peak passed the water would be drained back into the main channel.¹⁶

The CRCC intended that this engineering work would not only provide benefits to individual land-holders, reducing their flood risk, but would provide benefits for the whole community. As it noted in a 1968 report, 'Continuity of production and services will benefit all sections of the

¹⁵ John Enseby, Interview, 24 July 1998. Ian Dinham 2001, 'The Clarence Floodplain Project', in Stuart Blanch (ed.), *The Way Forward on Weirs Conference Proceedings*.

¹⁶ E.W. Harrison 1960 'Problems of flood mitigation' in A. Dunton (ed) 1960, *Clarence Valley Development*.

community and it is expected that various intangible benefits such as improved health and morale will follow.¹⁷

The state and federal governments supported the flood mitigation works on the Clarence as part of a broader government agenda of investing in water infrastructure projects to enhance rural development. Large-scale water engineering projects, such as drainage schemes, along with dams for irrigation, flood control and hydro-electricity, were seen as an important instrument for achieving a range of outcomes: creating opportunities for individual land-holders; supporting rural industries; enhancing regional development and in turn contributing to the growth of the national economy. In the early 1960s the federal government was still completing work on the Snowy Mountains Scheme, a critical part of Australia's post-war redevelopment effort. The NSW Government had also embarked upon a massive program of constructing large water storage in catchments across the state (see Table 1).

The NSW Water Conservation and Irrigation Commission (WCIC) noted in a 1971 publication that the completion of so many dams in NSW, along with the Snowy Scheme, 'made the nineteen-sixties outstanding in the history of the State's achievements in water storage.'¹⁸ As well as investing in flood mitigation on the Clarence River the state government also supported flood mitigation works on other north coast rivers, including the Tweed, Richmond and Macleay Rivers.

¹⁷ G.J Shaw and B.F Fitzgerald 1968a, *A report on the effects of flood mitigation work works on four farms in the Clarence Valley*, p 7.

¹⁸ Water Conservation and Irrigation Commission 1971, *Water Resources of New South Wales*, NSW Government Printer, Sydney, p 118.

Table One: Major water storages completed in the late 1950s and 1960s¹⁹

Storage, year completed	River, nearest town
Burrinjuck 1956	Murrumbidgee, Yass
Eucumbene 1958 [^]	Eucumbene, Adaminaby
Glenbaw 1958	Hunter, Scone
Tantangara 1960 [^]	Murrumbidgee, Cooma
Keepit Dam 1960	Namoi, Gunnedah
Menindee Lakes Storage 1960	Darling (adjacent), Broken Hill
Hume 1961 (enlarged)	Murray, Albury
Jindabyne 1967 [^]	Snowy, Jindabyne
Burrendong 1967	Macquarie, Wellington
Blowering 1968 [^]	Tumut, Tumut
Pindari 1969	Severn, Inverell
Wyangala 1971 (enlarged)	Lachlan, Cowra
Copeton*	Gwydir, Inverell
Toonumbar*	Iron Pot Creek, tributary of Richmond River, Kyogle

Note: [^] indicates part of the Snowy Mountains Scheme, * indicates that work commenced in late 1960s.

Unlocking the landscape's productive potential

The flood mitigation scheme was intended to increase the production and productivity of farms on the floodplain. A report by the CRCC on the benefits of flood mitigation reveals the ideas of 'improvement' which informed these engineering developments.

In 1962 John Ensbey's farm was selected by the CRCC for a study of the benefits of flood mitigation works. It was one of four farms selected as model

¹⁹ Ibid, Appendix 2 pp 195-207 documents all large storages in NSW.

farms to demonstrate the potential of flood mitigation. John Ensbey's farm was a model for dairy farms; the others were one each of beef, sugar cane and mixed beef and dairy. The report's authors noted that the particular farms were selected to demonstrate the productive potential of the district:

The basis of this selection was chosen in the hope that it may show the potential of floodplain, given flood mitigation works and an enterprising and keen agricultural population. . . the full potential of land can only be realised after the construction of flood mitigation works, and without those works no amount of capital, enterprise and agricultural knowledge will be able to work efficiently.²⁰

The authors argued that reducing the damaging effects of flooding was critical for unlocking the productive potential of the area.

On John Ensbey's farm the CRCC extended the drainage works which he had begun. It constructed a series of drains across the property and installed a sump drain and an electric pump to remove water from the low point of the property. Finally, it constructed levees on the river bank to stop small floods from running over the bank. This work was carried out over five years with some of the costs being picked up by John Ensbey.

Areas which before any drainage works had taken six to eight weeks to drain could now be drained in four days. With the electric pump water could also be drained completely from the lowest points on the farm. Thirty acres of 'swamp' could now be used for cropping rather than just swamp couch. Twenty-two acres where crops were at 'high-risk' of being destroyed by floods could be confidently cropped.

The CRCC's report of this trial gives a clear narrative of improvement from this intervention,

Before any drainage works were constructed this farm was one of the least-favoured on the river. It was prey to floods which townspeople would not even notice, and only a small percentage

²⁰ G.J Shaw and B.F Fitzgerald 1968a, *A report on the effects of flood mitigation work works on four farms in the Clarence Valley*, pp1-2.

of the land was capable of the development needed for it to give adequate returns to the labour and capital applied.

There have been spectacular increases in production since the completion of the drains. . . The drains and levee have given the land security against flooding, which in turn has given the farmer the confidence necessary to go ahead and try out new management techniques, new crops and new pastures. . . Production and income are still rising as old techniques are replaced by new techniques discovered through experimentation and analysis.²¹

The report noted increases in all areas of the farm – increased potatoes, maize and butterfat production– and continuity of income across flood years. It also described improvements in farm financing, ‘The stabilisation of the farm through flood mitigation has contributed to an increase in the willingness of Banks to lend money for farm improvement.’²² The report also noted benefits in terms of family continuity on the farm,

A further benefit of the Flood Mitigation works and subsequent production increases is the retention of the young population, in this case the two sons of H. J. (John) Ensbey. Both these young men are being paid slightly more than award wages, and they will eventually take over the farm between them.²³

The report, prepared by the staff of the CRCC, outlined the benefits of this type of farm improvement, a positive change from being troubled by floods, to a future with increased productivity and the ability to hold young people on the family farm. The report also indicates the convergence of interest, with the Flood Mitigation Authority furthering improvements which were began, and desired, by local land-holders. Flicking through this report thirty years after it was written John Ensbey says, *There’s a lot in that report*. He recalls that

²¹ Ibid, p 1.

²² Ibid, p 6.

²³ Ibid, p 2.

this report was used, successfully, as part of a lobbying effort to gain extra funding for flood mitigation from the federal government.²⁴

Local reflections on the benefits of modification

John Ensbey's experience of flood mitigation is typical of many land-holders in the area. Thinking back over his years of living in the area, he says that *flood mitigation is the best thing which happened to this valley*. Flood mitigation was seen by land-holders as giving them the resources to realise strongly held desires – reducing the problems caused by floods to allow farmers to 'get ahead'.

Reflecting on his years of farming on the Clarence he places these improvements in the context of his long family heritage of working in this place,

If you love the land then you work with the land, you want to preserve the land.

My great great grandfather came here and cleared the land, went through hard times to try and establish himself and then the generations down.

And I feel proud today to be able to say that we're producing more per acre today than what probably my father, or my grandfather or his grand-father before him produced.

*It's in your blood and you learn with experience.*²⁵

John Ensbey speaks of his role, in continuity with the male generations before him, as a steward of the land, caring for the land, while improving it to increase productivity. Flood mitigation was experienced as furthering these deeply held values, securing this way of living on the floodplain. John Ensbey's sons continue to run a dairy and cane farm by the river. It is one of a handful of dairies left in the district – John Ensbey describes it as a progressive farm and a very good business.

²⁴ John Ensbey, Interview, 24 July 1998.

²⁵ Ibid.

Other local farmers also speak of the benefits which came about from flood mitigation. Frank Clark is a fourth generation farmer from Southgate, near Lawrence. His property is also located on the rich alluvial soil right on the banks of the Clarence River. Like John Ensbey he recalls destruction caused by large floods, and the nuisance caused by small floods, both of which inundated his family's property. He speaks of the problems caused by the swamps such as the Everlasting Swamp. He also speaks of the benefit to his farm and the area from flood mitigation, *I regard flood mitigation as one of the greatest things that happened in the valley in my lifetime.*²⁶ He served on the CRCC for many years, as a representative of the Copmanhurst Shire Council, of which he was a member for over thirty years.

After talking for a while about the flood mitigation scheme we go outside for a walk up to his old milking shed, a short walk which brings to the surface many stories from his childhood. The dairy isn't used as much nowadays with sugar cane being grown across a lot of his property, which he still runs with his children. He stops his explanation of dairy farming to say how much the place has changed. He tells me that when he was young the farm ran on horse power – horses were used for everything and most crops were grown to feed the horses; some butter was sold from the dairy, with extra milk fed to pigs, and also some cane grown and sold. This was subsistence farming, where there was a constant struggle to provide enough and to make any money. Frank has seen the first tractors, improved pastures, transport shift from river to road, and an end to the problems of flooding in the area. Now he can look across his place and see the expansion of cane on what used to be dairy country. The river has been at the centre of these changes. He remembers the trouble of loading goods on the river barges and the trouble caused by floods. He looks around his property and says that he has seen a lot of changes in his day, and they have all been good.²⁷

Farmers on the Clarence have constantly sought to make improvements to increase the productivity of their properties – to control and enhance their

²⁶ Frank Clark, Interview, 28 July 1998.

²⁷ Ibid.

environment. Since settlement in the 1850s, settlers have experimented with new methods and practices, working between what could be produced in this place and what markets valued. Farmers continually tried out new crops, new types of stock, new farming techniques and new ways of working the floodplain; attempting to use the land more intensively and more productively. For local land-holders flood mitigation was experienced in continuity with a history of innovation in this place, providing additional tools to confront the hardships of living on the floodplain.

An engineer's view – improving the landscape

The actual work of the flood mitigation scheme was carried out by professional engineers – the County Engineer was the most senior manager at the Flood Mitigation Authority, overseeing and directing the work program. Other engineers carried out the investigations, designs and then oversaw the individual constructions. For local land-holders their view of the drainage works was shaped by their particular experience of running properties on the floodplain. This experience was further informed, for many, by the memory of previous generations working the same land. Engineers, by contrast, were generally from outside the area. They viewed the flood mitigation works, and the floodplain landscape, through the prism of their professional practice – what they had learnt in their professional training, their experience of working for the Flood Mitigation Authority and other public works agencies. Engineers' experience of flood mitigation adds another layer in understanding the ways that the transformation of landscape was viewed.

* * *

Ori Pastega had promised to take me to look at some of the drains he had worked on. We had talked about the drains, and I had read about them but Ori said that you could only really get a sense of the work they did when you actually saw them. One windy July afternoon I take up his offer.

Ori worked as an engineer for the Flood Mitigation Authority from 1964, five years after it was established, until the mid-1980s. Over these years he developed a strong knowledge of floods, how they moved across the

floodplain and how to control them. He also used his knowledge to provide information on flood rises during floods – his predictions are regarded highly by residents on the floodplain. Ori continues to live in the area, right by the banks of the river, which has been the focus of his work for so many years.²⁸

To begin, Ori takes me to a drain out the back of Ulmarra, down river from Grafton. We stop in a cleared area on the edge of a cane field. He points out the drain. It is a few metres wide at the base, wider than you'd be able to jump across, with some water sitting in the bottom. It runs between paddocks of high green sugar cane, disappearing up toward the hills on the edge of the floodplain, a good few kilometres away. Ori says it was dug out in 1965 and 1966, and is only a small drain compared to the larger ones like the Swan Creek drains. Ori recalls it was excavated by a single dragline machine, working around the clock dragging its bucket of dirt backwards and forwards. Excess fill from the excavation was used for levee banks and roads.

Ori says it drains an area of thousands of acres back to the low foothills, part of what was the Harrington Swamp. Inundation of land was a big problem in this area – water would rush in with a flood, then sit here for months. Now with this drain and the smaller feeder drains, water drains off in three or four days, a timeframe that cane can easily tolerate. What used to be mixed farms – dairy, grazing and a little cropping – is now sugar cane as far as we can see. Taking in the whole scene Ori says, *Flood mitigation has done a lot to improve the lot of people on the land.*

There isn't much more to say about the drain, so I ask Ori about his first impressions when he came to the Clarence as a young engineer. He had grown up in Griffith, an irrigation area in south-western NSW, and had worked there as well as on the Snowy Mountains scheme as an engineer before he came to the Clarence. He came here in 1964 when much of the land on the floodplain was still inundated from the 1963 flood. He says he was struck at first by the poverty of the area and the lack of tractors used in agriculture, which by then were widely used in Griffith. While driving around the area he saw people working with horses and ploughs, *And I said, my gosh*

²⁸ Ori Pastega, Interview, 23 July 1998.

*why don't they use tractors? But I realised later that they just, you know, didn't have the money to buy tractors. It's as simple as that. Now you can see a vast improvement here.*²⁹

Ori remembers his first good view of the floodplain landscape and the excitement of his early days working on the scheme,

I found that the flood mitigation was a real challenge, in those days.

See when I came here, the County Engineer took me for a flight over the area. And he says, 'There it is.' He says, 'Do you think that you would be interested in doing some of this work here, tidying up the area.'

And I says, 'My word.'

So that was it.

And it was a challenge, I can tell you. We worked up till nine or ten o'clock at night, no overtime. We just did it for the sake of doing it.

And the result is what you see now.

Damian: What was it about the challenge that interested you, what was it that you felt you could get your teeth into?

Ori: Well mainly draining the land. You see I'm interested in drainage.

And I found that after seeing it from the air, with these great huge areas of water, I thought if you can get rid of that water then you can actually get into production.

And, by gosh, this is what is happening today.

Well a lot of people may argue, and say, 'leave swamps as they are.' That might be ok if they are salt water swamps. I'd be inclined to go in for that.

*But these fresh water swamps, well they're non-productive, unless you go in for wildlife, but that's not my go.*³⁰

²⁹ Ibid.

³⁰ Ibid.

Ori remembers his first views of the Clarence from the air. He saw the area in a similar way to the aerial survey photos which were a tool of his work for many years. From the air he could read the country on a grand scale, gaining a sense of control over a large area, whilst detached from the specific details. His was a grand and economic reading of the country – he could see the areas where water formed ponds on the floodplain and conceptualise how the potential of this area could be unlocked, reclaiming land for agriculture. He saw this place through his training as an engineer; this landscape provided a place for him to carry out his professional challenge of modernising the area, regulating the floodplain, bringing benefits which had passed this area by. This challenge of bringing progressive change to the area, creating a new future, was appealing to Ori as a young engineer. The appeal and energy is still evident in his voice as he retells this story to me.

Localising the benefits of regional development

The transformation of the floodplain was undertaken on the basis that it would bring great benefits to the Clarence region, reducing flood risk and enhancing the conditions for productive land-use. A particular goal was to increase the intensity and profitability of land-use – providing the conditions to progress from sparse grazing to more profitable intensive cropping, particularly of sugar cane. Increasing the opportunities for individual land-holders was seen to provide flow on benefits to the whole region, and in turn the national economy.

This transformation was undertaken on the basis that it had few negative consequences; the floodplain was seen to be robust in the face of this modification, that it could only be improved. Where there were negative consequences, such as Ori Pastega’s mention of the loss of freshwater swamps, then these costs were seen as far outweighed by the benefits for the region.

These ideas of the benefits of publicly funded river engineering developments were not unique to the flood mitigation works, but part of a broader discourse, or sets of beliefs, about the benefits of large-scale developments

which circulated in the 1950s and 1960s. In this period there was strong optimism in the possibilities of large-scale developments.³¹

A seminar, 'Clarence Valley Development', held in Grafton in October 1959 provides a good indicator of how these broader ideas of modification were seen to apply to the Clarence Region.³² The seminar attracted high profile speakers representing a range of perspectives on the benefits of large-scale modification. They included: staff from government public works and water management agencies, including the Flood Mitigation Authority; an academic geographer with an interest in rural development, and C. H. Munro, an engineering academic and leading advocate for large-scale water engineering projects.

The seminar was intended to prompt community discussion about the lack of development in the Clarence Region. The conference was convened by A. F. Dunton, the Director of the Clarence Office of the Department of Adult Education, University of New England (UNE). Dunton's approach was informed by ideas of community development from the time, using adult education and extension services to address 'community problems' – in this case it was educating local people about the possibilities of modern resource development. The proceedings of the conference, including points for group discussion, were published, in association with the local *Daily Examiner*, and circulated in the area.

Dunton suggested that the students view the Clarence as a resource manager would, as a 'development problem'. He directed them to study the questions of 'why isn't more use being made of irrigation in the Clarence Valley?', 'what would you do to encourage decentralisation of industry?' and 'what is your community doing to examine the problems in an objective manner?' In directing answers to these question he chastised the people of the Clarence for

³¹ J.M. Powell 1991, *Plains of promise, rivers of destiny: Water management and the development of Queensland 1824-1990*, Boolarong Publications, Brisbane. Paul Sinclair, 2001, *The Murray: A river and its people*, Melbourne University Press, Melbourne.

³² A. F. Dunton (ed) 1960, *Clarence Valley Development, Problems of Water Utilisation Communications and Populations*, Proceeding of Conference, Grafton, October 23-25 1959, Clarence Regional Office, Department of Adult Education, University of New England, Preface, p. 1 and conclusion p 42.

decades of wishful thinking and parochialism about development, 'which has pleased nobody but themselves.'³³ When the seminar's contributors reached for ways to describe the Clarence there was a consensus that the Clarence region was an area of 'disappointing development' and 'lacking in development', having not taken up the possibilities of post-war development. This lag in development was considered to encompass the place in totality, both in the landscape and people of the region. Presenters outlined different dimensions of this 'lack of development' and proposed ways of unlocking the potential of the area.

E. W. Harrison, an investigating engineer with the Public Works Department, Harbours and Rivers Branch, spoke about the planning which was being undertaken for flood mitigation. He pointed out the damage caused by floods and the benefits of flood mitigation. In particular he noted that the drainage works could be defined, in planning terms, as providing 'national benefits' from enhancing the economy, so the scheme should be strongly supported by the state government.³⁴

J.H. Shaw, a lecturer in Geography at UNE, viewed population levels as an indicator of regional development and also that increasing population was a desirable end in itself. Shaw was concerned that the population growth in the Clarence region was amongst the lowest in the state and almost stagnant.³⁵ For Shaw population was an indicator of 'economic progress or retrogression'. Population growth of an area would indicate, 'that its resources were being used more intensively and that it was experiencing a time of economic progress.' The stagnation of population growth in the Clarence was not caused by a low birth-rate but because the region could not 'hold' its residents. There was a 'brain drain' from the area with the younger, energetic and more progressive people leaving. Shaw noted that those leaving were the

³³ Ibid.

³⁴ E.W. Harrison 1960, ' Problems of flood mitigation' in A. Dunton (ed) 1960, *Clarence Valley Development*, p16.

³⁵ J.H. Shaw 1960, ' Clarence Valley populations and potential' in A. Dunton (ed) 1960, *Clarence Valley Development*.

ones who would have carried on the 'progress' and modernisation of production in the area.³⁶

The stagnation of population in the Clarence was part of a broader trend of across the north coast of NSW and more broadly across rural NSW. The north coast was affected by the downturn in the dairy industry; dairy farmers on the north coast had one of the lowest family incomes across all of NSW and a high rate of poverty. More broadly, since the late 1930s there had been a movement of population from NSW rural areas to the big cities on the coast.³⁷

Noel Smith, the district engineer for the Water Conservation and Irrigation Commission, reflected the mood of technological optimism of the time. He proposed that the Clarence valley would be a prime location for the siting of a nuclear power station, 'I understand that atomic reactor plants need large quantities of water and in view of the open spaces in this area and scope for waste disposal the possibility of such an establishment is a thought for the future.'³⁸ The increased power capability could then provide a basis for attracting industry to the region.

C. H. Munro, Professor of Civic Engineering at the University of New South Wales and Director of the Water Research Foundation of Australia, provided a national and international perspective on development in the Clarence region. Munro commented that almost nothing had been done towards developing the Clarence valley, and that 'this seems very odd.'³⁹ Munro saw that development was needed in the region in order to contribute to nation building:

For survival as a nation, a population of 20 million must be reached within 50 years. The seeds of national disaster lie in

³⁶ Ibid.

³⁷ Terry Kass 1989, *Regional History of the North Coast: A discussion paper on recent settlement*, Department of Planning, Grafton. Jim Hodge 1959, 'Our Second Snowy Wasted', *Australian Country*, Sept, vol 7 no 2.

³⁸ Noel Smith, 1960, 'Farm Water Supplies for the Clarence' in A. Dunton (ed) 1960, *Clarence Valley Development*. p23.

³⁹ C.H. Munro 1960 'Problems of Planning in Valley Development' in A. Dunton (ed) 1960, *Clarence Valley Development*.

Australia's present neglect of the science and technology of water use.

The Clarence Valley is one region in Australia which is well endowed by nature, so far as the vital requirement – water – is concerned. If it were located in the USA it would be highly developed, industrially and agriculturally.⁴⁰

He claimed that the Clarence was a priority area for development, citing the eminent geographer Griffith-Taylor's argument that Australia should fully develop the fertile areas of the east coast before it developed the drier areas west of the ranges. He argued that engineers and agronomists should be placed in control of 'valley development schemes.'⁴¹ Munro noted that the flood mitigation scheme was a good 'first step' towards development, however he argued that the local community should 'set their sights higher' and press for carrying out the 'Gorge Scheme' to capture water and divert it inland.⁴²

The ideas about the benefits of large-scale development, which were presented at the 1959 seminar, were also circulated widely in the rural media. A leading rural monthly magazine *Country Life* in September 1959 picked up on the themes developed by C. H. Munro. The magazine reflected the ideas of rural development of the day, on its front page it outlined its main concerns: 'Pasture improvement, Farm mechanisation and Better country living.' In its 'Country Opinion' section the editor Jim Hodge wrote of the need to develop the Clarence. Under the title 'Our Second Snowy – Wasted' Hodge made comparisons with the Snowy Mountains Scheme, arguing that the Gorge Scheme offered the chance to do something 'big' in the valley:

Slowness of Clarence Valley development, where a big fraction of the entire annual rainfall of the continent could be trapped and put to work as a quick money-back proposition, is a first-class

⁴⁰ Ibid, pp3,-4.

⁴¹ Ibid.

⁴¹ C.H. Munro 1960, 'Problems of Planning in Valley Development' in A. Dunton (ed) 1960, *Clarence Valley Development*.

⁴² Ibid, p 7.

national scandal. Works like these create populations – rural populations. . .

Make power from water in the high-rainfall Basin and run it out in a controlled way through low-rainfall western land, and you'd have a Clarence Scheme which dwarfed the Snowy. . .

We need an authority with powers wide enough to slash through the red tape. Americans used this sort of body in bringing their great Tennessee Valley project through to success. So can we.⁴³

This 'Country Opinion' provides a good indication of the dominant ideas regarding modification of rivers which circulated at this time. There was strong optimism in large-scale development projects, they were seen as providing increased security for profitable land-use and solving problems which faced rural communities, such as declining populations, as well as enhancing regional economies. At this time regulating the riverine environment, through such projects as flood mitigation, was widely seen to have many benefits for rural communities.

However it must be pointed out that by 1968 the CRCC noted that the flood mitigation scheme was not delivering the expected benefits. The engineering works had been successfully carried out, however local land-holders were not taking up the opportunities created. In particular they were not adopting more productive farming methods as quickly as expected. The CRCC argued that more effort needed to be put into extension services to assist farmers in adopting new farming methods. So while the landscape had been rapidly transformed, farmers were considered to be slow to change their land-use practices.

* * *

The benefits of the flood mitigation project were seen in different ways, depending on people's backgrounds and experience of the landscape. High profile advocates of large-scale development, such as C. H. Munro, saw such

⁴³ Jim Hodge 1959, 'Our Second Snowy Wasted', *Australian Country*, Sept, vol 7 no 2.

developments as an important component of national development. For engineers and resource managers, people who also approached the floodplain landscape from their professional background, it was viewed as advancing regional development. It was perceived as localising the benefits of post-war modernity, bringing this region in line with more developed regions in Australia and further afield. For local farmers such as John Ensbey the drainage works were perceived as reducing the risks in running a productive farm, securing family heritage in this place and keeping local communities viable. Well resourced drainage works provided new tools for the old problem of maintaining commercially viable production on the floodplain. However even with these differing perspectives there was certainly a shared view that this transformation was beneficial to the whole community.

However the flood mitigation works were also seen to have severe negative consequences, diminishing what was valuable about the floodplain landscape. With the strong support for development, these ideas of negative consequences of modification were considered marginal, and marginalised in the area. The next chapter turns to exploring this alternative experience of the drainage works, attentive to the particular interaction with the floodplain landscape which shaped these contending views; and attentive to the recognition these ideas gained in the Clarence region in the 1960s.

Chapter 2

Drained too deep: Recognising damage from drainage

They drained too deep, they over-drained.

Roy Bowling¹

The large-scale drainage works were carried out with the intention of improving the landscape, making commercial land-use more secure and less risky. However, modification of the floodplain was also seen at the time as having negative consequences – that valuable aspects of the floodplain landscape were damaged or undermined in this process of modification. And further, that the floodplain was richer, and more valuable, before the drainage works, and diminished afterwards.

A range of groups, with diverse interactions and associations with the floodplain were concerned about the drainage works. Graziers on the floodplain were concerned about the decline in the quality of pasture on the large areas of ‘back swamps’ and wet pastures on the edge of the floodplain. Professional fishermen were concerned about the loss of habitat for fish. Aboriginal people held concerns about the general decline in the health of the

¹ Roy Bowling, Interview, 21 May 1997.

river. And conservationists, both within the Clarence region and outside the region, were concerned about the loss of habitat for water-birds.

This chapter explores the concerns which were held about environmental modification, at this time, and the recognition these concerns gained. The chapter is attentive to the particular experience of the landscape which informed these concerns. For some of these groups their concerns were based on commercial activities – for graziers and fishermen their starting point was a loss of commercial benefits, while others had concerns based on other than commercial interactions. This chapter illuminates the ways in which the contest over the modification of the landscape played out in the 1950s and 1960s, a time when there was wide support for modification of the landscape.

Grasses soured – floodplain graziers

Drained too deep – I heard this phrase from a number of older farmers when speaking about the flood mitigation works. These older farmers say that what the Flood Mitigation Authority set out to do was fine, to return flood water to the river. However they say that the Authority went too far, that drains ended up being bigger than originally intended, that they *over drained* and *that they took the swamps out of the swamps*, making areas that were previously wetlands permanently dry. Swamps, which would today be known by the less pejorative term of ‘wetland’, are areas between water and land, that are not considered fit for cultivation. As part of the flood mitigation works swamps were drained to ‘reclaim’ these areas for cultivation or grazing.

For floodplain graziers the quality of grass was the most important, and intensely noticed, part of the landscape. The quality and abundance of pasture affects the stocking rate and the health of stock. Graziers say that excessive drainage ‘soured’ the good quality native grasses that grew in ‘wet pastures,’ areas which generally were covered by a few inches or so of water. Some graziers also held concerns about the decline in wetlands, which they knew as places of diverse native vegetation providing habitat for birdlife. For graziers wet pastures and wetlands were valued elements of the landscape; with drainage works they noticed that these aspects of the landscape declined. This

view of change to the floodplain landscape was made clear to me when speaking with Roy Bowling.

Roy Bowling has a grazing property on Bowlings Lane, on the Coldstream River near Tucabia, about 10km from the main river.² A complex series of swamps surround this area and creeks meander across the flat floodplain. Roy's family has a long heritage in this area, *Bowlings and Colletts were the first to settle in this area in the 1850s, we go back that far.*³ Roy is the fourth generation to manage this family farm; when he was growing up it was run as a dairy but in the 1950s, after changes in dairy regulation, they shifted to grazing. Roy is deeply interested in the history of the area, when he retires he hopes to put some of his knowledge down in a book. From his own experience working the land, and the stories passed down from his father, he has a strong knowledge of the floodplain before and after flood mitigation works.

Roy is known in the area as a teacher; a teacher of young people about the land and heritage in the area. He plays this role with me and takes me for a drive around his farm and the surrounding area. He points out marks in the landscape – fence posts, old buildings, regrowth and old trees; all play a role in stories about family, work, the regenerative power of nature, droughts and floods.

Like other land-holders on the river Roy knew the destructive effects of floods. With each flood the stock had to be moved to high ground, Roy recalls in particular the difficulties caused by the 1953 flood,

On dark there was a foot of water on these wetlands. By daylight there was sixteen to twenty feet of water.

We hadn't shifted any cattle, so it affected us in a big way, and we wouldn't have predicted that it would've risen so fast.

*We were swimming out through there with horses, all next day. We only lost one head of cattle, our neighbour lost quite a few.*⁴

² This section is based on a number of interviews with Roy Bowling - 21 May 1997, 17 November 1997, 23 July 1998

³ Roy Bowling, Interview, 23 July 1998.

⁴ Roy Bowling, Interview, 17 November 1997.

Following a flood low lying areas would be covered by slow moving water for months, cutting off road transport. Roy's partner Jean also recalls the difficulties caused by flooding,

Oh I don't like the floods. It makes a mess.

I hate going in the flood boats, they always wobble as I get in, then you have got to be very careful as you go around, you have to know where you are, you could hit a fence post under the boat and tip. And you see I can't swim.

And after the flood, mud everywhere, throughout the house, a few inches of water in the house is as good as a foot.

And the smell after a flood, all the rotting vegetation. It turns the white paint black.⁵

During times of floods, when there was little income from the farm, Roy took up work as a builder around the district to bring in some extra money. However Roy saw that the floods had some benefit for the property, *flood mud is fantastic for soils*, with each flood they would get six inches or more of top dressing.

Roy speaks of the abundance of this area before flood mitigation – rich pasture for grazing and a great diversity of native bird-life. In his account both grazing and habitat for native birdlife are compatible and both relied on having water on the land.

To make this point, on a rainy afternoon, he takes me for a drive across to the large open floodplain behind his house. He owns about 400 acres of this area of wet pasture, which stretches for a few thousand acres. Roy says that he remembers this area growing good quality 'swamp couch' a very desirable grass, *the highest quality feed which you can have.*⁶ As a 'swamp' grass, or wet pasture, it grew best in areas covered by a few centimetres of water. Roy says that these areas were particularly valued during droughts, as the feed dried up in other areas these wet areas would still have quality feed:

⁵ Jean Bowling, Interview, 17 November 1997.

⁶ Roy and Jean Bowling, Interview, 23 July 1998.

They were seen as a good thing, when droughts came that is where they ran the cattle.

But in those years, back as far as the 1953 drought, there was a 1000 head of cattle and 90 horses just on one paddock. Swamp couch up to your knees. That was before flood mitigation.⁷

Roy also recalls the abundance of water-birds attracted to the wet pastures and wetlands, he says that where there was water there was birdlife:

I can remember when ducks were here by the thousands - black ducks, whistling ducks, mountain teal, red ducks, shovelers. You name the duck and they were here.

I used to watch the Peregrine Falcon getting the ducks in the air so that he could catch one. They'd work on a mob of ducks, take a few sweeps to get them in the air, then he'd have one.

They still nest in the back out here, only a few pairs. The big white-breasted sea eagle they'd nest out here, they'd catch the ducks, and the turtle, there would be turtle shells up to your ankles under a sea eagle's nest.⁸

Wetlands were areas of diverse vegetation – melaleuca, swamp oak, the odd red gum, casuarinas, swamp turpentine – which fringed the permanent water holes. Some wetlands, such as Chaffin Swamp, were up to a kilometre wide. In dry times these areas would form a series of waterholes, when there was a lot of water all the waterholes would join up, forming part of a watercourse. The area around Coldstream River was rich with wetlands, including Morans Swamp, Collettes Swamp, Ellis Swamp, Crowsnest Swamp and Chaffin Swamp. Roy says, *you'd have no idea what birds were in there*, he had seen broilgas, swans and jabirus all nesting in these wetlands, attracted by this diversity of vegetation.

The wet pastures, which Roy remembers as a place of abundant feed, and bird-life, were not a pristine landscape but were managed and created by an

⁷ Roy Bowling, Interview, 17 November 1997.

⁸ Ibid.

earlier system of drainage. The large flat area of wet pasture, which included the 400 acres of his farm, had a system of drains dug out in the 1890s, which were then improved in the 1910s. He recalls that his father made these drains with the technology of the time,

It was my father who told me when those first floodgates were put in, because he was with them when they mixed the concrete to put them in. That is why I know it was in 1913.

He told me about the avenue drain going in, because that went in by hand. They dug that by hand, well with mattocks and shovels and horses and scoops.

He gave me a lot of history, and history that his father had told him.⁹

This drainage system modified the environment, extending a natural creek to drain a large area of many thousands of acres. These original drains were slow to drain water after large floods – low areas of land may have remained inundated for months. However from Roy's experience this older system of drains *got it right* in terms of managing the wet pasture between flood events and preparing for droughts. The shallow drains allowed a few inches of water to stay on the land, which was beneficial for growing swamp couch and, as an unintended consequence, supported bird-life. Also during dry times, when conditions were right such as a high tide or strong running river, they would open the floodgates on the Coldstream River to allow fresh water to push across the land, giving a coverage of a few inches of water. After a time they would close the floodgates, holding water on the land and in the drain. Roy speaks with pride of their skilful management of these areas which were wet as often as they were dry. This system allowed the local landholders to manage the growth of the valued natural pastures.¹⁰ In Roy's opinion this all changed with the introduction of the large-scale and inflexible flood mitigation scheme.

⁹ Ibid.

¹⁰ This practice which Roy Bowling describes, aligns with current recommended practice for managing wet pastures.

Excessive drainage

The Flood Mitigation Authority carried out drainage work in this area in 1965. Roy says that these new deeper drains are effective in removing water after floods – where land was inundated for up to six months, it now drains away in six days, which was the intention of the scheme.¹¹ However outside of flood events these drains, and new sets of flood gates were perceived as damaging the area. Roy says that this new lot *drained too deep*, building drains below low tide level. These deeper drains actually drew all of the water off the wet pastures – including any local rain, or water that seeped on the pastures from natural springs. These areas were no longer places of abundant grass, *they had practically given up growing grass, because they were dry and weren't meant to be dry.*¹² As these areas dried out the pasture changed, with less swamp couch and more rushes and poorer grasses, *There is more blue couch there now, that will keep cattle alive in drought but wouldn't fatten them.*¹³ For graziers on these floodplains, who valued the native wet pastures, the action of turning the area into a 'dryland' actually depleted what was valued about the environment.

A similar decline in the quality of swamp couch was noticed from an earlier incident of drainage. In June 1929 a farmer from Shark Creek, just down river from Tucabia, wrote to the local newspaper with his observations,

Take Shark Creek, its past and present . . . Every acre of land was profitably utilised - it was a common thing to see thousands of cattle fattening and looking well on it . . . How many cattle can be seen there, in and out of season, now? Scarcely any, and in places none at all. In the meantime, there is a really good growth of swamp couch grass, which looks very nice in appearance, but it is affected by a chemical that asserts itself and becomes more pronounced with excessive drainage . . . Cattle become . . . affected by consuming the substance. After a while their coats grow coarse and rough and they lose condition.¹⁴

¹¹ Roy Bowling, Interview, 23 July 1998.

¹² Roy Bowling, Interview, 17 November 1997.

¹³ Roy Bowling, Interview, 23 July 1998.

¹⁴ Letters to editor, *Daily Examiner*, 24 June 1929, cited in David Moloney (ed), 1990, *Shark Creek Tales*, n.p. (Maclean) p15.

Graziers strongly valued healthy swamp couch which relied on relatively constant water covering the soil. Excessive modification of the environment through drainage damaged this valued grass, leading to a decline in its value for stock.

Flood mitigation also drained some areas of permanent wetlands. Chains of water-holes were joined together with new channels to form continuous water courses, removing the water from waterholes and swampy areas which surrounded them. With the water drained away the diversity of vegetation and bird life declined. In all the Flood Mitigation Authority modified over 150km of natural watercourse.¹⁵ These works improved drainage but greatly modified the natural conditions.

Roy points out that many land-holders on the floodplain opposed the flood mitigation works. Land-holders were concerned about the depth of the drains and how they would be operated,

They argued with them, but they couldn't get what they wanted, and they had to put up with what happened.

Now it would be different, but then that is what happened . . .

There were a lot of arguments, especially here, these fellows won't tell you that. The drains went in and we were told that's the way they'd work.¹⁶

In Roy's opinion locals only accepted the scheme because the 1950s and 1960s were a time of economic hardship for farmers, with years of little income from the waves of severe flooding, *How they got it in, was because they had that many years where they made no money that to get rid of water was the in thing.¹⁷*

Roy Bowling's concerns about drainage are not an isolated view. While Roy's recollections were recorded in the late 1990s, a time of heightened environmental awareness, similar responses were noted twenty years earlier.

¹⁵ Ian Dinham 2001, 'The Clarence Floodplain Project', Stuart Blanch (ed.), *The Way Forward on Weirs Conference Proceedings*, The Inland Rivers Network, Sydney, Proceedings of Conference, 18-19 August 2000, Sydney.

¹⁶ Roy Bowling, Interview, 17 November 1997.

¹⁷ Ibid.

In the late 1970s, about 10 years after the major drainage works were completed, a geographer doing fieldwork in the lower Clarence noted that many farmers held concerns about the drainage works:

I was interested to learn that a number of the farmers in the district, don't really approve of the Flood Mitigation works. One comment was that most of the swamps which had been drained were fairly useless as most of the soils were heavy clays. These soils were difficult to till, as a result are mainly used for cattle and in the event of dries they become extremely dry and hard packed and retained very little soil moisture.¹⁸

Graziers had developed profitable ways of grazing on these extensive swamps, a system of adaptive use, relying on the natural wet pastures, modified by a particular style of drainage. However, the work of the Flood Mitigation Authority was dominated by the idea of transforming wetlands into dry land, to allow increased agricultural production. The benefits of drainage were clear in some areas, such as sections of fertile soil near main riverbanks used for intensive cropping or improved pastures. However graziers strongly felt that extensive drainage of swamps, such as Everlasting Swamp or areas of the Coldstream River, did not suit the soil type and their less intensive use of the natural pastures of floodplain. Graziers recall that their views and their experience of impacts on the landscape were not recognised in decision making at this time.

However, Roy says that some wetlands on the Coldstream were saved from drainage,

There were only two areas that they didn't touch. That was the Crowsnest Swamp and Chaffin Swamp down here [near Tucabia].

Damian: How come they decided not to drain those?

Roy: Well they were going to, but it was getting towards the end of the time, and they had started to change their ideas a bit and the land owners didn't want it drained, so they won the day.

¹⁸ S. Salisbury, R. Wilson and E. Woolmington 1980, *Fishermen's Views: Transcripts of interviews with senior members of the lower Clarence River fishing fleet*, Monograph No. 6, Dept. of Geography, UNSW, Royal Military College Duntroon, p D5.

Damian: How come land-owners changed their ideas?

Roy: Well they could see what was done on these, that they were over drained, drained too deep.¹⁹

Roy is proud to be able to take me, and many other visitors, to these wetlands – Roy points out the diversity of bird-life and vegetation, and explains how these remnants are rich places for bird-life and for grazing.

Damage to fish habitat – commercial fishermen

Commercial fishermen also perceived that flood mitigation undermined what they valued about the Clarence River. Like graziers, they relied on the natural processes of the river to provide for their commercial activity, in this case harvesting fish from the river and estuary. Native fish had evolved in relation to the particular natural conditions, and relied on the natural diversity for habitat; estuary fish relied on the wetlands and riverbanks for breeding grounds and nursery areas. For many decades the conditions for fish had been damaged by vegetation clearing, pollution and the pressure from fishing; all of these led to a decline in fish populations. However commercial fishermen perceived that the flood mitigation work, particularly the draining of swamps, was one of the single greatest causes of decline in habitat for fish and fish numbers. As an older fisherman said in an interview in 1977, *I think that flood mitigation is the biggest destroyer on our river.*²⁰

In the 1960s and 1970s commercial fishing was a major industry on the Clarence, centred on the Clarence Fishermen's Cooperative in Maclean. Commercial fishing was the fifth largest commercial activity in the region, after grazing, sugar cane, dairy and timber; the Clarence was the largest supplier of estuary fish to the Sydney market. Estuary fishing boats worked

¹⁹ Roy Bowling, Interview, 17 November 1997.

²⁰ S. Salisbury, R. Wilson and E. Woolmington 1980, *Fishermen's Views: Transcripts of interviews with senior members of the lower Clarence River fishing fleet*, p E39. This report, within the discipline of geography, conducted life history interviews with 'older members of the lower Clarence River' about 'changes they have noticed on the river.' They were interested in the fishers because they were an 'intact social group'. Full transcripts of the interviews were provided in the report. Interviewees were only recognised by initials. The current fishing community recognise these as quality interviews with key people in the community.

the estuary and lower river, travelling up as far as Grafton, occasionally venturing up as far as the falls at Copmanhurst. Ocean-going boats travelled out through the river mouth, seeking snapper and other ocean fish. Estuary fishermen spent hours motoring along the river, watching out for fish movement and sorting the catch, thereby developing an intimate knowledge of the ways that fish lived in the river. The most intensively observed fish were the commercial target fish - mullet, bream, whiting, flathead and prawns. Knowing what fish were running, and how they responded to changing conditions was essential to the work of fishing. This knowledge of the river was often passed down from father to son, along with boats and boat licences in the tight-knit Clarence fishing community. Many people who were fishing on the river in the 1960s and 1970s had a strong knowledge of the river before flood mitigation, from personal experience and intergenerational memories of fishing on the river.²¹

Fishermen, from their intense observations of fish lifecycles, saw swamps as deeply important places for fish habitat. Bucky Harris, a long-time fisherman from the Clarence, in an interview recorded in 1990, recalls the richness of swamps before flood mitigation works:

These swamp areas have been huge areas. They were not very deep. They were a foot to two foot deep. And as a young person I used to go into these swamp areas, when the fishing was a bit lean, to shoot ducks.

I would sit on the banks in the mangroves and while I was sitting there, I was aware of the vast quantities of small fish that were in these swamp areas.

You would see the mullet jumping and the things we term mud gudgeons swimming around. And there were vast quantities of fish life in these areas.

So these low lying swamp areas were a great nursery for the fish to grow as immature fish and to grow up eventually, like the mullet into a marketable size.

²¹ Ibid. See also Simon McVerry, n.d. (1995), *A Socio-economic Evaluation of the Clarence River Commercial Fishery*, Integrated project for Bachelor of Applied Science (Hons), Faculty of Resource Sciences and Management, Southern Cross University, Lismore.

All the mud gudgeons and similar type fish in these swamps eventually became the food for larger fish in the river.

When we had a large flood, the floods covered all these low lying areas and a lot of fish migrated out of these swamp areas into the river system.

We were aware of that because when we were trawling we would get quite large quantities of mud gudgeons and various things that we knew came from the swamps. . .

Now that they are drained, these vast areas are no longer areas where there was a nursery or sources of food for the fish in the river.²²

Fishermen of this generation perceived swamps as rich places for fish, with flood mitigation this valued part of the river was seen to decline.

Fishermen saw that creeks and watercourses, and their interaction with the main river channel, were important for fish habitat, as one fisherman said in an interview in 1977:

You take all the creeks around the Clarence River, there's a lot of creeks.

You could go in there in wintertime, particularly, and you'd be unlucky if you couldn't get a nice boat of fish out of it.²³

With flood mitigation works many of these creeks and watercourses were controlled, linked up into drainage systems, and blocked off from the river by floodgates. Floodgates allowed water to run out but blocked water from running back up. For fishermen these floodgates acted like weirs, blocking flows between the river and creeks. As one fisherman said, *There is not one creek which hasn't been weired off.*²⁴ Fish were 'locked out' of the creeks by these barriers,²⁵

²² Bucky Harris, Interview, 7 April 1990 in Malcolm Tull (ed) 1999, *Oral History of the Australian Fishing Industry*, Fisheries Research and Development Corporation, Canberra [CD Rom].

²³ Interview with R.P in S. Salisbury, R. Wilson and E. Woolmington, 1980, *Fishermen's Views: Transcripts of interviews with senior members of the lower Clarence River fishing fleet*, p C12.

²⁴ Ibid, p E39.

²⁵ Interview with R.P. Ibid, pC12.

They used to be wonderful breeding grounds, all these creeks. All the little fishes were up there and they'd breed, all natural feed, see, but now that they are weired, well Christ, they can't get up there.²⁶

For fishermen the floodgates were seen as blocking fish mobility between breeding grounds and the river channel. In this way they perceived that the floodplain was alienated from the river, reducing interaction between the floodplain and the river.

Some fishermen also saw that drainage led to a more subtle effect on the quality of the river, that it effected the 'freshness' of the river, and the smells which circulated around the estuary. These changes could only be noticed from an intimate knowledge of the mix of salt, fresh and brackish water in the river, and the effect of this on the fish. Before flood mitigation local rain would slowly filter into the river through the swamps, collecting rotting vegetation along the way. Some people refer to the swamps as the 'kidneys' of the river. When the swamps were drained this detritus was removed from the riverine system. Also rainwater would enter the river much more quickly, carried by drains, rather than running through the swamps. Some fishermen said that the river did not smell or taste the way that they expected it to, it lost some of its nutrients and richness which fish relied on.²⁷ This perception of decline may be a socially eccentric view of a change, or based on a very particular interaction with the river, only available to those who spent many hours on the river following the patterns of fish and flows of water. However for these older fishermen this was another indicator of the impact of flood mitigation.

For commercial fishermen flood mitigation was experienced as an event which transformed the river. The stories that fishermen tell of flood mitigation is that it led to a decline in the diversity of the river, that it was no longer the rich place they had known. In an interview in 1977 a fisherman said:

Well, I think it is commonly said at the first meeting by B., that there would be a drain made out of the Clarence River, and his words are true. It is a drain.

²⁶ Ibid, p E39.

²⁷ Ibid.

*Mind you, there weren't enough investigations into the flood mitigation before it started to move.*²⁸

The term 'drain' is evocative of something which is technological, regulated and dead, very different from the life of a diverse natural river. Fishermen perceived that the natural processes of the river were fragile and diminished by the process of regulation. This was not only a perception of fishermen but supported by scientific research in recent years which highlighted the diversity of natural habitat which fish need.²⁹ The drainage works that benefited intensive land users also reduced the productivity of commercial fishing. What many in the district saw as combating the floods to modernise the area, was experienced by fishermen as having many negative consequences for fish and fishing. Further fishermen's strongly held concerns, about the impacts on swamps and creeks, were not taken into account in the planning for flood mitigation, no assessments of impacts were conducted before the works proceeded.

Decline in river health– Aboriginal people

Aboriginal people on the Clarence, in common with fishermen and some landholders, also valued the natural diversity of the floodplain. However their experience of the river has been quite different; so has their response to the drainage works.

Many Aboriginal people from the Clarence, particularly older people, say that they are *worried about the river*, that it is no longer a place with the quality or quantity of 'living things', such as fish, insects, bugs and bushfoods. Kooris, similar to non-indigenous people, have always relied on river fish, such as yellow-eye mullet, eels, King George whiting and bream (also called morowong).³⁰ Particularly during tough times Aboriginal people relied on fish

²⁸ Ibid, p C13.

²⁹ See for instance recent research on the Clarence, K. Auld 1998, *Wetland Rehabilitation on the Lower Clarence Floodplain: Opportunities and Priorities for Action*, Oceanwatch, Sydney.

³⁰ Ron Heron, a Koori from the lower Clarence has documented the uses of bush foods and bush medicines on the Clarence. Ron Heron 1991, *Aboriginal Perspectives: An ethnohistory of six Aboriginal communities in the Lower Clarence Valley*, Thesis submitted in partial of the requirements of a Bachelor of Letters degree in Prehistory, Australian

to supplement food bought through the cash economy. Aboriginal people also harvested other foods, such as mangrove worms, known as cobra, which whites did not use. Cobra live in submerged logs and are considered a delicacy like oysters.³¹ They also used plants and animals from the river, such as riverweeds and cobra, for medicinal purposes, something which white people did not do.

However it is not just that Kooris used different things from the river and estuary, but that there are traditions and experiences attached to the river, which gives the river a particular significance. The river provides a connection to the deep Aboriginal history in this place. The river is the site of powerful creation narratives; stories are told and retold about traditional characters such as Dirrangun, the cheeky old woman, who created the river. Eels and other fish are also characters in these stories.³² As other places of significance in these stories in the region have been modified or taken by agriculture, the river has remained a pathway for important stories. In these ways Aboriginal people approach the river with a particular set of interests and expectations, from their traditional and historical experience in the area.

Some Aboriginal people perceive that valued aspects of the river declined with flood mitigation. One older Aboriginal man whom I spoke with held strong concerns about the decline in the swamps in the Clarence,

It keeps me awake at night thinking about the river and the swamps and what the white people have done to it. This used to be a beautiful rich place, full of birds and acres of fish in the swamps. Now the white man has ruined it.

Within the Aboriginal community many people speak of the decline in diversity in the environment. However in these accounts the drainage works

National University, Canberra. Ron Herron, 2001 'Heritage Landscapes and Indigenous Cultural Landscapes: Dirrangun and the creation of the Clarence River', in M. Cotter, W. Boyd and J. Gardiner (eds), *Heritage Landscapes: Understanding, Communities and Place*, Southern Cross University Press, Lismore.

³¹ Ron Heron 1991, *Aboriginal Perspectives: An ethnohistory of six Aboriginal communities in the Lower Clarence Valley*, pp 18-23, 35.

³² See for instance stories recorded in Ronald Robinson 1965, *The man who sold his dreaming*, Currawong, Sydney. Della Walker 1989, *Me and You: The life of Della Walker as told to Tina Coutts*, Aboriginal Studies Press, Canberra.

do not figure prominently as a cause of decline, as it does for graziers and professional fishermen. In speaking about decline Aboriginal people may mention intensification of agriculture (particularly cane), urban development, increased fishing, but drainage works do not figure strongly as a reason for a reduction in diversity. This lack of emphasis on drainage may reflect the limited number of people consulted in researching this issue, and limits in available printed material. This may provide a partial explanation, there is probably a broader reason for this perception of decline.

Some fishermen and land-holders recall *not being listened to* in the planning of the drainage work – they remember that their concerns were not taken into account in the planning decisions made by the Flood Mitigation Authority. However at this time Aboriginal people were not involved in the planning for resource decisions – they did not get a seat at the table, their views were not sought out and they did not, as a rule, participate in public debates about floodplain management. The period is remembered by Aboriginal people as a time when Kooris *didn't talk-up* and the north coast is remembered as a place of intense racism. The main concern of Aboriginal political activity on the north coast at the time was maintaining reserves as a secure place for Aboriginal people to live. The late 1950s and 1960s saw a sharp increase in pressure for the revocation and merging of reserves in the region, and this affected the lower Clarence. In 1958 the 140 acre reserve at Yamba was revoked, forcing Aboriginal people into camps on the edge of towns. Through the late 1950s Aboriginal people were encouraged, and forced, to move off Ulgundahi Island and into Maclean or camps. This pressure to move came from white demands for reserve land, particularly with increases in coastal development, and an increasing push to assimilation through ending the separation on reserves.³³

Whereas for farmers and fishermen flood mitigation marked a major change in their experience of the Clarence, either beneficial or leading to decline, in

³³ Heather Goodall 1996, *Invasion to Embassy: Land in Aboriginal Politics in New South Wales, 1770 - 1972*, Allen and Unwin, Sydney. Jenny Ledger 1998, 'Working Their Grandparents' Gardens: A history of settlement on Ulgundahi Island 1880-1980,' in Jo Kijas, Jenny Ledger, Anne Beasley (eds), *Past Lives Fresh Views: Histories of the mid-north coast of New South Wales*, The Xerox House, Coffs Harbour.

Aboriginal accounts of change it doesn't stand out as such a prominent process of change. This could reflect Aboriginal people's experience of engaging in public debate in this period.

Undermining habitat for native birds - conservationists

The Clarence Valley Field Naturalists (CVFN) were another group in the region which, like some farmers, fishermen and Aboriginal people, perceived that flood mitigation led to a decline in the valued diversity of the floodplain. In common with the other groups, the Field Naturalists were particularly concerned with the policy of draining swamps, which they saw as leading to a decline in habitat for bird life. The Field Naturalists actively raised these concerns in public debate at the time. It is interesting to explore the conservationists' concerns, and the support for this campaign both within the area and outside the area. This campaign is revealing of the concerns of conservationists at the time, and the recognition conservation interests gained.

The Field Naturalists were an active group in the Clarence in the 1960s. The richness and diversity of nature in this sub-tropical area, which included coastal, estuary and mountainous regions, provided a wide range of native habitats to study. The Clarence region had a population large and diverse enough to support this group and its activities. The group had connections with the major government conservation and scientific organisations of the time, including the CSIRO and the NSW State Fauna Protection Panel (FPP).³⁴ As an organised group the Field Naturalists have left an archive of their activities, including records of their campaign between 1962 and 1967 regarding flood mitigation.³⁵

* * *

³⁴ The FPP was a fore-runner to the NSW National Parks and Wildlife Service formed in 1967.

³⁵ This draws on archival material (submissions, letters, letters to newspapers) from the archive of the Clarence Valley Field Naturalists Club, held at Schaffer House, Grafton. In this section this is just referred to as CVRN Archive.

I read about these concerns in an old foolscap file marked 'Flood Mitigation.' It sits in the archives of the Field Naturalists at Schaffer House in Grafton, also the home of the local historical society. The file contains a series of news clippings, letters and reports, on foolscap paper that the A4 photocopier has trouble copying. I am surprised, pleasantly, to find such a dense documentary record of campaigning and opinions. Some older members of the club had said that the Field Naturalists may have been involved in such activity in the 1960s but they weren't sure. Up until now flood mitigation has been for me a mix of recollections and government reports, here I can sift through an archive of concerns raised publicly and the responses which bounced back.

Artie Ford, the secretary of the club, kindly guides me through the archives. He is not used to having someone from the city so interested in the club's records. He doesn't remember much about this campaign, though he has strong memories of the two people who were involved, Philip Strong and the secretary of the time Mrs Grieves. Both were school teachers, he says. I read on, here the past comes to life through these yellowing pages. I move to the photocopier and Artie tells me about the problems the club is having now with attracting younger members, more interested in TV than coming to monthly meetings and occasional excursions, it's not like it used to be. He mentions names of people I should speak to, Athol McPhee and many others.

The Field Naturalists first raised concerns about threats to bird habitat from drainage, the file informs me, in relation to the South Grafton Common in 1962, three years after the Flood Mitigation Authority started its work. The Common was a large area adjacent to the town at South Grafton, which after floods would be inundated for a long period of time. Given its proximity to the town and frequent inundation it was one of the early sites of drainage works. It was also an important habitat area for birds. The Field Naturalists attempted to enlist the support of the Fauna Protection Panel (FPP) in acquiring the common for conservation purposes. The FPP was the government agency responsible for protecting wildlife and its habitat in NSW, it had a small staff and was located within the Chief Secretaries Department. The FPP replied that local planning authorities were the relevant body with the power to reserve the land, that it could offer no assistance and that the

land would probably be taken up for drainage and agriculture.³⁶ This incident, with limited recognition of wildlife conservation, would set a pattern for the Field Naturalists' campaigning.

In 1965, six years after drainage works had commenced, the Field Naturalists raised broader concerns about the methods of drainage and the areas which were being drained. There was a drought on the Clarence in 1965, which was claimed by some to be the worst for decades, and many swamps had dried back to their core. The Field Naturalists were highly attentive to changes in bird population from years of close observation of birds – noticing where they nested and how they moved around the environment.

In early 1965 Mr Clive Everyingham of Turf Street, South Grafton, made a representation to Mr Wiely MLA, the region's state parliamentary representative (Country Party). Mr Everyingham reported that this season he had noticed a decline in the number of birds, especially blue cranes, as well as an increase in birds feeding along roads, away from their natural habitat. He predicted an exodus of birds away from the region, because of pressure on their habitat from drainage. Mr Wiely passed these comments to the Field Naturalists Club, noting the need for action.³⁷

The Field Naturalists followed up this letter and raised broader concerns about decline in bird habitat through a submission to the Flood Mitigation Authority and letters to the local newspaper. Philip Strong was the most active person for the Field Naturalists on this issue. Strong, a biology teacher, was active in conservation work, as a ranger with the FPP and as a bird-bander with the CSIRO. In a letter to the *Daily Examiner* Strong criticised the drainage of swamps, seeing it as inefficient for both agricultural production and habitat for birds,

An expensive policy is pursued of swamp reclamation, rather than just rapid drainage of floodwater. Farmers have found that excessively deep drains have destroyed their swamps, and have

³⁶ Letter FPP to CVFN 23.12.63, original letter 20.3.62. Clarence Valley Field Naturalists Club (CVFN), *Flood Mitigation Files 1965-1967*, CVFN Archive.

³⁷ *Ibid.*

taken their drought water reserves. Water-birds have lost an essential part of their habitat, and their numbers have decreased dramatically. Again the farmer loses, as the birds are his pest destroyers.

An immediate and competent review is needed of the degree of swamp drainage, in view of the role played by swamps in the agricultural economy.³⁸

Strong claimed that there was 'considerable disquiet' amongst farmers about the loss of drought reserves, and noted that drainage often occurred even where there was opposition from land-holders.³⁹ In this way Strong put forward arguments about impacts on both native habitat and commercial land-users.

In a submission to the County Council Strong presented the Clarence floodplain as a place of unique and unusually diverse natural habitat. He saw that this diversity was threatened by drainage:

The Clarence Valley . . . is unique in NSW in having the largest amount of intact flood-plain wildlife habitats, and the greatest variation of coastal habitats. It is the largest river valley area in the only subtropical region within Australia. The subtropical region is relatively small, and it is urgent that adequate representative habitat be set aside in this unique region, before it is too late.

The Clarence Valley is a meeting place of the three main areas of distribution of Australian faunas, so that there is a mixture of tropical, temperate and inland species. Almost half the species of birds in Australia are found here, making it one of the most compact and richest bird faunas in diversity and numbers in Australia. Similar comment holds for other groups of living things in this area. . .

³⁸ Philip Strong, letter to editor, *Daily Examiner*, 25 March 1965. CVFN Archives.

³⁹ Clarence Valley Field Naturalists Club (CVFN) 1965, *Submission on conservation of water and consequent involvement of biological resources in the Clarence Valley*, prepared by P. Strong, Hon Sect, CVFN Archives.

Due to highly diversified favourable habitats, high population densities, very successful breeding occurs, making this valley a reservoir of wild life for surrounding areas. For example, at Ulmarra near Grafton there is Eastern Australia's primary nesting area for Egrets.⁴⁰

Strong argued that in times of drought the significance of the floodplain for bird habitat increased greatly, and Strong drew upon scientific research to support his arguments,

It is a major drought-refuge for numerous species, including ducks and the straw-necked ibis, which is well known for its grasshopper control. Ideas of coastal drought refuge have been substantiated by CSIRO banding studies and research on nomadic water-species such as ducks.

The uniqueness of the area made it a drought-refuge for numerous species, including ducks and the straw-necked ibis which they noted is recognised for its grasshopper control.⁴¹

Strong linked his arguments for protection of native bird-life with the benefits water-birds provided for grazing and agriculture. He also noted the possibility of the natural diversity of the region being used as a tourist attraction; tourism was an emergent industry at the time.⁴² In this way he presented a commonality between conservation and commercial imperatives.

In terms of specific areas Strong argued for the creation of a 'game reserve' around the Broadwater section of the estuary, and 'Water Storage - Wildlife Refuges' in the upper Coldstream and Shark Creek areas. He proposed that such refuges could either be purchased by the government, or created by agreement with land-holders. With a concern for shared use he proposed the stored water in such reserves could also be used for irrigation. Strong also noted that there was a heightened need to preserve habitat in the Clarence because of the loss of habitat from drainage schemes in other north coast

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Ibid.

floodplains.⁴³ Strong noted that within the Flood Mitigation Authority's regulations there was no specific allowance for any compensatory works for native fauna, however in spite of this lack of regulation he requested that the County Council act on these concerns.⁴⁴

Strong argued that science, the great rational force of modernity, could be used as a force for conservation as well as modification, 'Modern science has given man the ability to cause huge changes in his environment. Modern science should be consulted in the exercise of this ability.'⁴⁵ In order to include the progressive perspective of science in the Flood Mitigation Authority's work, Strong pressed the Authority to consult with a broad range of established scientific experts including: the CSIRO; universities; Department of Agriculture; Department of Water Conservation; Department of Soil Conservation; the FPP and learned natural history societies.⁴⁶

Building support for conservation

The Field Naturalists attempted to gain support from a range of organisations, both within and outside the area, which shared their interest in preserving the floodplain's natural habitat. The Field Naturalists tapped into key parts of the natural conservation lobby of the period: The Linnean Society of NSW; the CSIRO Foundation; the Royal Zoological Society of NSW and the Royal Australian Historical Society. All these established, and establishment, organisations offered their strong support and pledged to express their views to the relevant politicians.⁴⁷

One supporter placed this issue within the frame of national and international natural heritage significance. J. Le Gay Brereton, Associate Professor of Zoology at the University of New England, Armidale, and a leading figure in

⁴³ Letter CVFN to FPP 30 March 1965.

⁴⁴ CVFN 1965, Submission on conservation of water and consequent involvement of biological resources in the Clarence Valley.

⁴⁵ Typescript letter Strong to *The Northern Star* (published), and *The Sydney Morning Herald* (not published).

⁴⁶ Letter CVFN to the Flood Mitigation Authority, 9 April 1965.

⁴⁷ CVFN correspondence file, March and April 1965.

conservation at the time, wrote, 'By far the single most disturbing likely outcome of widespread drainage is extinction of the Egret Colony at Ulmarra.' He was concerned that if the breeding colony was destroyed this could trigger the disappearance of the egrets across the whole of the east coast. This was the only known breeding colony in New South Wales, even though the birds travelled the whole east coast of Australia. He raised the international significance of this particular site at Ulmarra, 'This colony with four species is world famous, among world famous ornithologists and has been visited by such people. It could be an international disaster to extinguish it.'⁴⁸ The Field Naturalists took this letter to a wider audience by publishing it in *Wildlife Service*, the journal of the FPP.

The Field Naturalists also attempted to gain support from local groups which shared a common interest in the diversity of floodplain habitats. The Coffs Harbour Gun Club, an unlikely ally, had also noticed a recent decline in bird numbers, particularly during the duck season. The Gun Club also saw flood mitigation as the cause of the change, recognised the similarity of interest between the two groups, and offered to assist by documenting changes noticed by its members.⁴⁹ Strong and Grieves attempted to enlist the support of local farmers who they knew to be 'adversely affected' by flood mitigation and who may have observations of bird life. They contacted five farmers, Mr Grozien, Mr Gillett, Mr Wall, Mr Gallagher and Mr Phelps, to elicit the effects they had noticed from flood mitigation. Most of these farmers were from the complex wetland system of the upper Coldstream River, behind Ulmarra - the same area as Roy Bowling's farm.

Other local people had also noticed a decline in habitat. Noel Smith, the Water Conservation and Irrigation Commission (WCIC) District Engineer for Farm Water Supplies at South Grafton, stated that he had noticed a 75% decline in habitat, due to flood mitigation, and that there was a corresponding 'disbursement' in bird populations. He noted this was, 'undoubtedly a tragic problem arising from the greater problem of flood mitigation.' In this way

⁴⁸ J. Le Gay Brereton, letter to editor, *Wildlife Service*, vol 3, no 4, 1965. See letters in reply, vol 3, no 7.

⁴⁹ Letter from Coffs Gun Club, CVFN correspondence file, March and April 1965.

Smith recognised the loss but saw it as justified in terms of the greater need to combat floods. However, Smith recognised that in time current practices would have to be reassessed, 'The long range view is that man will be forced to consider a wider range of subjects in designing and executing flood mitigation and drainage works on the coast.'⁵⁰

The Field Naturalists also reached out to the state government's conservation agency, the Fauna Protection Panel (FPP), based on their common concern for protecting native fauna. The FPP offered their support and encouragement. Mr Strom, the head of the FPP, recognised that the issues on the Clarence Floodplain were part of a wider set of concerns, 'The question of water control over the whole of the State as it affects waterfowl, has been a matter to which we have given consideration for some time.' In pursuing this matter they had held meetings with the relevant state bureaucracies, the Water Conservation and Irrigation Commission (WCIC) and the Department of Public Works (DPW).⁵¹ The FPP had a particular interest in developments on the north coast, an area rich in bird-life and under pressure from drainage. However they gained little support because of the greater concern about reducing risk from flooding,

Officers of the Fauna Protection Panel have had a number of conferences with suitable authorities in an effort to secure some kind of restraint in the matter of drainage but have been singularly unsuccessful, *because up to the present time people have been thinking in terms of flood damage.*⁵²

The FPP pointed out that the local County Council held the authority to make decisions, the DPW were only the 'operating agency.'⁵³ In terms of a course of action the FPP advised that unless the Field Naturalists could offer a compelling and focused submission to the State Ministers, it would be up to the Field Naturalists to influence the County Council at a local level.

⁵⁰ Letter N. P. Smith WCIC, to Mrs R Grieves, 9.3.65.

⁵¹ Letter FPP to Philip Strong 2.4.65, FPP to Weily 2.4.65.

⁵² Letter FPP to Weiley 2.4.65, my emphasis.

⁵³ Letter FPP to Strong 2.4.65.

This advice from the FPP revealed that there was no established mechanism, within either the state government or County Councils, for dealing with these concerns about loss of native habitat. The Field Naturalists could only get their concerns recognised if they made an especially compelling case, while both the Public Works departments and the local County Council held that large-scale drainage works were justified, legitimate and brought great benefits to the region.

Limited recognition of decline

In 1965 the Field Naturalists, with support from Mr Wiely MLA, made representations to the Minister for Public Works, Davis Hughes. The Minister recognised that there had been some reduction in swamps, however he noted the greater need for flood control. He offered a blunt assessment of the future of swamps:

Further reductions can be expected as it is likely that Local Government bodies, Drainage Unions and individual land owners will construct additional drains and extension drains linked to the subsidised flood drains. It is possible, therefore, that most of the swamp areas will eventually disappear.⁵⁴

The Minister added a small qualification to his fatalistic opinion, 'You may rest assured that my Department is aware of the need for waterfowl conservation and will view sympathetically any measures to this end.'⁵⁵ He noted though that responsibility for conservation lay with the Chief Secretary's Department, and the FPP, which had already been sent the submission.

The words from the Minister were emphatic. The submissions, pressing for preservation of natural diversity, had travelled with great hopes from the Clarence. They moved around different Ministries, backwards, forwards, until they ended up in the files of the FPP. There was little interest in protecting swamps and birds when confronting the greater problem of flooding.

⁵⁴ Minister for Public Works to Weiley, 1 February 1966.

⁵⁵ Minister for Public Works to Weiley, 1 February 1966.

At the local level, similar to the state government level, there was a strong recognition that swamps were transformed by flood mitigation, however this loss was seen as justified in terms of the greater good of reducing the damage from flooding. Further, within the local area, there was little support for the perceptions of changes to swamps put forward by the conservationists. Within the Clarence region the swamps were not broadly perceived as valuable areas of native habitat, or fragile in the face of change. If the loss of swamps was recognised it was seen as justified in terms of the benefits gained to the community, or as necessary to the cost of progress.

The Chairman of the Flood Mitigation Authority, Gordon McCartney, forcefully dismissed the claims of the Field Naturalists, particularly their interpretation of environmental change, and presented a contending narrative of change. In April 1965 in the *Daily Examiner*, McCartney stated that he had consulted with a wide range of government bodies and was well aware of the needs of fish and wildlife. McCartney claimed that the areas in contention were not 'true swamps', but were instead 'areas which were old flood waters.' Swamps were not unique and diverse habitat, but recently created wasteland. Swamps, he stated, were drying up not from drainage but from the drought. In fact, in building drains they had created more habitat for water-birds and fish, through creating 170-200 miles of controlled waterways. McCartney claimed that nature had been enhanced by water engineering and not undermined. He claimed that the local members of the County Council knew the true mood of people, not the Field Naturalists, and these were the appropriate people to be making decisions. To add weight to this claim McCartney stated that he had personally spoken with fifty-two farmers who supported the scheme and had benefited from it. These farmers, he said, did not want to write to the paper as it would be seen as 'skiting' about their successes.⁵⁶

McCartney's views were strongly endorsed by other members of the County Council.⁵⁷ However the Council did agree, after the Field Naturalists addressed their meeting, that further investigations should have been carried

⁵⁶ Council Chairman answers drainage works criticism, *The Daily Examiner*.

⁵⁷ Anon, 'Almost every swamp no river dry', *The Daily Examiner*.

out and wider co-operation sought with government departments on conservation. The County Council promised to follow up on the specific concerns which had been raised.⁵⁸

In the local newspaper the Field Naturalists were disparaged by members of the County Council and other locals for not respecting proper process, for caring more about birds than humans and for not having personally experienced floods in the region. One correspondent, under the pseudonym 'Be Reasonable' raised the significance of drainage works, not just for local producers but also for the nation, 'The CRCC is doing a national job and is well aware of the factors raised by the club.'⁵⁹ A correspondent from Ulmarra, under the name of the fictional bush family, 'Dad and Dave' wrote,

Does he forget that 20 years ago, many of these swamps he is writing about were prosperous dairy farms? Then they were covered with valuable paspalum grass and natural clover, not with dirty water and useless blue couch grass which they would be now. . .

From my front verandah, we can count nine farm homesteads empty and falling down, where before the floods became so frequent, lived farmers and their families making a decent living.

To the dairy farmer the flood drains are a wonderful venture, giving us hope that we will be able to regain our lands from the swamps again, to be once more good farms.⁶⁰

In this way 'Dad and Dave' asserts that drainage work was reclaiming lost productivity – a contending memory and meaning of swamps, and a contending narrative of change.

G. L. Shannon of Woodford Leith, on the Lower Clarence, saw this transformation as a natural part of history and necessary for supporting growing populations. He weighed up factors involved; on the positive side

⁵⁸ 'Council Chairman Answers Drainage Work Criticisms', *The Daily Examiner*.

⁵⁹ Be Reasonable, letter to editor, *The Daily Examiner* 12.4.65.

⁶⁰ Dad and Dave, letter to editor, *The Daily Examiner* 2.4.65.

there was flood relief, on the negative, 'rapid changes in the ecological balance in the area'. He set out a resolution to this problem,

What then of the birds? Here we are faced with a situation which has occurred repeatedly during the history of man. . . Man has altered, and will continue to alter, the environment to suit himself. . . As the population of the world is increasing, we must accept these conditions to be part of our future.⁶¹

G. L. Shannon echoed the dominant ideas of progress of the time. He recognised a loss to natural environment, however loss was justified by the greater need of creating a more productive future, and providing for expanding populations.

And so what of the outcome of the Field Naturalists' protests? What recognition was given to concerns about conservation? Following the active campaigning in 1965 the County Council stated it would consider the Field Naturalists' specific recommendations. However for two years there was no formal response from the County Council, and no contact between the two organisations. In July 1967 Philip Strong attempted to reinstate correspondence with the County Engineer at the County Council. By December 1967, after repeated requests, the County Engineer said that he had not had time to deal with the matter but may be able to address it in a number of months. There is no record in the file of any response. During this time an investigating officer for the Wildlife and National Parks Authority (a successor to the FPP) met with the County Engineer. At this meeting the County Engineer said that he was unaware of protests about the effects of flood mitigation on wildlife.⁶² In the mid-1960s the concerns of the Field Naturalists, even though supported by a range of groups, were given very little recognition in decision making.

* * *

The Clarence Valley Field Naturalists were experienced in lobbying government authorities and engaging in mainstream public debate. They were

⁶¹ Shannon letter to editor *The Daily Examiner* 5.4.65.

⁶² Letters, and handwritten log, CVFN to CRCC.

also skilled in building support for their campaigns, they gained support from a range of local groups who shared their concerns about decline in swamps, such as sporting shooters concerned about bird population, and graziers concerned about the loss of drought reserve. They were also active in drawing upon elements of the conservation movement of the time, university based ornithologists, scientific organisations, natural heritage organisations and the government fauna protection agency. The archive of the Field Naturalists' activities provides a window on their activism in the 1960s, and the reception of this campaign by the local community and government agencies.

The conservationists were more engaged in mainstream public debate than other groups who also held concerns about flood mitigation - floodplain graziers, commercial fishermen, or local Aboriginal people. However the outcome was similar across these groups: a very limited recognition of their concerns. Major flood mitigation works continued until 1973 and after this period smaller works continued to be carried out. Research carried out in the 1970s and 1980s estimated that at least 60% of high value waterfowl habitat in coastal floodplains, had been destroyed or reduced, and that flood mitigation works were the main cause of this destruction.⁶³ Among this broad destruction to waterbird habitat the egret colony on the Coldstream River, which was a particular concern of the conservationists, was not drained and eventually this wetland gained some protection. This was one of the last areas slated for drainage works and by the mid-1970s when the Flood Mitigation Authority was going to carry out this work, they had modified their policy of wetland drainage.⁶⁴

Opposition to flood mitigation was based on the experience that the floodplain was richer, more abundant, and more valuable before the drainage works. A range of groups held concerns about the modification of the floodplain. For each of these groups their concerns were based on their

⁶³ G. N. Goodrick 1970, *A Survey of Wetlands of Coastal New South Wales*, CSIRO Division of Wildlife Research, Technical Memorandum No 5, p 24. R. Pressey, 1981, *A Review of Literature on the Floodplain Wetlands of Coastal New South Wales*, report prepared for the NPWS, NPWS, Sydney, p 62. See also R. Pressey and M. Middleton 1982, 'Impacts of Flood Mitigation on Coastal Wetlands in NSW', *Wetlands (Australia)*, no 2, p 27.

⁶⁴ Roy Bowling, Interview, 17 November 1997.

particular interactions, experiences and associations with the landscape: for graziers their concerns centred on loss of pasture for grazing; for fishermen the conditions need to sustain native fish; for Aboriginal people their concerns centred on the health of a range of living things and for conservationists, habitat for native and migratory birds. In addition these concerns were based on different types of interests in the floodplain landscape: for fishermen and graziers these concerns related to commercial use of the floodplain, the activity of running viable grazing enterprises and gaining an income from estuary fishing; for Field Naturalists their concerns related to an interest in conservation of native habitat for water-birds, and for Aboriginal people a broad interest in river health from their specific cultural background. These concerns about drainage were held by interest groups within the Clarence region and also by groups from outside the region, in particular groups and individuals associated with the conservation movement of the time.

Improving the landscape through modification

The string of severe floods of the 1940s and 1950s highlighted the difficulties for settlement on the Clarence floodplain. In these conditions flood mitigation was widely seen to offer great benefits, in particular offering additional security for intensive agriculture on the rich alluvial floodplain soils. A range of interests, both within the area and within government, considered flood mitigation as strongly beneficial: for local land-holders it fulfilled a long-held desire to reduce the risk from flooding; for local civic leaders it offered a path to regional development, and for state and federal governments the flood mitigation scheme fitted with their policy of using large-scale water engineering projects as a tool for promoting regional and national development.

Within the local area, and within government circles, the benefits from flood mitigation were seen to greatly outweigh the negative consequences, in fact it was broadly seen that negative impacts did not need to be considered. The commercial benefits from flood mitigation, to dairy and cane growing, were much greater, and easier to measure, than the possible loss to commercial fishing or grazing. Further it was difficult to prove, or measure, the negative impacts of drainage, as these negative impacts were all based on complex

ecological interactions, which were difficult to notice without specialist knowledge, and difficult to tie back to flood mitigation. For instance it was difficult to notice a decline in fish numbers, and then to conclusively prove that drainage works caused that decline. Even where negative impacts were documented, such as a decline in bird numbers from swamp drainage, this perception of decline was strongly challenged. Where losses were recognised they were often seen as justified by the greater benefits from drainage.

This situation of strong support for modification reflected the circumstances and conditions of the time: there was great optimism in the benefits offered by large-scale modification of rivers and floodplains; it was difficult to notice and measure the negative impacts in ways that were meaningful for the broader community and government agencies, and further where losses were recognised this was seen as justified by the benefits to the region. Overall there was confidence that modification led to an improved landscape.

In Section III we return to the Clarence region in 1980s and 1990s, when there was a reassessment of the benefits, and costs, of large-scale drainage works; the section explores the changing circumstances which led to this reassessment. In the following section, Section II, we explore the experience of landscape modification in inland region, the Balonne Floodplain, in the 1960s. The experience on the Balonne has resonance with the Clarence, in that modification of the river was broadly supported. However there were differences in the circumstances of development and in the opposition to development in this semi-arid region. It is to the contrasting experience of modification that we now turn.

Section II: Capturing water, Balonne River 1950s and 1960s

Chapter 3

Improving country, developing water resources

The decades from the early 1950s to early in the 1970s were also a time of significant development in the inland Balonne River region. In the coastal Clarence region, where there was an abundance of water, development focused on draining water off the land. In this semi-arid region, where the river flows were highly variable, development focused on capturing and storing the variable river flows.

Flows in the Balonne River are highly erratic; at times the whole floodplain would be awash with water, while at other times the area would be bone dry and even the main river channel would reduce to a trickle. Large water storages were constructed to even out the variability of the river, providing reliable water supplies for stock and for irrigating crops across the dry periods. This section, in line with the previous one, explores the ways that the modification of the river was supported and challenged in the 1950s and 1960s. However, while the previous section explored this dynamic in a coastal community, where there was an abundance of water, this section explores this issues in a semi-arid inland region.

In the early 1950s, at the beginning of this period of development, there were few water storages in the Balonne region. The towns of Dirranbandi and Hebel had small weirs, but the town of St George relied on a natural waterhole, the large pastoral properties had a few storage dams and many properties had invested in deep bores to tap groundwater reserves. During the frequent dry periods – when for a stretch of three years or more rain wouldn't fall nor the river flow – these weirs and storage dams would dry down to nothing. Only the largest waterholes, and deepest bores, would provide water.

By the early 1970s the number and volume of storages, both public and private, had expanded greatly. Private landholders built small weirs to hold water in the river channel; away from the river channel landholders dug out storage tanks, which could be filled by water pumped from the river. These storages provided secure supplies of water for grazing and small scale irrigated cropping. The state government, with its greater resources, constructed much larger storages. In early 1950 the government completed a large weir at St George, a seven-metre high weir that held a large volume of water. In 1972 the government completed construction of a large dam, just north of St George – the dam backed up water for almost 50 miles, and held ten times more water than the St George weir. These public storages provided water for irrigated cropping around St George. In fact, such intensive cropping was unimaginable in the area without large storages to capture the erratic river flows.

Since settlement the Balonne region had been perceived as a harsh, difficult and risky region – the frequent droughts continually undermined the viability of grazing, the main commercial activity in the region. In 1948, on the occasion of the region's centenary of settlement, a local civic leader commented that in this region, 'nature has been kind in spots and unkind in lumps.'¹ An older grazier told me his rule of thumb for understanding droughts – you could expect a drought some time every five years, however it may last for five years. A saying which I heard from another grazier is also evocative of the risky nature of farming in the area. He said that running a property on the

¹ St George Centenary Committee 1946, *St George Centenary Souvenir*, p 6, history files St George Regional Library.

floodplain is like rolling two dice – one for the seasons and one for the markets – and it was rare that they both came up as sixes. Water storages took some of the risk out of running stock in this dry region.

Water storages, both public and private, were intended to make commercial activity in the region more secure and profitable. Reliable water supplies provided graziers with more resources to ride out droughts. Reliable water supplies also allowed the region to diversify into irrigated cropping, growing improved pastures, grains, cereals and cotton. The region was well-suited to irrigated agriculture, since it had fertile soils, long hot summers; the only missing ingredient was secure supplies of water. Private water resources were generally called ‘improvements’ – embedded in this term is the idea that these developments ‘improved’ the property, made it better than before. In government circles the large-scale water schemes were called ‘regional development schemes.’ This term evokes the idea that these schemes were intended to provide a benefit to the whole region through stimulating economic activity.

This section, of two chapters, explores the ways that these modifications of the river system were supported and challenged, the ways that they were seen to be beneficial and detrimental. This chapter focuses on the process of modifications being undertaken – the particular developments which took place, and the benefits which were seen to come from these developments. This chapter pays particular attention to the experience of long term landholders; this perspective is revealing of the motivations for carrying out these developments. The following chapter (chapter four) focuses on alternative experiences and perceptions of these developments – that is, the ways that these developments were seen to have negative consequences, damaging important aspects of the area. Chapter four focuses on the specific experiences of the floodplain landscape which led people to hold this view and it also explores the recognition which these concerns gained at the time. These two chapters provide insights into the ways that modification of this river-system was supported, and challenged, in this time and place.

Weirs and tanks – improvements for running properties

In the 1950s and 1960s a major improvement undertaken by landholders was constructing weirs and storage tanks – weirs held water in the river channel and tanks stored water away from the river. The 1950s were a period of intensive development from a convergence of factors: money from the wool boom; renewed confidence in grazing; support from government departments and access to new and more powerful technology. Tractors were not widely used in this area until the late 1940s. Besides a lack of capital, the pre-1940s tractors were difficult to use on the sticky black soil. The personal stories and recollections of landholders who undertook these modifications reveal the motivations that drove these modifications, and the ways that these developments were seen as beneficial for running properties on the floodplain.

Jack Hammond knows a lot about the harshness of this country and the efforts to lessen the area's dependence on nature.² He used to own 'Ballandool' a 64 000 acre property on the Balonne floodplain, just on the Queensland side of the NSW / Qld border. Jack grew up not far away at Angledool on the Narran River, where his father was a shearing contractor. He remembers a river where boatmen ferried you across in floods and huge codfish could be caught in the water backed up behind the weir – *In the eyes of a youngster it looked like an enormous body of water I guess*. In 1929 when Jack was a teenager his family took over Ballandool. *We put down roots*, he says. From 1942 Jack managed the place and owned it from 1949 until 1979, when his son took over. His family had earlier associations with this property: his ancestors Henry and Albert Hammond were the original selectors who in 1864 'took up' this country, known as the Currawillinghi selection.³ Jack Hammond, like others in the pastoral industry, has an intimate knowledge of this country through the work of running a pastoral property – providing feed and water for stock, shearing, mustering and making improvements.

² Jack Hammond, Interview, 6 October 1997.

³ Mike Whitcomb (ed) 1989, *Hebel Hallmarks: A Local History*, Harrison Printing, Toowoomba, p 88.

On a cool afternoon threatening rain we talk on the wide veranda of his house on The Terrace at St George, overlooking the Balonne River. Today a 'fresh' is running. The river will carry this flow south-west across the floodplain. Further down, as the country flattens, the Balonne River bifurcates time and again into a complex system of rivers and miniature channels which fan across the one hundred kilometre wide floodplain. This slow moving fresh will take days to reach Ballandool, 200 kilometres away. I ask Jack about the value of water, and about which rivers flow through the property:

All of them. We've got the Culgoa, the Braire, the Ballandool and the Bokhara. All four of them flowed through it.

And yes, well, whilst in its original state, I guess, when it was first resumed off Currawillinghi [in 1909], it would have been totally dependent upon the rivers for stock water and domestic water and everything else.

In 1902, at the tail end of the enormous drought, they were absolutely devastated for want of water.

The rivers just didn't run. For how many years, I wouldn't know. But they were finished anyway, because there were wells sunk in the bed of the Culgoa to water stock.

There was a well on Ballandool, called Morley Well, which was sunk in 1902. And was a godsend to the property because it was their sole supply. And it was a very bounteous supply. ... They watered 10,000 sheep there, permanently, out of that well.

So, at that time while we had the rivers, there was no water in them.⁴

A drought at the beginning of the twentieth century is still remembered at the end of the century, invoked in conversation to illustrate the variability of this river system, the harshness of the country and landholder's efforts to make properties viable. After many decades the details of the location of wells and the number of stock watered are also remembered – these wells are named as a 'godsend' because they were critical for the survival of the stock and the property.

⁴ Jack Hammond, Interview, 6 October 1997.

Experiencing the harshness and unpredictability of the river system fuelled Jack Hammond's efforts to increase the capacity to store water, lessening his dependence on the rivers.

I mean, I've seen the time when that river didn't run for a couple of years.

And that's why on that property we're talking about, we saw fit to establish dams or tanks and artesian bores. You weren't totally dependent upon the river. And that was the story up till when I left the land.

We could get by, not as well as if the rivers ran, but we could get by if they didn't run. Put it that way.⁵

Tapping groundwater remained a focal strategy for decades, however from the 1950s landholders complemented their groundwater resources with permanent weirs and large tanks to capture and store water from the river system.

Weirs – capturing water in the river channel

In the 1950s many landholders built permanent weirs to hold water in the river channel. These weirs complemented the deep natural waterholes, the largest of which would hold water even in the longest drought. The water held by the weirs was pumped to homesteads and pumped to tanks for watering stock away from the river, and in addition stock could directly drink from the weir. Setting up a watering system was easier than in previous decades because of advances in piping and greater availability of small inexpensive fuel driven pumps. Each property with river frontage could apply for a licence to pump water from the river for what was called 'stock and domestic' needs.

Permanent weirs replaced 'mud weirs' – impermanent earth barriers which were built in the river channel. In understanding the ways that permanent weirs were perceived, it is useful to explore the comparison with this earlier technique of storing water.

⁵ Ibid.

Reggie Stanton, like many pastoral workers, knows a lot about mud weirs. Reggie spent many years working as a boundary rider for large pastoral properties on the floodplain. As a boundary rider he travelled around the property by horse, carrying all of his equipment with him: *most of it was a pair of pliers and some wire.*⁶ One of his tasks was building and maintaining mud weirs after a run of the river. Reggie says that it was a skilful job. You had to wait until the peak flow had passed and the water was slow moving, so that the pressure of the water wouldn't wash the dam away. When you judged that the water was right you pushed in a pile of mud to form a dam. Horses pulling scoops came in useful to move soil. Once it was made, then there would be a job in maintaining the dam, repairing any breakages, *oh it was quite a business.* If it all worked right the water would hold up in the channel behind the mud bank, until the water evaporated or the next large flow washed it away.

Henry Cross from 'Goonaroo', on the Bokhara River just north of Hebel, also remembers building mud weirs.⁷ Henry takes me down to the riverbank, a short drive from his house. He points out a ditch besides the river channel where he scraped out soil for building, and rebuilding, their mud dam; here the river channel is only a few metres across. When he was young, in the 1930s and 1940s, they used a 'Wonky Scoop' pulled by a horse to make the dam. First they used the scoop to build up a pile of soil on each side of the river. Once they had a large enough pile of dirt they would use this to make the dam. Henry says, you would dig the scoop in and fill it up with earth, walk the horse across the creek and dump it, turn the horse around and do the same again and again. All day you would walk backwards and forwards through the creek building up the earthen wall. Henry says that the old scoop is probably still out in the paddock somewhere. Henry remembers it being fun mucking around with these mud dams when he was a kid, but he says it was not so much fun when he got older and it took days of work. From the 1950s they used a small Ferguson tractor to maintain the weir and this made rebuilding it after each flood a lot easier.

⁶ Reggie Stanton, Interview, 13 February. 1997.

⁷ Henry Cross, Interview, 13 October 1997.

Henry and his family, in line with other landholders in the district, sought to make their water supply more secure by building a permanent weir. While mud weirs were useful they desired more permanent ways of storing water for stock and the homestead. Their decision was prompted by the fact that the river hadn't run for some time and a well which they relied on was failing, giving out poor quality water. The permanent weir is a short walk down the river from where Henry built the mud weir. Building this weir was an important improvement for the property and took a number of months to complete, making do with materials and machinery they had on the farm. For building materials they collected large rocks from around their property, carting them with their old Holden ute. It took some time to accumulate enough rocks and loose fill to build the weir. At a time when the river was dry they used a post-hole digger on their tractor to dig out the foundations. They then used their largest rocks as foundations and grouted rocks together to build up the six-foot weir. They finished the weir face with a two-inch coating of cement.

Henry says they had to apply to the Department of Irrigation and Water Conservation for a licence to build the weir: the Department regulated all structures and extractions from rivers. Henry recalls that gaining approval wasn't difficult, and that the Department would have allowed them to build it even higher. Today the weir still functions well. Over thirty years after it was built, water backs for about seven miles behind it, providing water for stock and allowing water to be pumped through a series of pipes up to the homestead and across the property. Goonaroo, like other properties with river frontages, had a licence to extract water for 'stock and domestic' purposes. Henry says that the weir almost always has water in it – it is only in the longest of droughts that it goes dry. Looking over the weir, and looking back over decades of running this property, Henry says that this weir has been a great improvement, making the world of difference in running his property.

Other landholders could draw upon greater resources in making improvements such as building weirs. Jack Hammond, from 'Ballandool' also had a long experience of building and rebuilding mud weirs, initially with

draught horses, then from the late 1940s with tractors, which allowed him to shift earth more easily.

And I can well remember I got sick of putting these mud dams . . . And I thought, 'Well I'm going to put something permanent in.'⁸

In 1955 he employed contractors to construct a weir in front of the main homestead – they built the weir around foundations of ironbark poles driven into the riverbank. This weir rarely went dry, providing a permanent body of water, from which stock could be watered, and from which water could be pumped to other watering points or to the homestead.

For Jack Hammond part of the experience of building the weir was having to deal with expanding government regulation of rivers and their water. Jack Hammond remembers being shocked by the new regimes of regulations:

And I went along to the Department and said, 'I want a plan to put a dam in.' And the bloke almost had an epileptic fit.

He said, 'What do you mean, put a dam in? Where are you going to put it?'

And I told him.

He said, 'Have you applied for a licence?'

I said, 'No. Have I got to have a licence?'

'Of course you have.'

'Well,' I said, 'We've been putting it in for the last 50 years.'

Anyway, I explained it all to him and he said, 'Oh well, you were doing it before the Department was established.'

While Jack Hammond was confronted by increasing government regulation of in-stream structures, he, like Henry Cross, found that the government regulatory agencies were able to accommodate their needs and issued licences for these structures. While in this period there was increased regulation, this regulatory regime supported the improvements which landholders desired to undertake.

⁸ Jack Hammond, Interview, 6 October 1997.

Sinking tanks – expanding water storages

The 1950s and 1960s were also a time when landholders greatly expanded the number of storage tanks on their properties. Whereas weirs stored water within the river channel, tanks held water away from the river channel. These were often called ring tanks – the ‘ring’ referred to the ring which the earth-bank formed around the dam. In other areas they were also called ‘turkey nest dams.’ The floodplain was an ideal place for building storages – the high clay content of the floodplain soils allowed little leakage. Tanks provided watering points away from the river frontage – water was pumped out of the tank into water troughs for stock. Having a series of tanks allowed land away from the river frontages to be stocked more intensively.

In the early 1950s the cost of sinking tanks decreased greatly, with tractors replacing horse teams. This allowed the practice of tank sinking to greatly expand in the area. The shift from horses to tractors provided more capacity in undertaking earth works on properties. In understanding how the tanks and tractors were perceived in the area, it is useful to look at the use of horse teams, the technology tractors replaced.

Henry Cross from ‘Goonaroo’ used horse teams for tank sinking on his property until the early 1950s. He remembers horse teams with affection, proud of the improvements they made to the property. In particular he remembers a tank sunk in 1952 by a contractor team ‘Sweet Apples,’ which was new to the area and wanted to make a good impression:

They made it 28ft deep, the deepest tank in the district at that stage.

They put it down in ‘52, it didn’t fill until ‘53. Since then we haven’t seen the bottom of it.

It waters two paddocks. It’s made a big difference. They got seven jobs in the district after that.⁹

In the early 1950s the average tank in the area was 12-15 feet deep, so a 28 foot tank represented a new level of storage. The depth of tanks was very important in this area. The average evaporation was 10 foot per year – people joke that on hot windy summer days you could see the water level fall by the

⁹ Henry Cross, Interview, 13 October 1997.

hour – so the deeper the tank the longer it would hold water. Henry says that sinking tanks is one of the greatest improvements he has carried out on his property:

We have better watering systems, we have a few more tanks. Water is the main thing, having a few more tanks has improved things out of sight.

However Henry also clearly remembers the difficulties of using horse teams, the slow pace of work and the constant concern about providing adequate feed and water for the horses. Henry recalls that one tank on the their property, put in by local contractor Jack Hart, took almost a year to complete,

He had eighteen horses. They would only work one day in three, they would be spelled for the other two days.

By the end we had almost run out of feed – the horses are hard on country. We almost ran out of the water for the horses as well. It took him a long time.

And even though he was a relation he sure charged a normal rate!¹⁰

Getting enough feed and water for horses was a problem and the horse teams competed with stock for feed and water.

Jack Geech from Hebel worked for many years with horse teams as a contractor. Jack's voice is quiet, softened by age, but from his handshake I get a sense of his strength from years of manual work. In his kitchen, where we sit talking about the river system and how the area has changed, there are photos of Jack working with tank sinking (Figure 9). Jack says that this photo would have been taken in about 1947 or 1948 with a team he worked with on 'Brenda,' near the Culgoa River just over the NSW side of the border. Jack and his wife Beryl are very active in local historical work, collecting, preserving and interpreting photos and other material, to keep alive aspects of the area's past, particularly the history of settlement and rural labour.¹¹

¹⁰ Ibid.

¹¹ Ibid.

The photos, showing horse teams coming up out of a tank, give a sense of the strength of the team of horses, which dwarf the people. The photos also give a sense of the enormity of the task – the tank looks huge and deep, a massive amount of earth to move with only the scoops pulled by the horses. Jack remembers tank sinking as repetitive and hard work. You were walking six to seven hours each day following the horse, he says, *All day plough and scoop, plough and scoop*. The team was made up of four people; one person had the job of getting up at dawn to catch the horses, harness and yoke them. The work would start at about ten in the morning once all of the horses were ready, *On a job you had to clear the land first, cut the roots, pull over the timber with a team. Then plough the land, then start scooping it out and building the banks.*¹² You would work through to about four in the afternoon, then let the horses go for the day, resting them for the next day's work. There were about 100 horses in his camp, most were worked everyday.

The amount of feed for the horses affected how long the contractors spent on a job – *if the feed was good they may take longer to do the job, that is if they don't have another job. It's cheap agistment for their horses. If the feed is running out then they may speed up*. Jack lived in the camp with his family, and when the jobs were some distance from the nearest town, they would only go into town about once a month. While the work was hard and living in camp isolating, Jack speaks with pride of those years of working with horse teams. He says it has left a positive legacy to the district: *tanks are one of the biggest improvements in this area*.

From the early 1950s contractors and landholders increasingly used 'crawler tractors' for tank sinking and other earthmoving work. They were called 'crawler tractors' after the steel tracks which they 'crawled' on, similar to army tanks. For Jack Geech the transition from horses to crawler tractors was something to celebrate; he says it was *carnival day* when they started using tractors. With tractors you didn't have to be up early catching the horses and yoking them up, your day wasn't constrained by how hard the horses could work, or when they needed to be spelled, or what feed and water was

¹² Jack Geech, Interview, 13 October 1997.

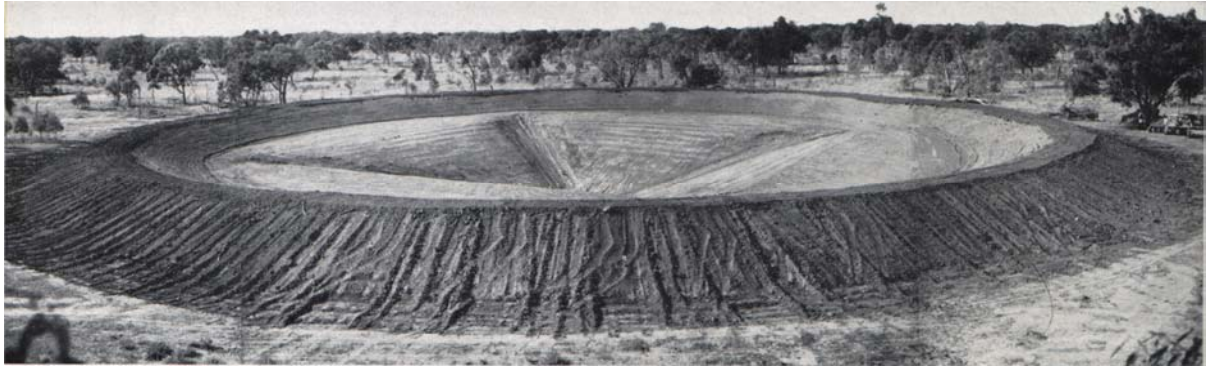


Figure 8: Ring tank on the Balonne floodplain

Ring tanks like these allowed landholders to store water on their properties.



Figure 9: Tank sinking with horse teams Bangate Station, Narran River 1947

Horse team were used through the 1940s for tank-sinking.

[photo collection of Beryl and Jack Geech, used with permission]

available. Jack says, *All you needed was to keep a bit of diesel up to them and they kept going.*

Tractors were desirable to landholders and contractors because they made undertaking improvements, such as tank sinking, much easier. Tractors operated on a different energy economy than horses. Horses relied on feed and water, tractors relied on fossil fuels – usually diesel – which could be easily carted, stored and easily converted into energy. Tractors could operate at a higher work rate and had more flexibility in the work they could do; however tractors also meant less need for rural workers.

Ken Murchison came to the Dirranbandi district in the 1950s as a tank sinking contractor with his own machinery; over the years he had various tractors including Caterpillar 40s, D7s and Fiats. Ken remembers the 1950s as a time when landholders had money to spend on improvements including tank sinking – *I did a lot of work down there around Dirranbandi, back then people had money from wool, things were booming, I did a lot of work, but never made any money!* Ken recalls that crawler tractors became much cheaper and more readily available in the late 1940s and in the early 1950s – for a time the market was flooded by cheap American army surplus from the campaigns in the Pacific Islands. Ken was a skilled diesel mechanic, able to maintain and repair all of his own equipment. Even today in his eighties Ken says he still has the knack, able to fix anything to do with diesel or hydraulics, though he says he's not much good with *this new electronic gear*. These skills, of working with diesel and hydraulic machinery, were highly valued, just as previously the skills of working with horses and their implements were valued. Tractors increased the capacity to undertake improvements – once landholders had adequate resources they rapidly adopted this new technology.

Irrigated cropping – increasing productivity of land-use

While water storages – such as weirs and tanks – were mainly used for stock and domestic purposes, they were also used for irrigated cropping. From the early 1950s irrigated cropping became an important land-use on the floodplain, supplementing grazing. Private land-holders diversified from grazing into irrigation and the Queensland State Government, through the

Irrigation and Water Conservation Commission, developed an irrigation scheme at St George. The public storage and the amount of water extracted from the river system was much larger than the small private schemes. However, both the public and private schemes were informed by the common intention of diversifying land-use and increasing the productivity of land-use. Also, both public and private developments were shaped by similar ideas of modification – that it was good management to modify the river to support the most commercially valuable use.

Irrigated cropping on the floodplain was used to produce supplementary feed for stock and ‘cash crops’: grains and fibre crops such as cotton. The alluvial floodplain soils were very suitable for cropping – they were highly fertile and held moisture well. Having a reliable source of water was crucial for irrigated cropping – crop yield depended greatly on the volume and timing of water – however the river’s erratic flows could not be relied on. Storages were critical for developing irrigation schemes in this region.

Compared to grazing, irrigated agriculture offered landholders increased control over both seasons and markets. By using irrigation landholders had more options in terms of what they produced and control over when water was applied to soil to maximize yields. They were no longer dependent on rainfall, or the natural floods; landholders could determine when to ‘turn on the tap’ to run water over soil.

Irrigated agriculture was also a more intensive land-use than grazing, requiring increased modification of the land and river system – land had to be cleared of vegetation, modified to correct slope, and prepared with furrows to carry the water. Finally, water had to be extracted from the river. Grazing, by comparison, relied on a different set of land-altering improvements, including developing water resources, clearing timber to increase pasture growth and introducing exotic pastures such as buffel grass. Irrigated cropping also required more intensive management – to maximise plant growth, the timing of planting, watering and harvesting was important. The simple act of flood irrigating a paddock required moving irrigation pipes every few hours, including throughout the night. Irrigated agriculture offered more control but

it also demanded closer management and increased modification of the land and the river-system.

Continual improvements – private irrigation development

In the late 1950s, husband and wife Tom and Noel Crothers from 'Booligar' on the Narran River developed one of the first private irrigated cropping systems on the floodplain.¹³ Their story of constructing this scheme is revealing not only of graziers' strategies for diversification but also the ways that benefits of modification were seen, and experienced.

Speaking over forty years after they began this development, Tom says that his experience of the harshness of the country was a key motivation for undertaking the improvement:

I worked on the theory that we got such a punishing in 1956 with the floodwaters that I would try and make use of them, harvest them.

So we got permission to build the dam and we built it.

And at the time... it was credited as being the largest one of its type in Australia.

Nowadays it's not even a puddle hole compared to some of them.¹⁴

Tom and Noel constructed an off-stream water storage by modifying a natural floodplain waterhole, called an 'ox-bow lake', which naturally filled in floods. They dug it deeper and constructed natural walls, to form a storage which covered 30 acres and held approximately 3000ML of water. They applied for, and gained, a 'water harvesting' licence, which allowed them to extract water when the river reached a certain level of flow.

The term 'water harvesting' is not only used in regulatory language, but is the vernacular term used in the area, in the 1950s and today, to refer to this practice of extracting water. The term 'harvesting' is evocative of the seasonal or episodic nature of this activity, gathering water at a time when it is available and then storing it for future use. It is also evocative of the river flows being seen as a resource, like a crop, which can be gathered and stored.

¹³ Tom and Noel Crothers, Interviews, 15 February 1997, 10 October 1997.

¹⁴ Tom Crothers, Interview, 15 February 1997.

Tom says that his intention was to use the irrigation scheme to make running his property more secure, in terms of its commercial viability, in the face of the area's variable climate:

The idea at that stage was just to grow fodder, to try and make it safer for us to carry the number of sheep we were carrying.

I had no intentions or desire to increase my carrying capacity, I just wanted to plug along with what we had, which was about 10,000 sheep at the time, 13,000 at shearing time.

And all I wanted to do was have a bit of a nest egg to try and run them a little bit better and save having to buy fodder when it came to drought time, or send them away on agistment. Both of which are just too damned expensive.

And I think I was probably the first one to experiment with silage out here.

Silage – green fodder which can be stored – provided feed which could be used when other feed was burnt off by drought or drowned by floodwater. Having this additional source of feed provided a buffer to lessen the impact of the variable seasons on their stock, and their financial bottom line.

After a number of successful seasons growing fodder crops, Tom and Noel Crothers set about expanding the irrigation system, diversifying into growing grain crops, which provided another income stream for the property:

And we satisfied ourselves that providing we flooded the flats once a year, that guaranteed us a ton of wheat [per acre]. Twice a year, we'd probably get a ton and a half.

So that's what we concentrated on, that sort of thing. And we grew quite a lot of wheat over the years, quite a lot of good wheat.

We don't water it every year, sometimes we get naturally flooded, then we don't have to water it.¹⁵

A characteristic of the deep alluvial black soil is that it slowly releases moisture, so for growing wheat it only needed to be flooded once or twice a

¹⁵ Ibid.

year. Using stored water, supplemented by occasional natural flooding, they could control the watering of country and increase the land's productivity. In the end Tom and Noel had 2000 acres of irrigated cropping on their 28 000 acre property.

Among floodplain land-holders, experimenting with new ways of using land was highly desirable where it assisted in increasing the productivity of properties. Land-holders were keenly interested in new uses of land and water – they observed what their neighbours were attempting, kept up with the latest research by government departments, and weighed up if it would benefit their property. This transition from grazing to agriculture was similar to the transition made by John Enseby, and other farmers, on the Clarence (see chapter 1). Both the Crothers' and Enseby's developments are remembered with a sense of pride for improvements to their properties in the face of difficult nature. On the coast, improvements focused on maintaining the regularity of production in the face of flooding; here in this inland area it was improvements to survive drought.

Tom is proud of the improvements that he made to his property. Reflecting on this work, in the context of a life history interview, he frames the benefit of these improvements in terms of maintaining his family's connection to this place, 'Booligar', and benefits to the district as a whole. Tom recalls a conversation with his father over forty years ago, when Tom was a young man in his early twenties,

'Oh, why don't you get a better district to live in son'. He said, 'sell the place and go inside.'

And I said, 'Oh no Dad, you've got 90 years up [for our family], I'll get a hundred.'

And now I've got 135.¹⁶

Tom is proud of the history of the Crothers family in this district. Among certain groups in the area the number of generations which your family has been in the district is a mark of status – by this understanding, the leading families in the district are those who have been in the area for the longest and

¹⁶ Tom Crothers, Interview, 10 October 1997.

contributed the most to civic affairs. The Crothers family, with its many branches, is one of the longest established families in the Dirranbandi district, having first settled here in 1862, only a decade and a half after the surveyor Mitchell travelled through the area. However, maintaining continuity of family in this difficult 'outside' country of variable climate relied on continual improvements, applying new skills and technology to managing the land. 'Outside' country marks the contrast to the less harsh 'inside' zone closer to the coast. Developing irrigated agriculture was just one of many improvements Tom carried out to keep the property viable and lessen risks. Other improvements included finding new ways to manage timber and regrowth, improving pasture with Buffel grass and other introduced grasses, constructing and maintaining fences and farm buildings and improvements in stock breeding. Tom calls his property 'a project' because there was always something to work at, to tinker with, to improve.

Tom and Noel's two sons now manage 'Booligar'. They have also continued the tradition of improvement and innovation, expanding the water storages, and diversifying into growing irrigated cotton – when this became possible and profitable. In their retirement Tom and Noel have gone 'inside,' spending more time at their holiday house on a pleasant part of the Queensland coast; retiring to the coast is a popular choice among graziers from the area. They still have a cottage on 'Booligar', where they stay to help their sons at busy periods and to spend time with their grandchildren. For Tom the years of work in improving the property continues to be a source of pride and a marker of identity. Reflecting on his legacy to the area, Tom hopes that he is remembered for his contribution to the district and the improvements which he has made, *And I hope, when I go out, that some people will be able to say, 'Well, you know, he did a fair bit for Dirranbandi District.' Or, 'He developed a pretty fair property down there.' And I think that's my standard.*¹⁷

¹⁷ Ibid.

Large-scale government irrigation scheme

In the 1950s and 1960s the Queensland Government, in line with private landholders, saw the benefits from developing water resources. The state government supported developments on private properties through providing a regulatory framework, licensing and tax incentives. However the state government also developed large-scale water storages at St George to provide reliable water supplies for irrigated cropping. In developing water storages the state government emphasised the benefits not only to individual landholders but also the benefits which flowed to the region and state.

The Queensland Government, similar to other state governments in the post-war decades, used large-scale water engineering projects as a strategy for fostering regional development. The Queensland Premier Ned Hanlon actively promoted water conservation schemes to support rural development – under Premier Hanlon the government’s funding of water resources increased greatly. The developments at St George marked the beginning of developments in the Queensland’s semi-arid region.

In St George on 28 April 1948, in front of a crowd of 750 people, Premier Hanlon fired an explosive charge to mark the beginning of construction of the St George weir and irrigation scheme construction. In his speech to the assembled crowd he outlined his hopes for the scheme:

We have a tremendous area of soil, capable of growing almost anything, and over a period of years, we have sufficient rain to supply adequate water to big areas.¹⁸

The St George weir provided a secure supply of water – the key ingredient for stimulating agricultural development in the region.

The Premier spoke of the St George irrigation scheme as a ‘pilot scheme’, to test out if irrigation development could work in these drought prone western

¹⁸ Premier Ned Hanlon, in Annual Report of the Commission of Irrigation and Water Supply, 1947-48, p 10, cited in J.M. Powell 1991, *Plains of promise, rivers of destiny: water management and the development of Queensland 1824-1990*, Boolarong Publications, Brisbane, p 230.

districts of Queensland. He also spoke of the St George scheme as marking an increased government focus on irrigation development:

This task is only a part of the giant scheme that is to be brought into operation following the formation in Queensland of the Irrigation and Water Supply Commission. Under our old order, irrigation was only a section of the Department of Public Lands. When the Government realised how important was this task of supplying water to our soil, it was thought desirable to appoint an Irrigation Commissioner, directly responsible to a Minister, so that he would have the same authority and access to the Government as an Under Secretary or a Commissioner for Railways.¹⁹

Government regional development strategies changed from time to time. In the first decades of the twentieth century, extending railways was one of the main strategies the government used to promote development in these western regions. In 1913 the government extended the railway to Dirranbandi, which was the end of the line and this transport infrastructure was critical for the development of the region, allowing much easier access to markets. In the late 1940s developing water conservation schemes became a key strategy for promoting regional development. Ensuring that the St George scheme succeeded was a priority for the newly created Irrigation Commission, and the St George scheme was consistently overseen by high calibre Commission staff.

The completed weir was 7.5m high and held 10 000Ml of water. The weir was called the Jack Taylor Weir after the local Labor member of state parliament, who consistently advocated for the weir. The weir was by far the largest structure on the river system, much larger than the small town weirs at Dirranbandi and Hebel, and much larger than the weirs constructed by landholders. The weir provided water for a government-run irrigation scheme 15km east of St George – by the late 1950s there were 50 irrigation farms of 600 acres each. Each of the farms had a licence which specified their annual allocation of water; when a farmer required water they put in an order to the Commission and the water was delivered to the farm through a series of channels and holding dams. A water wheel measured the actual volume of

¹⁹ Ibid, p 230.



Figure 10: Jack Taylor Weir, St George

The construction of this weir marked a major change for the region, increasing the capacity to store water and changing river conditions.

[photo by Damian Lucas]

water which entered their farm. The state government had two main intentions for the irrigation farms. They were intended to support the local grazing industry through growing supplementary fodder for stock. In addition, the irrigation farms were intended to diversify production from grazing into a range of crops. The government established a research station as part of the irrigation scheme to trial new crops and provide advice to farmers.

The development of the water storage and irrigation farms was strongly supported within the local area. Residents of St George had long held a desire for increased water storages. Until this time the town had relied on a deep section of the river which would occasionally dry out. The irrigation farms created increased commercial activity for the town of St George, in construction, in the management of the farms, in providing services and labour needed by the farms. The irrigation farms broadened the economic base of the region from grazing. The local grazing industry also welcomed the increase in local production of fodder and a number of local landholders took up farms in the irrigation area.²⁰

It took some years of trialling different crops for farmers in the irrigation scheme to work out what land-use was commercially viable – irrigators experimented with improved pastures and a range of crops. However, by the mid-1960s, the scheme was very successful. A 1965 government report promoted the benefits of the scheme:

Although settlers have experienced initial difficulties they have now acquired confidence in intensive land use under irrigation in the area for a wide range of crops including lucerne, perennial and annual pastures, annual fodder crops, annual summer and winter grain crops and cotton.²¹

The opportunity offered by the irrigation farms attracted many new people to the area, in particular farmers from other irrigation areas in Queensland, such

²⁰ Colin Chandler, Interview, 24 July 1996.

²¹ Department of Primary Industries and Irrigation and Water Supply Commission 1967, *Report on Extension of St George Irrigation Project*, QLD Government Printer, Brisbane, no. A 2 1967, p 1.

as Lockyer Irrigation area near Toowoomba, and farmers from the United States of America. These farmers were attracted to St George by the good growing conditions and the licences to reliable supplies of water. The American farmers played a key role in the development of cotton farming in St George, as they did in other irrigation areas, such as the Namoi and Gwydir River areas of NSW.²² By the mid-1960s, with the success of a range of crops, the irrigation scheme was fulfilling the government's intention of providing a catalyst for development in the region.

Convergence of support for expansion

In the mid-1960s the success of the scheme led to pressure to expand the storage capacity and the number of irrigation farms; a range of local and government interests supported this expansion. Farmers on the irrigation scheme were interested in having access to an increased volume of water and a more reliable supply of water; the crops that farmers were growing, particularly cotton, required a higher volume of water than the original storage could provide and at times farmers were faced with reduced allocation of water. For the town of St George, an increased number of irrigation farms offered more economic activity in the region and increased demand for support services.

The Irrigation and Water Supply Commission strongly advocated for the expansion of storage capacity and numbers of irrigation farms. The Commission presented a report which documented the benefits from the existing scheme, the limits of the current storage, and the benefits to be reaped from expanding the scheme; the Commission emphasised that the current scheme was drawing much more water from the weir than was 'safe' and thus needed more storage so to ensure reliable supply of water to the irrigation farms.²³ The Commission put forward a proposal to increase the water storage by over ten-fold and triple the size of the irrigation area; it costed the development at \$8.6 million with six years planned for construction. For the state government the proposal for expansion aligned with its continuing

²² Albert Brimblecombe, Interview, 13 February 1997.

²³ J.M. Powell 1991, *Plains of promise, rivers of destiny*, p 230.

strategy of developing water resources to support regional development. In 1967 the National Party government approved the plans for expansion.²⁴

In 1972 the Beardmore Dam, 15km north of St George, was completed. The dam held ten times more water than the existing Jack Taylor Weir, had a dam wall of 12.1m, held 110 000MI and the water storage covered 3350 hectares. Water back-up for 48 miles on the Balonne River and 11 miles on the Maronoa River. Two storages were also built on the Thuraggi Watercourse between the Beardmore Dam and the irrigation area and these held 9 000MI of water. Following tradition, the dam was named after the state parliamentary representative, in this case Jack Beardmore, a member of the National Party. The Commission increased the number of farms in the irrigation area and increased the volume of water allocated to each farm. In addition the government allocated water licences to farms, outside the irrigation area, up to 50km down the river from the St George. The expansion of irrigation further increased the economic activity in St George – St George developed much more than the surrounding towns, including Dirranbandi, which relied almost exclusively on grazing. The expanding economic activity continued to attract new people to St George so that in the early 1970s there was actually a housing squeeze in St George. To fulfil demand houses were transported to St George from the surrounding grazing regions which were experiencing a decline in population.²⁵

The development of water resources in the 1950s, 1960s and early 1970s was a significant marker of progress for the Balonne Region. The large public storages and the smaller private storages reduced the dependence on the variable river flows, increasing commercial activity in the region and increasing the ability of the area to hold, and attract, populations. A convergence of interests supported the development of water resources – local landholders, residents of towns and the Queensland State Government all saw the benefits from increasing the region's ability to capture and hold some of the river's variable flows. However, some groups in the area, based on their particular interactions with the landscapes, saw that the expansion of water

²⁴ Ibid.

²⁵ Albert Brimblecombe, Interview, 13 February 1997.

storages had significant negative consequences, and damaged or undermined important aspects of the river system. The following chapter turns to this contrasting experience of the modification of the river and it also explores the recognition these views gained in the region at the time.

Chapter 4

Steadying the flows: Noticing decline from modification

While modifying the river was widely seen as beneficial for the area, it was also seen as having negative consequences – that these modifications damaged and undermined valued aspects of the floodplain landscape. Building weirs and dams brought rapid change to the river system; before these developments there were few weirs on the river and little extraction of water. The Balonne community was a diverse one, and residents had a wide range of interactions with the river system. Residents noticed changes to landscape in differing ways depending on their particular experience of it – what they noticed, what they expected to see, what they saw as important.

A number of concerns about the modification were present in the Balonne community in the 1950s and 1960s. The most prominent concern was about the decline in ‘channel floods’ on the floodplain – that there was a reduction in the frequency of inundation of the floodplain from the storage and extraction of water. Graziers on the floodplain relied on these channel floods for rejuvenating pastures and the health of pastures was important for the success of grazing enterprises. There was also concern about the decline in the native fish in the region – that the modification of the river undermined the river as a place for fish habitat, particularly for the Murray Cod, the ‘trophy fish’ of the

region. Keen fishers had long noticed a decline in the native fish in the river, and the new weirs were seen as particularly damaging for native fish.

There were also concerns that collecting rock for building the dams damaged Aboriginal rock sites, specifically, a set of rock fish traps in the river north of St George. Gathering rock fill damaged this marker of past Aboriginal use of the river, erasing a link with this particular past. The St George weir also affected Aboriginal people's contemporary use of the river – when the weir was built a well-used Aboriginal camp on the river bank was closed down, and the inhabitants shifted to a smaller, less desirable site away from the river. This was a tightening of the social use of the river, restricting what was tolerated as appropriate use of the river bank.

These concerns were based on differing interactions with the floodplain: graziers' concerns were based on their experience of running commercially viable properties; the fishers' concerns were based on the experience of fishing; and the concerns about the disruption to Aboriginal heritage and living conditions were based on interest in current, and past, Aboriginal use of the river.

This chapter explores these concerns about controlling the river flows. It examines the specific changes in the floodplain landscape which were noticed; it also examines the recognition which these concerns gained in decision-making at the time. Exploring these concerns, and the recognition they gained, is important for gaining insights into the ways that controlling the river was experienced and contested in this inland community. This chapter has a number of axes of comparison with other chapters in this thesis: it sits beside the ways that modification of this inland river system was supported (chapter three) and how drainage of the Clarence floodplain was criticised (chapter two). This chapter looks at how concerns about similar large-scale landscape modification circulated in this inland community.

This chapter is based on life history interviews with long-term residents of the area, who were mainly in their late 60s or 70s when I interviewed them. They had experience with the pre-regulation river and saw the process of change to the river. The modification of the river, and the changes they saw

from it, were significant events for them, something they thought about and worried over. There is limited documentary material relating to these concerns; one reason is because they gained little space in public debate at the time. However, the life history material, of recollections of the 1950s and 1960s, provides a rich source of material about what people valued about the river system, how they saw it change and ways they acted to protect what they valued.

Loss of ‘channel floods’ – the experience of floodplain graziers

Graziers on the floodplain were strongly concerned about the decline in channel floods – where water broke out from the main rivers and spread across the floodplain through a network of intersecting streams. Floodplain graziers relied on the natural flooding regimes to rejuvenate the floodplain soils and, in turn, promote pasture growth. The large public storages were interpreted as causing a decline in this valued aspect of the river – for graziers, the more water stored in the dams and extracted for irrigation, the less water there was running across the floodplain. While there may have been benefits from developments there were also costs – in this case commercial costs for graziers.

Reg Betts, from the floodplain property ‘Balgi’ on the Braire River south of Dirranbandi, wrote his first letter of complaint in 1963, ten years after the Jack Taylor weir was completed. By that time it was clear to him that flooding regimes had been changed by the weir and water extraction. His 1963 letter was just the beginning of a long campaign for returning to pre-regulation flooding regimes. Reg had lived in the area all of his life and had taken up Balgi in 1947, so had first hand knowledge of the flooding regimes before the river was regulated. He was motivated to act because he was aware of similar concerns from graziers on the Namoi floodplain in north-west NSW when the rivers were dammed. Many graziers who had ‘flooded country’ were concerned by the changes further up the river system. There were some 60 properties which had flooded country on the Queensland side of the floodplain. In publicly raising these concerns in the 1960s, Reg Betts had the

support of the Hebel Progress Association. Graziers also raised their concerns through the local graziers' associations.¹

Jack Hammond, who lived on the floodplain property 'Ballandool' from 1929, knew the value of floods:

We always regarded floods as beneficial. If they were really big, they hurt for a while, but you got the benefits afterwards.

And then we used to look for that medium flood.

And by studying the heights up the river over a period of years you could pretty well say where the water was going to go. You'd say, 'Oh well, this country will go underwater, that country will go underwater. This'll be out.'

So you worked your stock around according to that. And, yes, floods were beneficial.²

Long-term graziers and farm workers observed the effects of different river flows over many years as they moved stock to higher ground during floods. From this experience they developed a detailed knowledge of which areas of their properties would be flooded. The ways the floods ran through the channels and inundated land was very complex – the floodplain is almost flat and water moves through a complex network of channels. Graziers and stockmen prided themselves on their ability to predict areas that would be inundated and this knowledge was important for running properties.

Graziers say that droughts had always 'worried the river', reducing the frequency of floods. However, the weirs rapidly changed the expected frequency and pattern of flooding. This decline in flooding, like droughts, had commercial costs for graziers. Graziers saw that the large storages affected the performance of the flooding regimes in a number of specific ways. The weirs were seen to reduce the frequency of these 'beneficial' medium floods. Rivers flows were 'held back' from filling the large irrigation storages; flows would run through the system only once these storages were full. During long dry periods, when graziers and irrigators most needed water, flows were strongly

¹ Reg Betts, Interview, 23 July 1996.

² Jack Hammond, Interview, 6 October 1997.

affected, because the empty storages would need to be filled before flows would run through the system. The large 'monster' floods, which came every few years were not changed. During these large flows, such as the floods of 1974, the whole floodplain was still inundated, as it had been before the large storages were built.

Graziers also saw that the way that flows moved through the system was changed, with flows not spreading across the floodplain as expected. Graziers saw that flows were more likely to stay within the main rivers, the Balonne Minor and the Culgoa Rivers, rather than breaking out into the smaller creeks and distributary channels which would spread the flow across the wide floodplain. In speaking about this change, graziers mention stories of landholders placing obstacles, such as fallen trees, in the major channels to direct the flows into the smaller channels towards their own properties. To counter this interference and keep water flowing towards their own properties, rival landholders would camp out at these bifurcation points. There is talk that this became so contested that landholders would carry guns to warn people off creating any interference.

Graziers actively lobbied the government authorities to get a return to the expected flooding regimes. Well organised politically, and skilful at political lobbying, graziers filled the ranks of many of the civic organisations in the area. In this campaigning, as in their perception of the changes, graziers perceived the river-system in terms of delivering volumes of flows. What was important to them was that the expected volumes of flow travelled down the river and spread across the floodplain, rather than being held up in the weirs and extracted for large-scale irrigation. They also couched their concerns in terms of equitable sharing of volumes among commercial users. As one grazier said, *water should be shared between the irrigators up there and sheep growers down here* and the irrigators should not be able to *get ahead* at the expense of the graziers. This view of the river was in some ways similar to the model used by the government river management agencies, which viewed the river through a water delivery model – they stored water and issued licences to irrigators. However, the difference with graziers was that they relied on 'natural' flows, did not have licences to water and could not so carefully calibrate the volumes of water. Irrigators measured precisely each megalitre of

water, and the dollar value of crops they grew from the water; flooding for pasture growth was not so easy to calibrate.

The government agencies gave some recognition to graziers' concerns about the change in flooding regimes. The government agencies attempted to address the concern about the disproportional impact on the different river systems – the concern that medium flows stayed in the large channels and did not spread across the floodplain. The Department constructed three 'bifurcation weirs' on the major rivers to encourage flows to spread across the floodplain. These are also called divisors, regulators or equalisers, because they 'equalised' the flows, such weirs consisted of a concrete structure at the river junction, with different wall heights for the two streams. The wall height determined the river level at which the flow would begin to run into the minor stream. These can still be seen on a map today: Bifurcation Weir One at junction of Culgoa River and Balonne Minor, above Dirranbandi; Bifurcation Weir Two at the junction of Balonne Minor and Narran River, just below Dirranbandi, and Bifurcation Weir Three where the Balonne Minor bifurcates into the Ballandool and the Bokhara Rivers. That these weirs were built demonstrates that the government department gave some recognition to graziers' concerns. However, these weirs, which were intended to return some of the natural flood conditions, actually further modified the river flows, in particular reducing flows down the Culgoa River, which previously carried the bulk of river flows.

These three bifurcation weirs, moreover, did not address the larger problem of river flows reaching the floodplain in the first place. On this issue, graziers' concerns gained little recognition. The Department saw its role as managing the river to meet the needs of irrigators – the government had built the storage dams to promote irrigation and issued licences to provide resource security to irrigators. In addition, irrigators could justify their use of each megalitre of water: water-wheels measured all water which went on to a property and irrigators could directly trace the effect it had on crop yield. Graziers' access to channel floods and overland flows, by contrast, was only based on historical use and not codified in licences or law.³ Graziers also needed much larger

³ Poh-Ling Tan 2000, 'Conflict over Water Resources in Queensland: All Eyes on the Lower Balonne', *Environmental and Planning Law Journal*, vol 17.

volumes of water, and could not easily calibrate the commercial benefit from each flow. Also, the graziers' claim that flooding patterns had changed was difficult to prove objectively– the pattern of inundation was variable and there was no comprehensive mapping of inundation patterns before, or after, the storages were built. Also there was no comprehensive research linking a change in flooding patterns to a decline in pasture.⁴ In this way the government managed the river flows to provide resource security for the emergent industry of irrigation, giving little recognition to graziers' deeply felt concerns about the decline in flooding.

The situation for channel floods became worse during the 1970s and 1980s. In these decades the area under irrigated cropping expanded and the amount of water allocated by licences expanded, placing more pressure on the Department to manage the river to fulfil these allocations. In the late 1980s pressure mounted again on flows, with expansion of irrigation on the floodplain (this is explored in chapter 7). Reflecting on this situation, and his decades of campaigning for rights to flows for floodplain graziers, Reg Betts said, *the main lesson that I have learnt is that when it comes to management of water it is basically unfair.*⁵

Changing river dynamics – fishing the Balonne

The large public storages were also seen to undermine the conditions native fish needed to breed and live. This concern was most strongly held by people who fished – the hours spent dangling a line, catching and eating fish provided opportunities to closely observe fish and to muse about the conditions in the river for fish. Fishing offered a very particular window on the conditions of the river system. Also, fishing offered an entry point for concern about healthy river conditions.⁶ Fishing was enjoyed by many people

⁴ Research in the 1980s and 1990s confirm these concerns about decline in grasses and decline in fish habitat. See for instance David Mussared 1997, *Living on the Flood Plains*, Co-operative Research Centre for Freshwater Ecology and the Murray-Darling Basin Commission, Canberra.

⁵ Reg Betts, Interview, 11 October 1997.

⁶ For works documenting experience of Inland fishing, see Paul Sinclair 2001, *The Murray: A river and its people*, Melbourne University Press, Melbourne. Jane Roberts and Geoff Sainty 1996, *Listening to the Lachlan*, Sainty and Associates Pty Ltd, Sydney.

in the Balonne community – townspeople, farm workers, graziers, Aboriginal people and women and men in each of these groups, all enjoyed fishing. While fishing was widely enjoyed in the 1950s and 1960s, it was not an organised activity. The local recreational fishing club only formed in the 1970s and there was no commercial fishing on the Balonne.

Many fishers noticed a decline in fishing over the years. Kevin Waters, an Aboriginal man from St George, first fished around St George in the early 1940s, when he was a young boy. Over the years he has continued to fish, often with his children and grandchildren:

*It was a very good fishing river back in those days.
You could go anywhere where you'd get sufficient water and catch a bag of yellow belly or jewfish, no problem at all.
We didn't have to go so far then, just below the bridge, somewhere down there, and it was quite easy to get a few fish, no problem at all. . . .
But now you've got to go more or less until you get a fresh in the river before you'll get a decent bite.⁷*

Beryl Geach, from Hebel, has also fished over the years:

And I remember going down and throwing a line in, and you seemed to be able to catch a Yellow Belly any old time, or a Catfish. And plenty of Crayfish in the rivers.⁸

Cod, the largest and most sought after fish, is a particular marker of decline. Many people tell stories of catching large cod, weighting up to 70 or 80 pounds, a big load for a person to carry. Ken Murchison remembers seeing a huge cod caught in a waterhole north of St George,

I saw an 80 pound cod pulled out of the Begorrah hole. Best hole on the river. . . . Begorrah had one of the longest waterholes on the river, good place to catch cod.⁹

Emmaline Schoonelveldt-Ried et al (eds) 2002 *Fish Everywhere: An Oral History of Fish and Their Habitat in the Gwydir River*, NSW Fisheries, Ballina.

⁷ Kevin Waters, Interview, 28 July 1996.

⁸ Beryl Geach, Interview, 14 February 1997.

⁹ Ken Murchison, Interview, 7 October 1997.

These massive fish, which made for good eating, were seen as a marvellous aspect of the river. Many residents remember catching cod with ease. Doug King, from St George, remembers the ease of catching cod back in the 1950s, *Well, you'd catch a cod with hand lines, in those days, no worries at all.*¹⁰ Reg Betts who was a keen fisherman also recalls catching cod, *Well, the main sought after one was the Murray cod, and we did catch plenty of them.*¹¹ These stories of catching large cod and the ease of doing so are all told in the past tense; the river is no longer seen to sustain such large numbers, or such large cod.

Fishers made a connection between the decline in fish that they observed and the controlling of the river flows. The impact of the large storages was seen as one important cause, among many other changes to the river-system, for the decline in fish. Native fish relied on the natural river conditions. They had evolved around these specific conditions – the variable flows, the deep waterholes. Controlling the flows changed these natural conditions: the river was not the same river as it was before.

Markers of decline

Within the broad picture of change noticed by fishers, a number of specific moments indicated to them that the conditions in the river had declined. The changes noticed to the river system were complex, as were the ways that they affected fishing. There were three main dimensions to the changes: barriers to flow and blocking passage; increased siltation of favoured deep waterholes, and increase in turbidity (murkiness of water).

Barriers to flow

The large and small weirs, which captured and stored the erratic flows, were seen by fishers to block the passage of fish up and down the river. In a similar way, floodgates on the Clarence River floodplain also were seen as barriers to fish passage (see chapter 2). Ken and Marleen Murchison from St George clearly remember the confusion of fish in the early 1950s when a flow spilled

¹⁰ Doug King, Interview, 10 February 1997.

¹¹ Reg Betts, Interview, 11 October 1997.

over the recently completed 18 foot high Jack Taylor weir at St George. This moment of chaos for fish from the recently completed weir has stayed with Ken across all these years, as an example of how the river changed:

Ken: The first time they shut the water off, down here at the weir, the water below the weir, was just a seething mass of fish. Yellowbelly mainly.

And people were going down there, with three bushel wheat bags... they were catching half a bag of fish. Do you remember Ozzie next door Marleen? And all the fish? The first time they shut the water off at the weir here?

Marleen: You couldn't possibly eat them. They could only throw them away.

Ken: They just caught them in thousands.

Marleen: Wasting them.

Ken: Oh, you could track yourself from the middle of the town to the weir. I don't know why people... I know I went down about four days afterwards and I couldn't catch a fish.

Marleen: Wasn't that always the way!¹²

The same event occurred at other times when fish, sensing a river flow, swarmed below the weir but couldn't proceed any further. When a 'fresh' was running at St George, the area below the weir was one of the best fishing spots in town – the swarming fish were an easy catch. These structures, large and small, changed the river conditions for fish. Fish stuck at the bottom of the weir wall were just one indicator of the wider changes these structures caused for fish.

Silting of waterholes

Silting up of the deep waterholes was another negative change to the river which fishers linked to the storages. People perceived that the storages changed the flows, in turn affecting the ways that silt and sand aggregated in waterholes. Deep waterholes were rich places for catching fish, particularly

¹² Ken Murchison, Interview, 7 October 1997.

the prized cod, as keen fisher Doug King said, *If you want to catch good cod you've got to have good deep water.*¹³ Fishers closely watched the conditions in waterholes. They were popular places for fishing where people spent many hours, and to which they returned year after year.

Many fishers recall seeing their favourite waterholes silting up. Beryl Geach, a long-term resident of the Hebel area, reflected on changes she has seen over many decades,

Oh, the rivers have silted in a lot of places.

You know, sometimes where the river would have been deeper there's sand banks and silt now. Some of the areas where there was really good waterholes, they're not nearly as good.

*Out in the Culgoa River there was quite a lot of waterholes that never went dry, which doesn't apply anymore.*¹⁴

Reg Betts also noticed a change in a favourite waterhole. He remembers going to one particular hole in the early 1950s and testing the depth – he put his 18ft bamboo fishing rod all the way into the water and it didn't even touch the bottom. Returning a few years later the end of it stuck out 4 feet. Silting up of these waterholes meant that they longer held such deep water; the silt and sand also covered up the snags and rocks fish needed for breeding and feeding.

Fishers saw a connection between the silting of these holes and the change in river flows from the storages. Beryl Geach saw the change in flows as the cause for the siltation of river holes:

*We are not getting regular runs through, all the weirs are steadying the rivers down. We're not getting enough water to keep it running.*¹⁵

The 'steadyding down' of the flows was seen to cause change in how silt built up in these waterholes. The bifurcation weirs, or regulators, which were built on the floodplain following lobbying from graziers, were seen by some to compound the problem of silting of holes, particularly on the Culgoa River

¹³ Doug King, Interview, 10 February 1997.

¹⁴ Beryl Geach, Interview, 14 February 1997.

¹⁵ Beryl Geach, Interview, 13 October 1997.

which was the largest floodplain river with the largest waterholes. The bifurcation weirs also provided another barrier to fish passage.

While many fishers attributed the silting of waterholes to the building of weirs, it is important to note that silting of waterholes had been noticed as a problem long before the weirs were built. For instance, in the 1940s there was strong concern regarding silting of waterholes. This was mainly seen to be caused by soil erosion from grazing practices, in particular, over-stocking and clearing of native vegetation. Seeing siltation as caused by the weirs drew attention away from the environmental damage caused by grazing, and did not recognise that this had been a long-standing problem. However, for many people the weirs were a rapid change to the river and it made sense to them that this modification caused the sand and silt to build up in favourite waterholes.

I n c r e a s e d t u r b i d i t y

Fishers also saw a subtle change in the river – a decline in the actual clarity of the water, which they saw as an indicator of declining river health. These inland rivers are naturally turbid, because of the high silt load they carry. At times they would clear up a little, though they were never crystal clear.

Harry Mellon from Dirranbandi, now in his 70s, has fished the rivers around Dirranbandi since he was a boy; heading down to a waterhole with a friend and his boat for a few hours fishing has always been one of his favourite activities. Over years of fishing he noticed a change in water clarity:

*Yes, the river would be very dirty when it first ran through.
But after it'd stop running it would clear very quickly, which it doesn't do now.*

*Since they've put the weirs in here the water doesn't seem to clear.
You'd go down and put a spin [a lure] in the river you'd catch a cod no trouble.*

But it's not clear enough now to do that.¹⁶

¹⁶ Harry Mellon, Interview, 27 July 1996.

Reg Betts also noticed a change in clarity, but emphasised that clarity of water was seasonal,

See, these rivers, once, used to... every winter they would clear up and become crystal clear.

And you could use artificial lures then to catch cod, and we used to catch a lot of cod.¹⁷

Fishers noticed this change from the hours spent on the river and the practice of using artificial lures, called spinners, which could only be used in clear water when the fish could see them. Spinners were a propeller type of lure, usually red on top and silver underneath. As they were trawled through the water they would spin and flash. The cod would strike at the flash thinking it was a small fish. In muddy water, when the fish couldn't see the flash, fishers used live bait – such as worms, shrimps or crayfish – the fish could home in on the smell.¹⁸ Spinners allowed fishers to closely monitor the clarity of the river conditions. Harry Mellon says that he hasn't used his spinners for years, they have gone dusty on the shelf in his shed. That the river didn't clear as frequently was seen as a further indicator that the river had become unhealthy.

* * *

Fishers had a keen understanding that native fish relied on the natural conditions of the river; that their patterns of breeding and feeding were woven around the natural river conditions, with all their variability. So fishers interpreted the modification of the river system – building barriers to flows, changing flow conditions – as undermining the conditions fish needed. The increasing difficulty in catching fish, the barriers to flow, the silting of waterholes and the increase in turbidity were all indicators of this decline.

This interpretation of change, in its broad outlines, is supported by current scientific research. This research points out that native fish evolved based on the complex conditions of the natural river; changes in these conditions, such as all the changes introduced by large storages, undermine the conditions

¹⁷ Reg Betts, Interview, 11 October 1997.

¹⁸ Ibid. Harry Mellon, Interview, 27 July 1996.

needed for native fish.¹⁹ Research is clear on the damage to fish from barriers to fish passage and that increased turbidity and siltation affect fish habitat.²⁰ So these views of fishers align with other bodies of thought on the effect on fish from changes to rivers.

Little recognition of concerns

While fishers were concerned about the effect of modification on the health of native fish, this concern gained little recognition in the public management of the river – no measures were taken to mitigate the damage caused to fish habitat from building large and small storages. In fact the decline caused by the small Jack Taylor Weir was exacerbated by the much larger Beardmore Dam, where no account was taken of the effect on fish. While some mitigation measures were made for graziers, by building the bifurcation weirs, there was no similar action for the non-commercial interest of native fish habitat.

In the mid 1970s there were some limited mitigation measures – the Department of Fisheries provided fingerlings to local fishing clubs for stocking, particularly for large weirs and dams, and to promote recreation on these new bodies of still water.²¹ However there was no effort to improve fish habitat which was damaged by the modification. In fact, the restocking targeted these large storages partly because these large areas of still water were not natural habitat for native fish.

In the 1950s and 1960s it was difficult to comprehensively demonstrate these concerns about a decline in fish. Tracking this decline and causation was a slippery fish, so to speak. On the Balonne, as with other inland rivers, there was no comprehensive survey of fish before the weirs were built, and no comprehensive survey afterwards in the 1950s and 1960s. To the casual observer, and even the casual fisher, it could appear that there were still fish in the river – people still caught yellowbelly, silver perch, the occasional catfish

¹⁹ David Mussared 1997, *Living on the Flood Plains*.

²⁰ Ibid. W.J. Young, CSIRO Land and Water 2001, *Rivers as Ecological Systems: The Murray-Darling Basin*, Murray-Darling Basin Commission, Canberra.

²¹ Doug King, Interview, 10 February 1997.

and even the occasional large cod. With the seasonal fluctuations in the river and fish catches, it was difficult to see a consistent pattern of decline. Furthermore, if there was a decline, it was difficult to link it to the building of the weirs and dams, as opposed to other changes to the river, or to seasonal variation. The enjoyable activity of fishing offered a window on the river; however, this perception of decline remained anecdotal and fragmented, and gained little recognition.

As well as the issue of demonstrating this decline, there was the overriding issue that the river was primarily managed for delivering water for irrigation. The interest of fishing, an unorganised recreational activity, was not given strong consideration in management of the river. In managing it, the Department conceptualised the river in terms of providing water for irrigation – storing water and regulating its use by different irrigators. In this way of perceiving the river it was difficult to recognise the need of fish, and fishers, and that the river may in fact be damaged by these changes. Not only was fishing not recognised as an interest – its way of conceptualising the river was also not recognised within management frameworks.

Disturbing sites of Aboriginal heritage

Constructing the weir at St George and associated works created a strong demand for rock to build the structures – contractors sought out good supplies of rock throughout the area. There is some evidence that sourcing this rock erased Aboriginal fish traps on a shallow rocky stretch of the river north of St George. Such rock sites were an aspect of the pre-regulation river, which provided a link to the deep history of the sophisticated use of the river, and the lives lived along its banks, long before Europeans arrived.

In the course of my research I have collected only limited evidence of the existence of these fish traps and their damage; my understanding of this is based on the recollections of Ken Murchison, a long-term St George resident who was familiar with this site (which was on the property Begorrah, owned by his father-in-law Andy Nixon). Ken worked extracting the stone and has a keen interest in the history of the area. Recognising the limits of this evidence,

it is still important to note this dimension of change to the river in controlling the flows.

Ken recalls that the fish traps were made up of a maze of small pools formed by large river rocks, *the fishery was laid out like sheep yards and covered roughly a third of an acre of the river bed . . . it was really something to see.*²² The maze of pools trapped fish swimming up the river, confusing them and slowing their passage – the disoriented fish could then be caught easily. There is a very well known rock fishery on the Darling River at Brewarrina, some 400km south of St George, which works on the same principle. The Brewarrina fish traps were documented in a series of photographs in the 1880s. Even though they have been damaged by stones being removed and a weir being built across part of the structure, they are still evident in the river today.

The Balonne fish traps, Ken recalls, were an important place for collecting rock for the St George weir and a causeway at the nearby Thuraggi Lagoon. Ken remembers the skill and ingenuity they used to extract the large rock and to prepare it to be put through the ‘crusher’,

The biggest stones would have been two feet wide, we used to put three in a carry-all.

We found a way to break those – there was plenty of dead pine there, we put dead pine rails underneath, and burnt them. And the rock broke up easily then.

*Then it had to be knapped into smaller stone. The margin was probably to leave the stone big. Well, it went from those stones, down to the size of a two litre ice-cream container.*²³

In the late 1960s more rock was extracted from this area for constructing Beardmore Dam. This work removed most traces of the rock fishery.²⁴

Thinking about this decades later, Ken is surprised that it was ever allowed to happen and that Andy Nixon, the property owner, gave them permission to

²² Ken Murchison, Interview, 7 October 1997.

²³ Ibid.

²⁴ Ibid.

do it. Since then, Ken says, his views have changed, *I didn't value Aboriginal things then*. Ken says that the fish traps were of *considerable importance but it wasn't realised at the time*. If they were still here today, he says, visitors would flock to see them. In the 1980s and 1990s the Brewarrina fishery was a focus of a revival of Aboriginal culture in the area – the local Aboriginal community built a museum and cultural heritage centre focusing on the fish traps.

Ken Murchison's recollections suggest that this particular aspect of the pre-regulation river was damaged, even erased, in controlling the flows and creating a modern, regulated river. This concern is based on a perception of the river which valued the physical markers that provides a connection to the history of Aboriginal use of the river. This set of concerns, and this perception of the river, gained little recognition in the area at the time – in the public discussion or management of the river there was very limited concern for avoiding, or mitigating, damage to such aspects of the pre-regulation river. In building the modern river layers of the past were erased.

Disrupting Aboriginal living conditions

In the 1940s, Aboriginal people lived in a camp on the river bank opposite the town of St George. The camp was on the western bank of Balonne River, opposite the town. It began near the wooden road bridge across the river and extended a fair distance north along the riverbank – from the camp it was an easy walk across the bridge and into town. The camp was made up of basic tin shacks built in the low scrub. The camp was known as 'old Hollywood', an ironic reference to the lack of glamour in the camp. This camp, like other similar town camps throughout southwest Queensland and northwest NSW, provided Aboriginal people a reasonably secure place to live, for little cost, close to the services the town offered, and close to work in town or on surrounding properties. These camps were often called 'fringe camps', because they were 'fringe' to the mainstream town activities. However, they were central to lives and social networks of many Aboriginal people in the region. Being by the river offered many of benefits – water for washing and drinking, fish for eating and the riverbank was a good place to spend time, particularly for young people and children, with endless opportunities for playing by the river. Many camps throughout the region were located on

riverbanks; for instance, there was a riverbank camp on the edge of Dirranbandi.

During the construction of the St George weir in the early 1950s the town authorities closed down the riverbank camp. The people who lived at the camp were shifted to a new site on the edge of town, which had simple shacks, one tap for town water and pit toilets. The reason the authorities gave for closing down the camp, as recalled by long term residents, was that the camp was impinged upon by road works involved with the weir – the weir also served as a road bridge replacing an old wooden bridge and the road was realigned with this change.

The new site reveals a change, by the town authorities, in what was considered an appropriate location for a camp. The new camp was situated away from the riverbank, out of sight of the town, on a small contained site (of approximately one acre). It was on the ‘polluted’ southern edge of town, near the rubbish tip, and only had basic facilities. No longer was the riverbank considered an appropriate place for a sprawling camp. Although it is speculation, one assumes that with the building of the weir there was a renewed focus on the riverbank; an unofficial camp used by Aboriginal people was now considered out of place.

Closing the riverside camp had an impact on the people who lived in the camp – the riverbank had long been favoured as a place to camp. While it did not provide much in the way of material standard of living, it did provide a place where people could live in a way of their choosing; a separate domain for Murrumbidgee away from the surveillance of non-Aboriginal people. This concern about the shifting of the camp was based on the idea of the river corridor as a public space that could provide for a diversity of ways of living. With the weir there was a narrowing in the use of this open space. While this was a major issue for the Aboriginal people affected, these concerns gained little recognition in the decision-making at the time. Aboriginal people were not given a voice in planning and were not involved in public debate on such issues.

Limited recognition of negative consequences of modification

Within the Balonne community, a number of groups held concerns that valued aspects of the floodplain landscape were damaged by these developments. Graziers held concerns about loss of spreading floods. Fishers, from their close observation of the life below the water line, worried that native fish habitat was undermined by these changes. Some Aboriginal people held concerns about the restriction on the use of riverbanks, related to building the new weir. Some residents held concerns about the loss of Aboriginal heritage – which provided markers of past use of the river. These concerns were based on particular experiences of the floodplain landscape, through the work of grazing, the intimate experience of fishing, an interest in Aboriginal heritage, and the use of riverbanks for living space, which led people to value aspects of the pre-regulation river and notice their loss.

These issues gained little recognition in the Balonne community at the time – while they were strongly-held by some members of the community, they gained only limited legitimacy in decision-making. However graziers' concerns about the decline in channel floods did gain recognition – the 'bifurcation weirs' went some ways towards returning the spread of the channel floods. This instance of recognition allows us to look at the conditions under which concerns about modification were recognised. This issue affected an important interest in the region, and this interest groups was active in lobbying to promote their position. In addition, the issue could be addressed through a solution which was comprehensible and simply resolved by the government department; the weirs were a structural solution which directed flows. Furthermore, the solution did not impact the needs of irrigators, a significant interest in the region. However, in resolving this problem, the department actually further modified river flows. Graziers' concerns fitted within the management framework of the time.

The graziers' other concern, however, about the decline in the volume water getting to the floodplain, was not addressed. Addressing it would have had significant impact on providing water for irrigation. The concern about decline in fish was also not recognised. This did not affect a commercial interest and there was not a ready solution to the problem – there was little

comprehensive research on how fish were affected by such change to the river and less on how this damage could be mitigated. So while some issues were recognised, and attempts were made to mitigate them by the management bodies, other issues were not recognised in environmental management of the time.

* * *

In the 1950s and 1960s modification of the river-system was strongly supported in both the inland Balonne region and the coastal Clarence region. In both regions there were major developments of their river-systems: in the Clarence the floodplain was transformed through drainage works and in the Balonne many weirs, both large and small, were constructed. In both regions these developments were supported by key interest groups – local landholders, town residents, local councils, state and federal governments. Each group had their own specific motivations for supporting these developments. For land-holders these developments provided additional resources for running commercially viable properties, providing buffers against the harsh effects of nature. For governments, local, state and federal, developing water resources was seen as a key strategy for stimulating regional development. Across these groups, however, was the common idea that developing water resources was a way of achieving the key goals of stimulating commercial activity and holding populations in rural communities. In the 1950s and 1960s there was ample evidence to support this idea – where water resources were developed commercial activity increased and populations increased, though not always as much as intended.

In both areas, however, groups and individuals saw that modification of the rivers also had negative consequences for the regions; that the modifications damaged or undermined what was valuable about the area. The negative impacts were noticed by a range of groups – fishers, Aboriginal people, graziers, conservationists. These groups had interactions with the river that led them to see that valued aspects of the river-system were damaged, or undermined, in the process of modification. Fishers, both recreation and commercial, noticed these changes because the experience of fishing drew them into the life below the water line. The concerns of graziers and fishers

were based on their commercial interaction with the landscapes – with modification of the rivers they experienced a decline in viability of their commercial operations. Some groups, such as conservationists in the Clarence Region, backed their concerns with scientific research and had the support of a government agency – they used scientific research to document the loss of native bird habitat. However all of these concerns gained little recognition in environmental decision-making at the time. In both of these regions the benefits from modification were seen to greatly outweigh the negative impacts of modifications.

The following two sections (Sections III and IV) explore the perceptions of modification in both areas in recent decades, the 1980s and 1990s, when there was heightened awareness of the negative consequences of modification. These sections, in common with the previous sections, take account of the interaction of different interests and in particular, the local social conditions. These two sections provide further insight into the ways that modification is supported, challenged and reassessed.

Section III: Reassessing modification of rivers, Clarence River 1980s and 1990s

Chapter 5

A mysterious fish disease: Recognising damage from development

The 1980s and 1990s were a time of great change in the Clarence region. In the space of a few short decades there was a major shift in perceptions of modification of the river. In the 1950s and 1960s modification of the Clarence River was broadly seen – within the community and by the government – as bringing great benefit to the region. The river was seen as robust in the face of development, there were seen to be few negative consequences from such modification. Only a minority of groups in the region, and minority sections of the government, saw that development of the river had significant impacts, and these concerns gained little recognition in environmental decision-making (as explored in Section I).

However through the 1980s and 1990s there was increasing recognition, within the region and by government, of the negative consequences of modification of the river. This reassessment of modification was based on the perception that the river was fragile in the face of modification – that modification damaged and undermined important aspects of the river. Also the reassessment was based on the recognition of the benefits from maintaining the natural conditions of the river. In the Clarence region there

were increased efforts to repair and rehabilitate the river and moves towards sustainable use of the river.

This section, made up of two chapters, explores this reassessment of modification of the Clarence River. This chapter focuses on responses to a mysterious fish disease, which professional fishermen noticed on the Clarence from the early 1970s and was the subject of public debate in the early 1980s. Fishermen strongly felt that this disease was related to recent modification of the floodplain and they campaigned for solutions. This chapter explores the actions of professional fishers, a long-term commercial interest, in pressing for change; this chapter also places this campaign in the context of increased concern about development on the floodplain. This chapter provides a micro study of reassessment of perceptions of development.

The following chapter (chapter 6) takes a broader view of the reassessment of the modification of the Clarence River. It broadens out from the incident of fish disease and floodplain management and explores the wider concern with maintaining the natural conditions of the river. This chapter highlights the conditions, in the area and in the state government, which shaped this reassessment – in particular the influence of social change in the region and the influence of changing government direction.

The 1980s and 1990s were a period of heightened awareness of the impacts of development on the riverine environment – at a national and international level. From the mid-1980s the federal government, both Labor and Liberal, was very active in promoting ecologically sustainable use of rivers, for instance through the Murray-Darling Basin Ministerial Council and other initiatives. At an international level, impact of dams was a major issue at the United Nations sponsored Earth Summit in Rio in 1992. In addition, the report of the World Commission on Dams, released in 2000, was highly critical of the negative consequences of large dams.¹

¹ United Nations Conference on Environment and Development 1993, *Agenda 21: Programme of action for sustainable development*, United Nations, New York.
World Commission on Dams 2000, *Dams and Development: A New Framework for Decision Making – The report of the World Commission on Dams*, Earthscan, London. The World Commission on Dams (WCD) was born out of International Conservation Union and World Bank sponsored workshop in Gland, Switzerland in April 1997.

However, the particular local conditions shaped how these broad concerns with modification of rivers played out. So it is important to explore the particular response in specific regions. The inland Balonne region had a contrasting experience to the coastal Clarence region in the 1980s and 1990s. In the Balonne region significant elements of the local community and the Queensland Government continued to perceive large-scale modification of the floodplain as beneficial for the region; in defiance of the wider trend towards heightened awareness of the negative consequences of development. This contrasting experience is explored in the following section (Section IV).

So now we turn to the Clarence River in the 1970s and 1980s, where estuary fish were effected by a strange disease.

A mysterious fish disease

In the early 1970s fish in the lower Clarence River were affected by a mysterious disease. The first sign of the disease was red spots, the size of match heads, forming under the scales and gills of fish; these spots gave the disease its name: 'red spot'. If the disease advanced, these spots developed into ulcers, which looked red and inflamed and ate away at the fish's skin and flesh. If the disease continued to advance, the fish's gills and eyes became covered by sores, and the ulcers would eat holes right through the fish. In its most advanced stages the ulcers would eat away the fish's flesh, making their stomachs open, trailing behind them, and their tails held on only with a piece of skin.

Outbreaks of this disease were first noticed in 1972. The disease would come and go, professional fishermen noticed that outbreaks usually followed heavy downpours of rain – at these times they would throw back 40% to 70% of their catch because they were affected. During dry times the number of affected fish was much reduced, but still between 1% and 5% of the catch would be affected and would have to be thrown back. Fishermen noticed that 1974 and 1976 were bad years for the disease, that between 1977 and 1980 there were

minimal outbreaks, and that between 1980 and 1983 there were many outbreaks of the disease.²

Many people who fished noticed these outbreaks of fish disease – dangling a line in the water they would pull up a mullet with ulcers, or they would see a diseased fish swimming through the reeds on the river's edge. However, it was professional fishermen, and their organisation the Clarence River Fishermen's Cooperative, who were strongly concerned about this outbreak.

Professional fishermen were concerned about red spot because it affected their income – fish markets were not particularly interested in buying mullet, bream, whiting or flathead, which smelt rotten or had ulcers or ugly red spots. Because their income came from fish, they watched the river and fish health with concern. By 1983 they had seen over ten years of outbreaks and saw it threatening the viability of the industry.

Fishermen were disturbed by the unpleasant experience of catching fish with ulcers. Fish were expected to be clean and fresh; diseased fish were anything but. If fishermen struck a school of mullet their net could fill up with over 200 kg of fish, but during heavy outbreaks most of these fish could be covered with ulcers. Noel Everson, an experienced fisherman, wrote of the experience of netting diseased fish on the Clarence estuary:

Tuesday 31st May 1983 ... I shot [for mullet] just on dark and succeeded in netting a rather large quantity. Unfortunately, these fish were in a deplorable condition, most with very large ulcers into which the mesh had disappeared and I was having difficulty unmeshing them. Many were falling in half as I tried to remove them. The smell had me vomiting and after some hours I was dry retching. I could not unmesh all the fish and boated the last six pieces at dawn and came home for help.³

The smell is one of the things that fishermen strongly remember about dealing with diseased fish – the ulcers were covered with slime which smelt of rotting flesh – fishermen said that the smell would stay on them for days. For Noel

² Clarence River Fishermen's Co-operative Ltd 1983, Submission to Mr J R Hallam MLC, Minister for Agriculture and Fisheries, Subject: Ulcerated Fish, Clarence River Fishermen's Co-operative, pp 4-5.

³ Cited in Anon 1984 'The Red Spot scourge', *Rolling Stone*, March.



Figure 11: Fish with red spot ulcers

Ulcers, caused by red spot, ate away at fish's flesh.

Everson the smell was overpowering, 'You can smell them before they come out of the water.'⁴

Decline from recent modification

Fishermen were sure that these outbreaks were a recent occurrence. Noel Everson said he had been fishing on the river for 32 years, and that his forefathers had fished before him, 'They never spoke of anything like this and I can never remember it.'⁵ And they saw it was related to recent transformation of the river. As Mr Everson said, 'I don't think I am guessing when I say that it is the [chemical] spray from farms and councils and the drainage of swamps which has caused it.'⁶

Fishermen valued the river's ability to produce native fish – particularly the commercial target estuary fish of bream, whiting, mullet, flathead, prawns and oysters. Fishermen generally referred to the river as the 'Clarence river fishery' a term which emphasises the focus on fish production. However the productivity of the fishery relied on complex natural conditions of the river, native fish needed a healthy habitat to breed and thrive.

For instance mullet, one of the most abundant fish in the estuary, relied on a diversity of habitat, and a diversity of interactions between the floodplain and river, for their life cycle. Mullet spawn at sea, as juveniles they swarm into the brackish estuary to graze on the sea grass; the sea grass beds are underwater meadows for fish. In the estuary mullet also rely on nutrients from the floodplain and fringing mangroves – decaying vegetation from the mangroves and floodplain produce tons of detritus, rich in nutrients for mullet and other fish growing in the estuary. Once the mullet are 'roed up' they run back out to sea, turning up the coast, to spawn and die.⁷ Oysters grow in the channels of the estuaries; they gain nutrition from filtering the water that runs past them,

⁴ Mr Everson, quoted in, Anon 'Plague hits Clarence fish,' *Daily Examiner*, 30 May 1983.

⁵ Ibid.

⁶ Ibid.

⁷ Penguin Books 1998, *The New South Wales Fishing Atlas*, Penguin Books Australia, Ringwood.

feeding on minute matter in the water. The river, through the nutrients it carries, extends miles out to sea. Near-ocean creatures such as snapper and prawns are attracted by the nutrients the river carries out to sea.

For decades fishermen had noticed a decline in numbers of fish in the river. However, from the early 1970s – when most drainage works were completed – fishermen saw a rapid decline in fish numbers; the red spot outbreak was a dramatic and visceral marker of changed conditions. Fishermen saw that draining swamps, blocking off creeks and modifying tributaries for flood mitigation made the estuary less habitable for fish.⁸ In particular they noticed a decline in fish stocks in a number of reaches of the river where drainage works had taken place – South Arm, Coldstream River, Swan Creek, Broadwater Creek and Alipou Creek – previously all these areas had been rich fishing grounds.⁹ They also noticed a decline in non-target fish such as biddies and mussels – fish which weren't of commercial value, but an expected and familiar part of the river. Bucky Harris, a long term professional fisherman spoke of this broad decline in the river in an interview in 1990,

Let's look at two species, which I was aware of when I came to the river in 1946, there was literally millions of them in the river, and that was biddies and herrings. Two very small fish... You could look over the bank or under wharves, anywhere you liked in the 1940s and they were there in vast quantities.

I always look into the water wherever I go and I see very few of this species these days. They have practically disappeared. The fishermen used to catch a handful in their trawl nets but it was only a minimum what we caught. . .

Two other species that have disappeared has been a soft shelled mussel which used to grow ten, twenty mile inland from the sea,

⁸ Discussed in Chapter 3. Letter Co-op to CRCC 18.12.67, 'Advising members of the co-op have long been concerned with certain activities of the County Council, particularly as the regards to the construction of floodgates on the channels and also on the main tributaries which the Council have reconstructed for flood mitigation purposes. Requests a meeting with the full board and Council.' p 1, CRCC Archive, File 131-1.

⁹ Clarence River Fishermen's Cooperative Ltd 1983, Submission to Mr J R Hallam MLC, Minister for Agriculture and Fisheries, Subject: Ulcerated Fish, CRCC Archives, Preface. CRC Archive File 131-1.

*and there was a black sort of a mussel type of thing which used to grow on the piles on the wharves. They have disappeared also.*¹⁰

Fishermen strongly claimed that the decline in fish was not from overfishing – from their practices of trawling the river for fish – but from a range of recent modifications of the river. The drainage works, and the expansion in use of agricultural chemicals, were the most dramatic recent changes.

A transformed floodplain

Since the early 1960s the Clarence River County Council Flood Mitigation Authority (CRCC) had carried out major flood mitigation works on the Clarence Floodplain. The Flood Mitigation Authority built hundreds of kilometres of levees to keep small floods off the floodplain, and hundreds of kilometres of drains to rapidly return flood water to the river (see chapter 1). Individual land holders added private ‘feeder drains’ to the larger publicly funded drains. These works, the largest of which were carried out between 1963 and 1973, transformed the floodplain into the largest regulated coastal floodplain in NSW. These works aimed to control the destructive effects of flooding to allow for more intensive agricultural use of the floodplain.

Following the drainage works, sugar cane growing expanded rapidly on the lower river, taking over land which had previously been dairies, mixed cropping or grazing properties. A state government review of drainage works in 1980 noted that sugar cane was well-suited to the floodplain conditions and was the industry which benefited most from drainage works. It noted ‘Without these works the industry certainly would not have been able to expand to its present size.’¹¹ Sugar cane can withstand inundation for up to three days with little or no damage provided the drainage is rapid and thorough.¹² In the late 1970s sugar cane cultivation was the largest income

¹⁰ Bucky Harris, Interview, 7 April 1990, in Malcolm Tull (ed) 1999, *Oral History of the Australian Fishing Industry*, Fisheries Research and Development Corporation, Canberra [CD Rom].

¹¹ Soros-Longworth and McKenzie 1980, New South Wales Coastal Rivers Floodplain Management Studies, Main Report, Clarence Valley, Department of Public Works, Sydney, p 11-4.

¹² Ibid, ppA2-9, ppA2-6.

earner on the floodplain, earning \$11.2 million in 1979 while grazing and dairying earned \$3.2 million and \$1.1 million respectively.¹³ In the 1950s dairying and grazing had been the largest income earners, but both sectors had declined in these decades.¹⁴

Sugar cane is an intensive crop. Cultivation of cane, like cotton, is sometimes called an industrial crop, factory farming or power farming – in order to achieve consistently high productivity, many aspects of the production are controlled. Sugar cane growers, like cotton growers, were leaders in taking up opportunities provided by new technology – innovators or ‘early adopters’ in marketing terms. In the 1970s cane growing benefited not only from drainage works but also from a number of innovations: new frost resistant varieties; increased mechanisation, and the wide availability of a new wave of agricultural chemicals.

Cane growers on the Clarence were quick to take up the opportunities provided by these new agricultural chemicals, for they were useful in addressing the long held problem of maintaining productivity of intensive cropping. Pesticides and herbicides from the organochloride family offered solutions to problems which had long affected cane growing, such as the black beetle; use of deltridren, DDT and aldrin became common in the lower Clarence. New generation fertilisers were useful in increasing plant growth and sugar content. Cane was generally grown as a monoculture, and not rotated with other crops, so fertilisers were required to provide a fertile growing medium. The new herbicides were also used by the Flood Mitigation Authority, and other public bodies, for addressing the perennial problem of controlling weeds which grew along flood mitigation drains.

1983 – A major outbreak of red spot

In 1983 there was a particularly bad outbreak of red spot – fishermen claimed that often over 70% of the catch was diseased. The disease had been noticed on the river for over a decade, with this large outbreak it became not only a

¹³ Ibid, p 11-3.

¹⁴ Mick Moy 1994, *Cattle industry on the Clarence*, Mick Moy, Grafton.

concern for fishermen but the general public. The debate over this large outbreak provides an entry point for exploring the differing perceptions of this outbreak. The local newspaper reported the 1983 outbreak in dramatic terms labelling it a 'plague':

Daily Examiner, Monday 30 May, 1983

Plague Hits Clarence Fish

People have been warned against eating any Clarence River fish which show signs of physical abnormality.

The warnings have been issued by the Department of Public Health which said no part of any contaminated fish should be eaten.

An Iluka fisherman has claimed the mystery disease affecting Clarence River fish could destroy the local fishing industry.

The 1983 outbreak was seen as a threat to the local commercial fishing industry, which earned the area just less than a million dollars every year and employed scores of fishermen.

The red spot outbreak was also seen as a threat to tourist interests in the region. In the 1980s tourism was an important industry on the Clarence, and fishing in the estuary was one of the greatest attractions. Particularly over summer people would flock to lower river towns, filling camping grounds, caravan parks, hotels and guest houses. Recreational fishing on the vast estuary was one of the main focuses of tourism; tourists supported many tackle and bait shops, boat hire companies, repair shops, and fish tours. In common with professional fishermen, the tourist industry saw its interests threatened by red spot:

Front Page: Daily Examiner, Friday 19 August, 1983

Disease Threat to Tourism

The present Clarence River fish scare could pose a 'grave threat' to the local tourist industry, Big River Tourist Association officer, Mr Bill Day, said yesterday.

Speaking on comments at a recent Big River Tourist Association Meeting (BRTA) he said areas such as Yamba, Iluka, Maclean, and Harwood attracted thousands of visitors each year, and fishing was one of the main drawcards.

'Obviously not being able to eat these fish, because of their look, is one factor and of course it takes the fun out of the exercise as well,' Mr Day said. [. . .]

'It appears as though the problem is getting worse and something certainly needs to be done about it,' Mr Day said.¹⁵

Scientific research by marine biologists in the early 1980s could offer little direction in sorting out reasons for red spot or proposing action. Marine biologists from NSW and Queensland, where the disease also appeared in the early 1970s, had conducted extensive research on red spot. In Queensland a very similar disease appeared in estuaries. There it was called Burnett Disease, after the river where it first appeared. It was also known as QX diseases: Q for Queensland and X for Unknown. Marine biologists had identified a fungus that affected the fish, however they had little idea as to why fish became susceptible to this fungal infection. They saw it was related to fish becoming stressed and that 'heavy discharge of water' was a factor. They theorised that it may have been a change in temperature or salinity in the water which stressed the fish, however they could offer no coherent theory as to why this appeared in the rivers or what action to take against it. The local newspaper reported that the leading biologist, from the sum of his research, could offer little guidance - 'the only real advice he could give to fishermen was that they should not panic.'

Fishermen's explanations for red spot

Fishermen were frustrated with the response from marine biologists, they felt sure it was a recent occurrence. They pressed for action and in doing so developed and articulated their own idea of causation - why the disease occurred and how to stop it. They had very clear ideas of why this problem was occurring. Here we look at the two main understandings of the disease which circulated in the fishing community - one was drainage, the other, pollution from growing sugar cane. We then look at how these explanations were received in this time and place - that is, what recognition they gained.

¹⁵ *The Daily Examiner*, Friday 19 August, 1983, p 1.

Damage from drainage

Fishermen saw that the drainage works were damaging to the riverine environment, and red spot was the most visible manifestation of this damage. What for many in the district was seen as enhancing the area, making it more secure, was seen by fishermen as damaging valuable aspects of the floodplain landscape, and in particular, causing this disease which affected fish.

Barry Heyen, manager of the Cooperative, wrote in a 1983 report on red spot,

There is little doubt that, were a survey to be taken among professional fishermen seeking their opinion as to why there is an ulcerated fish problem in this estuary, they would almost, without exception, suggest that the drainage of the wetlands and blocking of creeks is somehow involved.¹⁶

Fishermen saw that the first outbreaks of red spot coincided with the large-scale drainage works on the floodplain. This point was recorded in a series of oral history interviews with fishermen carried out in 1977. Commenting on these interviews the researcher noted, 'A lot of the local fishermen blame the drainage channels for the problems they are having with the fish sores.'¹⁷ Fishermen saw that somehow red spot was connected with the process of installing flood drains and draining the swamps – this massive modification of the floodplain occurred at the same time as red spot appeared and red spot occurred at times of heavy rain, during which any water which sat in the drains washed into the river.

In the early 1970s fishermen had noticed a specific problem with flood drains. They saw that 'odorous water' flowing out of flood drains after heavy rainfall caused fish kills in the area around the drains. In 1972 the fishermen wrote to Grafton Council asking them to regularly test the water in the drains, to

¹⁶ Clarence River Fishermen's Cooperative Ltd 1983, Submission to Mr J R Hallam MLC, Minister for Agriculture and Fisheries, Subject: Ulcerated Fish, p 13.

¹⁷ S. Salisbury, R. Wilson and E. Woolmington 1980, *Fishermen's Views: Transcripts of interviews with senior members of the lower Clarence River fishing fleet*, Monograph No. 6, Dept. of Geography, UNSW, Royal Military College Duntroon. 'A lot of the local fishermen blame the drainage channels for the problems they are having with the fish sores.' p D4.

determine if it was toxic.¹⁸ The *Daily Examiner* in 1973 reported on these concerns of fishermen,

It was quite likely that reported fish mortalities were associated with the odorous water which had been mentioned as flowing from various flood drains after heavy rainfall.¹⁹

Jeff Richards, who was a professional fisherman, remembered the water flowing out of the drains as *nasty water*, and saw a connection between this water and the dead fish he saw floating in the river.²⁰

The Flood Mitigation Authority, in response to these concerns about ‘odorous water’, claimed that this dirty water flowing out of drains was the product of natural processes which occurred from time to time, and was not a recent change. The Chairman of the Authority, in November 1972, stressed that following floods water remained in waterholes and low lying pockets – this water became stagnant, then was eventually flushed into the river, possibly causing fish kills. The Chairman however welcomed any inquiry that the Fisheries Department wished to set up.²¹

So in the debate between fishermen and the Flood Mitigation Authority two contending narratives explaining the change were set up. One, by the fishermen who claimed that the ‘odorous water’ and the fish kills were a negative consequence of the recent drainage works. And another, by the Flood Mitigation Authority, that the dirty water and fish kills were a natural occurrence, not related to the recent drainage works; this was based on the idea that the drainage works had a neutral effect on the riverine environment.

The concern fishermen raised about red spot and drainage, in the early 1980s, echoed these earlier concerns about fish kills from water out of the drains. Fishermen claimed that the red spot disease was strongly related to the regulation of the floodplain. Before exploring the recognition given to the

¹⁸ Letter Co-op to City Council, 8.12.72. ‘History from Council File (Fishing Industry). CRCC Archive File 131-1.

¹⁹ *The Daily Examiner*, 16 October 1973 .

²⁰ Jeff Richards, Interview, 5 October, 1999.

²¹ Chairman in Minutes to Council, November 1973, CRCC ‘History from Council File (Fishing Industry), file 131-1.

concerns about drainage, we will turn to exploring the other main factor which fishermen claimed caused the red spot outbreak – pollution of the river from agricultural chemicals.

Intensive farming – polluting the river

For fishermen trying to make sense of red spot, and attempting to get public action on it, pollution of the river was also seen as a strong cause. In particular they were concerned about the river being polluted by run off from agricultural chemicals which came into wider use in the 1970s.

Fishermen saw a strong connection between the increasing use of the new chemicals and the disease which they saw occurring on fish. Bruce Paddon fished on the Clarence from the 1930s to the 1970s. In an interview recorded in Iluka in 1990 he spoke of how he saw this occurring in the Clarence River,

Then you mentioned something a while ago about pollution. Well in those days [when I started fishing] there was no such thing as pollution in the Clarence River.

But we found out that there is something which I wouldn't like to go on record as me saying, in case I get a kick back from it, but is definitely some type of pollution that is being washed into the river in heavy rain.

I believe some of the things have been banned now, I'll say no more about what actually it is, that affects all the fish and it's depleted our river stocks.

Well it's unbelievable how it's depleted them. When heavy rains come and we get a run off, it goes into the river and it causes a sore on the fish which, in about 90% of the times, the fish die. Occasionally you will see a fish that has a healed up sore when the salt water comes back.

Apparently this, what is called Bundaberg Disease, doesn't occur south of the Clarence River. There are some products of agriculture that are not grown south of this river. So I'll just leave it as that, as far as that goes. I won't say any more according to that. That has depleted our river stocks completely. Well not completely, well mainly.²²

²² Bruce Paddon, Interview, 9 April 1990, in Malcolm Tull (ed) 1999, *Oral History of the Australian Fishing Industry*.

Chemicals for farmers were seen as giving them greater control in growing crops. But fishermen, who conceptualised the river as an aquatic habitat for fish, a place for living things, perceived these chemicals as damaging the river. Fishermen imagined these chemicals being sprayed onto crops, then sitting on the ground and with the next rain being washed into the river, making it an unhealthy place for fish. Fishermen drew strong connections between particular spraying events and an outbreak of red spot. For instance one fisherman claimed that just before an outbreak of red spot in the Broadwater there had been aerial spraying of pasture and crops in the hills behind the Broadwater.²³

A researcher, who interviewed Clarence River fishermen in 1977, noted that most fishermen perceived that the river was polluted, whereas the general community did not hold this view.²⁴ However it was more specific than that. Fishermen's vernacular understanding of the river, as recorded in a series of interviews in the late 1970s, was imbued with knowledge of agricultural chemicals and their effects on fish life. The names of chemicals were a part of the fabric of everyday conversations: Aldrin, Dieldrin, Lindane, Rhisone, Chlordane, Anyhdrons Ammonia, Sulphate of Ammonia, Aqueous of Ammonia, DDT, Aretan, Arasan, Gammexane Cyanide. Talk of use of these chemicals, and their effects, filled conversation about the river, along with talk about which fish were running, or which fishing techniques were working.²⁵ For fishermen these could only be seen as making the river a poorer place.

Campaigning against pollution – Ray Black

People in the fishing community tell me that Ray Black could set me straight about this red spot business, so I go down to Yamba to speak to him. Today the river at Yamba is whipped up by a growing Southerly, the odd boat heading out is bounced around. A weak spring sun breaks through high

²³ S. Salisbury, R. Wilson and E. Woolmington. 1980, *Fishermen's Views: Transcripts of interviews with senior members of the lower Clarence River fishing fleet*, p D 5.

²⁴ Ibid, p C 14.

²⁵ Ibid, p. C3. There are many references to chemicals in the interviews.

clouds. Ray is happy to speak to me, finding some time between commitments at the Bowls Club. Though in his 70s, Ray has the voice of a young man and speaks slowly and with authority. In years of campaigning he has told his story of pollution and fish many times, and is happy to tell it again.

Ray grew up on the Clarence River at Yamba. The river provided a playground when he was young – he tells me he was quite a *Huck Finn character* always out on the water rowing for miles, catching fish and hunting birds, *I developed a tremendous love of water, and a love of catching fish.*²⁶ After a stint working in the city he joined his father and brother fishing for a living in 1950. Over the years he worked in all types of fishing: ocean trawling; ocean prawning and estuary trawling. In the 1950s catching prawns took him up to Queensland each winter – to Gladstone, Bundaberg and Southport Bay. It was only in 1994 at aged 67 that he gave it up.

Ray remembers when red spot *first raised its head on the Clarence*. He particularly remembers the outbreaks of infection in '76, '77 through to '79 and the early 1980s. He clearly remembers the terrible images of decay, seeing whiting and bream with the tails hanging off, or vomiting from pulling rotten fish from his nets.

For Ray the pollution of water by chemicals was compelling as an explanation for the outbreak. In the way that he sees it red spot began in Bundaberg, Queensland, *when cane farmers started to use organochlorine for the cane beetle*. These chemicals were so successful in getting rid of cane beetle, that it soon began to be used in NSW and on the Clarence. In Ray's interpretation, it was when farmers starting using organochlorides on the Clarence that the red spot outbreaks began.

The extensive drainage channels on the cane farms heightened the effects of these chemicals. Before the swamps were drained, in Ray's interpretation, run-off from sugar cane and other crops would pond in the swamps, allowing chemicals to settle on the bottom of the swamps; only the overflow water reached the rivers. However with the construction of over 120 flood mitigation

²⁶ Ray Black, Interview, 5 October 1999.

drains, all the farm water with its chemicals emptied directly and promptly into the river after rain.

In the way that Ray mapped the river, and chemicals moving through it, he also saw that farmers in other parts of the catchment contributed to river pollution. Over the years specific images and connections have stayed with Ray as a way of making sense of the outbreak,

Although the cane farmers have been accused of causing part of the problem, I think that the worst ones were the potato growers of Dorrigo. They used an immense amount of pesticide, in the form of dieldrin, aldrin and other organochlorines in large quantities to kill the potato beetle.

I recall one period being in Dorrigo in company with a potato grower, discussing pesticides, and he informed me that during one rainy season, when he had his fertilisers and pesticides washed off his lands with flood rains, he replaced it with further dumping of the said elements up to five times in the one season.

We found that when we got heavy rises on the Orara River, which rises up in the Dorrigo, we found that red spot created a greater problem during that time.²⁷

Rises from the Dorrigo part of the catchment have a distinctive purple brown colour, from the rich basalt soil running off the land, and are often called 'potato floods'. But for Ray, he saw that these floods also carried chemicals. From his mapping of the river, and understanding of chemicals, he saw a connection between these chemicals washing into the river at Dorrigo, and the red spot in the estuary, some hundreds of kilometres away. This web of causation has stayed with Ray across the years as a way of mapping the decay he saw in the river.

* * *

From this understanding of chemicals and this way of conceptualising the effect of chemicals on the river, Ray sought action to reduce the threat of red spot. Like other fishermen Ray was frustrated with the response from State Fisheries – their research efforts had failed to find a cause or a cure for red

²⁷ Ibid.

spot – so he pressed for thorough scientific research by marine biologists, and regulation of chemical use.

In campaigning Ray found it difficult to convince people that what he saw happening was a reality,

From a non-scientific person, it's very hard to convince people that what you're seeing is what is happening. Because you haven't got the back up of having letters after your name or being recognised as a trained biologist.

In campaigning on the issue he tried to gain support from other groups in the area,

It was hard to find allies really. . . .

But I rallied the support of a number of fishermen, and we took it to the local shire [Maclean], and they gave us some support. We took it to Grafton City Council and they were quite supportive, particularly a couple of Councilors. We had a number of public meetings in the Shire and the Grafton City Council.

And so pressure was brought to bear on the local member of day. But from his point of view, he was helpful . . . but he couldn't do anything except carry on the explanation from the Fisheries Department. So we had a problem there.²⁸

After a time talking, Ray pulls out an old scrapbook which he kept during the '70s and '80s. He lets me look through it while he heads out for a while.

Flicking through these clippings and letters I can slowly make more sense of the connections he made at the time and ways he tried to engage in public debate on these issues. There are old colour snapshots documenting fish with ulcers, with labels such as 'early infection 1976.' There are many letters to the editor of the local paper, putting the fishermen's line against criticism from tourist bodies, recreation fishing groups and the Flood Mitigation Authority.

The yellowing pages of the scrapbook reveal his efforts to gain support from sections of the growing international environmental movement. In February 1977, on behalf of the Fishermen's Cooperative, he wrote to the Rachael

²⁸ Ibid.

Carson Trust for the Living Environment in Washington DC. The Trust was set up following the success of Rachel Carson's book *Silent Spring*, which set out to expose the ways that new agricultural chemicals affected the natural environment. It particularly described the non-specificity and persistence of agricultural chemicals and the tragic effects on all manner of native ecology – plants, birds, fish and other animals – showing that modern high-technology agricultural practices had a detrimental impact on natural systems.²⁹ *The Silent Spring* presented in dramatic terms the conflict between high-technology agricultural practices and the natural environment.

The Carson Trust responded to Ray's inquiry and suggested that he contact experts in fish toxicology from the United States Fish and Wildlife Service who were 'thoroughly familiar with the problems of getting official recognition of such problems and effective action.'³⁰ Kevin Graham, author of *After the Silent Spring*, sympathised with Ray's plight and directed him to information about endrin poisoning in fish. Ray underlined these lines from his reply which gave support to his activist role in pressing for action on chemicals, 'Governments, it seems, are always apathetic about such problems until they are pushed into action by people like yourselves.'³¹

The newspaper clippings in the scrap book also point to the connections made between chemicals and environmental damage in other localities: fish kills in Walgett; contaminated fish in Lake Michigan; Great Barrier Reef fish affected by PCBs from Japan and Lindane from cane farms; pollution in the Hawkesbury River, and problems with farm chemicals in western NSW. This assemblage of clippings from the late 1970s and 1980s gives a sense of Ray's trajectories of thought – the patterns he drew upon in understanding red spot on the Clarence. These clippings and the correspondence from chemicals activists in the USA supported his perceptions of change – that high-technology agricultural practices had a negative impact on the marine

²⁹ R. Carson 1963, *Silent Spring*, Hamish Hamilton, London. This book is often seen as the beginning of the popular environment movement.

³⁰ Letter Shirley Briggs, Executive Director, Rachel Carson Trust for the Living Environment, to Ray Black, Clarence River Fishermen's Co-operative, May 20 1977. Ray Black, Scrapbook.

³¹ Kevin Graham, to Ray Black 2 May 1977. Ray Black Scrapbook.

environment. They also indicate that environmental damage from chemicals was an issue which circulated in the media at this time – this wider circulation provided a supportive context for the perceptions of change Ray developed and held.

In the early 1980s, with strong concern over a massive outbreak, the metropolitan media gave a wider voice to Ray's concerns. The *Sydney Morning Herald* ran an article on the red spot outbreak presenting Ray's account of how red spot developed. This page three story was accompanied by a photo of Ray in front of a fishing trawler:

Sydney Morning Herald: Tuesday 11 October 1983, page 3

Red spot – a cancer eating at the heart of a fishing industry

Mr Ray Black a member of one of the oldest fishing families on the North Coast, flinched as he extracted a pack of fish from his deep freeze at Yamba on the mouth of the Clarence River.

The fish had ugly red blotches down their sides.

"That's the early stages of red spot disease," Mr. Black said. . . .

The suspected cause is river pollution from increased run-off of farm and household pesticides and chemicals into the river. . . .

Mr Black said that the Clarence River Fishermen's Co-operative wanted a full-time research station with competent biologists on the river to study the problem.

The concern about environmental damage on the Clarence was also picked up by the alternative media at this time. *Rolling Stone* magazine in 1984 carried a feature on red spot – titled 'The red spot scourge' – portraying the disease as a tragedy for the area and supporting the fishers' point of view that the likely causes were pesticides and reclaiming of swamps. *Rolling Stone* portrayed the fishermen as supporting the values of the natural environment and taking on powerful interests: 'The fishermen are thus in the unenviable position of potential conflict with two of the most powerful local bodies – the cane-growing industry and the Flood Mitigation Authority.'³² In the early 1980s the

³² 'The Red Spot scourge', *Rolling Stone*, March 1984, p 54.

fishermen's perspective on the reason for red spot – that it was caused by recent changes to land-use – was picked up and circulated in metropolitan and alternative media, supporting the work of fishermen such as Ray Black in having their story heard and pressing for action. This occurred in the context of media running many stories expressing scepticism about chemicals, particularly organochlorides, because of their damaging side-effects.³³

In mid-1983 following the red spot outbreak on the Clarence, marine biologists conducted research into the ulcerated fish. After subjecting diseased fish to analysis they found no evidence of chemical contamination in the flesh of the fish. The marine biologists took this as evidence that chemical contamination was not involved in the forming of ulcers, clearing chemicals as a cause of the outbreak.³⁴ Senior marine biologists argued it would be almost impossible that red spot was caused by chemical contamination – there were no traces of chemicals in the diseased fish and typically, chemical contamination causes very specific and localised fish kills. Red spot affected fish over an extensive area of the estuary and an outbreak continued for some time. However, while they claimed this eliminated chemical contamination as a cause, they found no definitive cause for the outbreak or why it appeared in the first place, only suggesting that it was somehow related to changes in the temperature or the salinity in the water which stressed fish and reduced their resistance to naturally occurring diseases.³⁵

The findings of this research did not deter Ray Black and other fishermen from believing that there must be some connection between the chemicals they saw being sprayed on crops along the river and the ulcerated fish they caught in their nets. Chemicals were seen as highly toxic, and used in great quantities; the aquatic environment was perceived as very fragile. This connection was compelling for fishermen in finding ways to make sense of the outbreak. From these understandings they continued to press for more research to find a definitive cause, and solution, to the problem. Even when I spoke with Ray in the late 1990s he wanted to impress upon me that he still

³³ Drew Hutton and Libby Connors 1999, *A History of the Australian Environment Movement*, Cambridge University Press, Cambridge.

³⁴ 'Pesticides not to blame for river fish disease,' *The Daily Examiner*, 2 June 1983

³⁵ *Ibid.*

thought that chemicals were somehow wrapped up in red spot and that pollution was still a huge problem on the river. The views he had formed in the 1980s, and which filled his scrapbook, were still compelling in making sense of the ulcers he saw on the fish he pulled from the river.

The wider context – increased concern about impacts of flood mitigation

In the 1970s and 1980s fishermen were not alone in their concerns. From the late 1970s government agencies became increasingly concerned about the negative impacts of development on the floodplain. A range of government agencies asserted that broader environment considerations had to be taken into account in large-scale developments. Government agencies were active in developing environmental impact assessment regimes for large projects and protecting important features of the floodplain from damage: fish habitat, Aboriginal material heritage and wildlife habitat. Compared to the 1960s, when the major flood mitigation works were conducted, this was a significant increase in environmental activity by government agencies (see chapter two).

In the late 1970s the State Pollution Control Commission (SPCC) was active in regulating the use of agricultural chemicals and regulating the way that flood mitigation works were undertaken. This was part of its work in monitoring pollution and protecting the environment, particularly the riverine environment.³⁶

In 1978 the SPCC released a report on Environmental Impact Assessments (EIA) for flood-mitigation works.³⁷ EIAs had been required for flood mitigation works for a number of years, and this report outlined ways that this system could be improved. In launching the report, Paul Landa, Labor

³⁶ SPCC formed in 1970 under the Clean Waters Act, later became the EPA. State Pollution Control Commission Act, Act No. 95, 1970.

³⁷ State Pollution Control Commission, NSW, 1978, *Environmental Impact Assessment of Flood Mitigation Works and Dams*, The Commission, Sydney. Environmental impact assessment, in some form, had been required since the mid 1970s. In 1977 the SPCC also drew attention to the increase in weed growth from flood mitigation work in the report, State Pollution Control Commission, NSW, 1977, *Distribution of Aquatic Weeds in NSW*, The Commission, Sydney.

Minister for Environment and Planning, pointed out the need for increased attention to environmental and ecological values,

Measures to control floods have brought major environmental benefits to many areas and in the past insufficient attention has been given to the overall impact of these works on wildlife habitats, fish breeding grounds, and other sensitive ecological areas. Often these effects could have been prevented without overall reduction in the effectiveness of flood control measures.³⁸

The Country Party, the conservative rural based political party, argued that increasing focus on environmental values was a negative turn for the bush; this was particularly noted in terms of costs to employment. NSW Country Party Member of the Legislative Assembly, Leon Punch said,

Men are being laid off up and down the coast because of unnecessary environmental studies on flood mitigation. Adequate environmental studies have always been made before flood mitigation work is proceeded with. A new situation has suddenly arisen. This government has been sitting on its backside.³⁹

Mr Punch's assertion that in the past adequate consideration had been given to the environment implied that the flood mitigation acted in a way that was responsive to the environment and did not damage it. This perspective echoed the response of the Flood Mitigation Authority in response to concerns raised by Field Naturalists in the mid-1960s (see chapter two).

In 1980 the first comprehensive EIA for Flood Mitigation was carried out on the Clarence. This report for drainage works on the upper Coldstream River, a tributary of the Clarence near Ulmarra, assessed the impact drainage works would have on the wetland vegetation and the waterbirds which relied on that habitat.⁴⁰ This was a significant broadening of assessments before

³⁸ Media release by the Minister for Planning and Environment, Paul Landa, 10 July 1978, in CRCC Archive File no 146. Prior to EIAs being required the works were assessed in terms of engineering criteria and cost benefit analysis. CRCC Archives, File 146.

³⁹ News release, Leader of the State County Party Leon Punch, March 1977, CRCC Archives, File 146.

⁴⁰ Clarence River County Council, Flood Mitigation Authority, 1980, *Upper Coldstream Area Environmental Impact Statement*, The Authority, Grafton. The research on the ecology of the wetlands was carried out by biologist R. Pressey and local bird specialist Greg Clancy. Both went onto play important roles in the debates over

development. Previous drainage works were assessed only on the basis of economic cost/benefit analysis and the competence of the engineering strategy. From the 1980s onwards projects were assessed on the basis of three criteria – environmental impact, economics and engineering – instead of two. The flood mitigation work carried out on the upper Coldstream ended up being much more limited than in other parts of the floodplain, preserving areas of wetland, while also mitigating the effects of floods.⁴¹ However it is interesting to note that in assessing environmental impact this report did not assess the possible impact on aquatic habitat or water quality, factors which affect fish in the river. It conceptualised the floodplain as land based, not considering it as part of the wider riverine system.

In the 1970s the Fisheries Department took an increasing interest in protecting fish habitat in estuaries in order to maintain fish stocks. The Fisheries Department traditionally protected fish stocks through issuing licences to fish – where fish stocks were being reduced they considered reducing the licences or licence conditions. For instance, the Clarence estuary was closed to trawling for part of the year, and parts of the estuary were permanently closed to commercial fishermen. The increasing interest in protecting habitat came from a recognition that estuaries were highly ‘vulnerable’ to damage from development – such as flood mitigation, residential canal estates, and clearing reeds beds for dredging. Fisheries officers also recognised that they held few regulatory powers to protect fragile habitat areas – river banks, reed banks and mangroves – which may be damaged by such development.⁴²

In 1974 the Fisheries Department pressed the CRCC to consider the impact of drainage works on fish habitat. J B Halliday the under secretary of the Fisheries Branch, responded to a request from the CRCC for information regarding the impact on fish habitat from flood mitigation works and

coastal wetlands, with Pressey through his state wide research work and Greg Clancy through his in active involvement in conservation issues on the Clarence.

⁴¹ Roy Bowling, Interview, 17 November 1997. Greg Clancy, Interview, 28 July 1998.

⁴² See this trend for instance in the series of articles by officers of the Fisheries Department ‘Special Report: Our vulnerable estuaries,’ *The Fisherman*, Autumn 1973. Through the 1970s the Fisheries Department gained increased regulatory power and also slowly increased its interest in maintaining fish stocks through protecting estuary and wetland habitat.

pesticides used to control weeds in drains. Halliday responded that no detailed studies had been undertaken, however:

It is known that such works result in the destruction or substantial change of the intertidal zone, it has a damaging effect on the fisheries and if such damage or change is widespread enough, it can virtually eliminate the fisheries in the region.

Mangroves, tidal swamps, weed beds etc., are essential to the productivity of the fisheries, providing sources of nutriment, nursery areas and filtration.⁴³

The under secretary also pointed out that there were many potential negative effects on fish life from using herbicides from the organochlorine family. So in the mid-1970s a government agency was raising with the CRCC the potentially damaging impacts of their work.

The Fisheries Department did not just want to offer advice but were interested in being involved in assessing the impact of future works. However Halliday noted that the CRCC had broken with previous undertakings for consultation,

At this point, I would like to mention that despite an arrangement made through the Department of Public Works for flood mitigation proposals to be discussed by Councils with the Fisheries Branch of this Department, your Council went ahead with the construction of the levee bank on Goodwood Island, which resulted in the destruction of mangroves.⁴⁴

Halliday asked the Council for their assurance that prior to any further works consultation with his department would be arranged, and requested their assurance of this. J B Halliday wrote to the CRCC on three separate occasions over the next six months asking for such an assurance.⁴⁵ The repetition of these requests suggest that the CRCC did not feel it was necessary to involve the Fisheries Branch – and their concerns about aquatic habitat – in planning flood protection works.

⁴³ J. B. Halliday, Under Secretary, Fisheries Branch, Chief Secretary's Department, to County Clerk, CRCC, 26 February 1974, CRCC Archives, File 146.

⁴⁴ Ibid.

⁴⁵ J B Halliday, Under Secretary, Fisheries Branch, Chief Secretary's Department, to, County Clerk, CRCC, 15 July 1974, CRCC Archives, File 146. Other letters were dated 26 February and 30 April, 1974.

During this period, the significance of the floodplain in terms of wildlife habitat, and the damage caused to habitat from drainage works, was raised by the CSIRO and the NSW National Parks and Wildlife Service (NPWS).⁴⁶ Similar to the case of the Fisheries Department and the State Pollution Control Commission, these government conservation agencies used scientific research to give recognition to the wider environmental significance of the floodplain, in this case as habitat for waterfowl. Similar concerns about wildlife habitat were raised by the Clarence Valley Field Naturalists in the early 1960s (see chapter 2), however in the 1970s and 1980s these scientific and conservation agencies had greater resources to apply to these efforts.

A 1970 study by the CSIRO quantified the destructive effects of drainage works,

Some 60% of the high value waterfowl habitat previously available in coastal NSW has been destroyed or has had its value for waterfowl habitat much reduced, mostly due to drainage for flood mitigation.⁴⁷

Goodrick, the report's author, noted the Clarence River and Richmond River (just north of the Clarence) were the main areas of waterfowl habitat on the north coast. On these two floodplains the area of high value waterfowl habitat – fresh meadows and seasonal fresh meadows – had been massively depleted. Of an original area before settlement of 56 000 acres, only 5 300 acres remained. Most of this depletion was from drainage works.⁴⁸ The CSIRO recommended preserving representative areas of these wetlands.⁴⁹

A study by the NPWS in 1981 noted that Goodrick's estimates of loss of wetlands would be conservative. This report documented the wide ranging impacts on estuaries from drainage works, grazing and agricultural chemicals. The report noted that the impact of drainage works on floodplain ecology was

⁴⁶ The NPWS was established in 1967, replacing the Fauna and Flora Protection Boards, and given greater powers in 1974. National Parks and Wildlife Act, Act No. 80, 1974.

⁴⁷ G. N. Goodrick. 1970, *A Survey of Wetlands of Coastal New South Wales*, CSIRO Division of Wildlife Research, Technical Memorandum no 5, p 24

⁴⁸ Ibid, p 17.

⁴⁹ Ibid. High value waterfowl habitat, in two types, fresh meadows and seasonal fresh meadows, decreased from original area 56 000 acres to 5 300 acres. p 17.

little understood and should not be underestimated: 'more information is required on the response of soils, water chemistry, flora and fauna to changes in the water regime.'⁵⁰ The decline in native habitat in estuaries and coastal wetlands was also an important focus for newly formed non-government environment groups, such as the NSW Total Environment Centre.⁵¹

The significance of Aboriginal material heritage – particularly middens – on the floodplain was also raised by the NPWS.⁵² In late 1974 the Director of the NPWS raised with CRCC the importance of including archaeological surveys in any environmental impact assessments. The NPWS pointed out the floodplain was a rich area for Aboriginal middens which it considered to be of 'high scientific value.' Middens are collections of shells from edible shellfish – they are one marker of Aboriginal habitation of the floodplain. The floodplain was a rich place for shellfish and Aboriginal occupation so it was assumed that there were many middens on the floodplain.⁵³ The NPWS stressed that middens may survive even on areas of previously developed land, because they are an 'integral part of the floodplain, often two metres deep.' The NPWS pointed out the need for surveys, conducted by qualified archaeologists, to be conducted before any drainage work took place.⁵⁴ In this way the NPWS attempted to further expand the values of the floodplain which had to be taken into account in planning drainage works and which may have been lost in carrying out works in the past.

⁵⁰ R.L. Pressey 1981, *A Review of Literature on the Floodplain Wetlands of Coastal New South Wales*, report prepared for the NPWS, NPWS, Sydney, p 62. See also R. Pressey and M. Middleton, 1982, *Impacts of Flood Mitigation on Coastal Wetlands in NSW, Wetlands (Australia)*, no 2, p 27.

⁵¹ F. Bell and A. Edwards, 1980, *An Environmental Inventory of Estuaries and Coastal Lagoons in New South Wales*, Total Environment Centre, Sydney.

⁵² The NPWS was responsible for the protection and management of 'Aboriginal relics'.

⁵³ Dennis Byrne, 1987, *The Aboriginal and Archaeological Significance of the New South Wales Rainforests*, a report to the Forestry Commission of New South Wales and the Australian Heritage Commission Forestry Commission of NSW, Sydney.

⁵⁴ D. A. Johnstone, Director NPWS to County Clerk CRCC, 3 December 1974, D. A. Holmes, Acting Director NPWS, to County Clerk, CRCC, 19 September 1974, in CRCC Environment File no 136.

On a wider scale, the prevailing preference for large mitigation works as a model of floodplain development came in for increasing criticism from academics and resource scientists. They argued that alternatives to engineering approaches had to be considered and that the full impacts of flood mitigation had to be assessed. A comprehensive review of Clarence River flood mitigation works published in 1980 reflected this changing mood.⁵⁵ This report noted that wider values of the floodplain such as environment and ecology had to be given consideration in planning decisions, and had not been given adequate consideration in the past. The report noted the benefits to intensive agriculture, particularly sugar cane growing, from flood protection and drainage works, however it recommended that no more structural works be completed.⁵⁶ The report was subdued in its appraisal of the success of the scheme noting that the scheme did not fully achieve its aims and that there were some unintended losses from the work:

Flood mitigation works have been generally successful in an agricultural sense although in some cases the anticipated benefits have not been fully realised (due to poor markets etc.) and some minor disbenefits such as loss of drought fodder reserves in swamps, have accrued.⁵⁷

This report reflected the changes through the 1970s, noting that the broader environmental values of the floodplain could no longer be ignored as they were previously,

The lack of research data has, in the past, sometimes provided a convenient reason for ignoring environmental effects or for underestimating their importance, particularly to estuarine fauna and waterfowl.⁵⁸

The report noted aspects of the environment and ecology which had to be taken into account in planning for drainage works including the importance of preserving wetlands for their role as 'aquatic nursery and production areas' and the need to consider the effects of the lower estuary salinity, caused by

⁵⁵ Soros-Longworth and McKenzie 1980, *New South Wales Coastal Rivers Floodplain Management Studies*. This report was carried out by a leading engineering firm and part of a state wide review of flood mitigation initiated by the Department of Public Works.

⁵⁶ Ibid, pp 11-9.

⁵⁷ Ibid, pp 11-4.

⁵⁸ Ibid, pp 11-4.

flood mitigation, on prawn production. The report recommended further research into these areas of concern.⁵⁹ In this way the report indicated that there had been losses in the past and that wider values of the floodplain needed to be taken into account.

* * *

The 1970s and 1980s were a time of change. When flood mitigation began in the late 1950s, the CRCC believed it was modifying the floodplain in the interests of productive users, particularly cane and dairy farmers. This was seen as representing the community interests. Their work was also based on the conception of the damaging nature of flooding, and anything which combated this was justified and legitimate. This work was strongly supported by scientific research – the work of engineers, agronomists and hydrologists lent support to this model of innovation.

Through the 1970s and 1980s the legitimacy and appropriateness of these practices were increasingly questioned. Government agencies and scientific research were increasingly responding to a wider public constituency, who valued a diversity of interests in this sub-tropical floodplain and claimed that planning should not just reflect the interests of productive land-users. Habitat for birdlife, fish, and Aboriginal physical heritage were seen as significant, damaged by regulation and in need of protection. These interests were supported by a new wave of scientific research. Wildlife ecologists, flora specialists, archaeologists, biologists, ecologists and some engineers were increasingly critical of this model of development. No longer were scientific research, and scientists, predominantly supportive of modifying the environment. This shift in the role and positioning of scientific personnel and interests was important in this process of change.

Pressing for action on red spot

The wider critique of flood mitigation practices provided a supportive context for fishermen, and others, to raise their concerns about red spot. However

⁵⁹ Ibid, pp 114 - 116.

fishermen still found that their concerns were highly contested and that it was difficult to get action on this issue.

Fishermen claimed that red spot was ignored because of the limited recognition given to the health of fish and commercial fishing, as Barry Heyen, manager of the Fishermen's Cooperative wrote:

We are well aware that the obnoxious nature and extent of these ulcerated fish is not appreciated by those outside the professional fishing industry. Imagine the situation where upwards to 50% of the livestock in this Valley were dying of open, weeping ulcers covering 10% - 50% of their body, the area would be overrun with Health Officers, Veterinary Officers, Scientists and the matter would be World news.

Because the problem is in a wild animal and below the water, where it is not obvious to the general public, it is being ignored.⁶⁰

As a group, fishers were not as valued as more 'traditional' rural land users – graziers, dairy farmers and cane growers. In economic terms these other groups were more important – estuary trawling raised less than \$1 million per annum in income, whereas cane growing generated ten times this income. In addition there was a strong perception in the region that fishermen were not custodians of the river, but exploiters. Estuary trawling was a highly visible activity, with trawlers working up and down the river – people made a connection between decline in fish stocks and these fishing practices. There were bubbling concerns that commercial trawling was against the interests of the tourist industry and recreational fishers. Some claimed that the voicing of the problem by fishers was damaging to the area and its tourist potential. Professional fishermen in response claimed that they were highly regulated by State Fisheries, and constantly felt the pressure of regulation. Further, fishermen claimed they lived with the threat that the estuary would be closed to fishing completely. Harvesters of the river were not as valued as harvesters of the land.

⁶⁰ Clarence River Fishermen's Co-operative Ltd 1983, Submission to Mr J R Hallam MLC, Minister for Agriculture and Fisheries, Subject: Ulcerated Fish, Clarence River Fishermen's Co-operative, p 6.

The CRCC strongly resisted claims that their work had in fact damaged the environment. In mid 1983, after a meeting between the two organisations, at which Mr Everson from the Co-op claimed that council drains were responsible for an outbreak, John Enseby a CRCC councillor, rejected this saying, 'It beats me why people go off and make statements without having the evidence to back them up.'⁶¹ The local newspaper described relations between the two groups as a 'prolonged slogging match.'⁶²

In 1983 the Fishermen's Co-op proposed lobbying for a broad ranging inquiry into the red spot and the decline in fish - with a focus on drainage and pollution from agricultural chemicals - and asked the CRCC to support this effort. The CRCC rejected the approach to jointly call for an inquiry as proposed by the Co-op. The CRCC said it would only support an inquiry which looked at 'all aspects of river utilisation' including the impacts on fish stocks from over fishing by commercial fishermen. Further, the CRCC suggested that such studies should be funded by professional fishermen, rather than public money, on the basis that they would be the ones who would benefit from it.

The CRCC claimed that their actions in the draining the floodplain enhanced the floodplain. It could not countenance that it had damaged the area, and had little time for people who raised these concerns. A journalist for *Rolling Stone*, interviewed Jim Thomson the Chairman of the CRCC, who said that the scheme had been 'successful beyond their wildest dreams.' When the journalist raised questions about the problems of pollution from drainage works he was told that he should be careful about the questions he asked, otherwise he would be 'thrown out of the area.'⁶³ The CRCC had a strong sense of its own authority, the legitimacy of its modifications to the area and a low tolerance for divergent voices.

⁶¹ John Enseby quoted in, 'CRCC Fishermen hold talks', *The Daily Examiner*, 2 June 1983.

⁶² Ibid. On two occasions the CRCC sought legal advice on taking a defamation action against the Co-op for media comments linking red spot to flood drains.

⁶³ Anon, 'The Red Spot scourge', *Rolling Stone*, March 1984.

The Fishermen's Co-op's lobbying ended up paying off. In late 1983 the state government agreed to fund a wide ranging research project into the disease. In this successful lobbying the fishermen were supported by groups who shared a commonality of interests – in particular recreational fishermen and the Maclean council; the area in which most of the fishing industry was located. The results of the research shed new light on modifications of the river.

Scientific research – reveals damage from modification

Researchers from the Wollongbar Agricultural Research Institute, near Lismore had a difficult path searching for a cause of the red spot outbreak. Richard Callinan, one of the leading researchers, spent many months monitoring fish in tanks being poisoned with a range of chemicals to see what types of ulcers they developed. Researchers testing water samples from flood mitigation drains found such extreme acidity they first thought that their equipment was faulty. When early findings were presented to scientific conferences, they were seen as so extreme that the audience thought them ludicrous.

By the late 1980s researchers had conclusive findings on the causes of red spot – it was indeed caused by the drainage works. Constructing drains and reclaiming swamps disturbed a layer of soil which was highly acidic. Once disturbed, this soil caused acids, sulphates and heavy metals to become soluble. This toxic mix leached through soil and collected in drains – with rain it would be washed into the river, polluting the water and causing ulcers in fish. The results found on the Clarence were applicable for other coastal floodplains with drainage works. We need to understand the formation of the coastal floodplains in order to understand how this toxic brew came about.

Over 10 000 years ago the Clarence floodplain was inundated by sea water. During this time sulphates in the sea water mixed with land sediments containing iron oxides and organic matter; these substances reacted to produce large quantities of iron sulphides, which settled in the clay and sandy sediments on the sea bottom. About 6500 years ago the sea receded, leaving this layer of waterlogged sediment containing iron sulphides, covering what is

now the floodplain. Over the centuries these sediments were covered over by layers of alluvial soils washed down by floods. In some places these alluvial layers were deep, such as near the river banks; in other places, such as the back swamps on the edge of the floodplain, they were quite shallow.

The layer of iron sulphide rich soil is stable so long as it remains waterlogged. However, once exposed to air, through drying out or digging, a series of reactions takes place, creating toxic water. After contact with oxygen iron sulphide oxidises, generating sulphuric acid. One hectare of soil can create fifty tonnes of sulphuric acid.⁶⁴ The acid moves through the soil, acidifying soil water, groundwaters and eventually surface waters. There is another element to the toxic mix as well. Acid sulphate soils are also rich in iron and aluminium. When in contact with acidic water these metals become soluble, and can leach into groundwater and surface water. This acid water, complete with soluble metals can build up in flood mitigation drains, caught in deep spots or behind flood gates. With heavy downpours of rain it is flushed out into the river.⁶⁵

The formation of acid water from draining coastal swamps had been identified by scientists since the early 1960s, but it hadn't previously been connected to fish kills.⁶⁶ Acid water and soluble metals diminished the water quality, having a range of effects – causing outbreaks of disease in fish, reducing aquatic food resources, reducing fish recruitment and altering waterplant communities.⁶⁷ Acid Sulphate Soils (ASS) are naturally occurring but the level of disturbance with the large-scale drainage works caused a rapid change in water quality. The main way to control the problem is to avoid exposing the soils to air by either drying out the soils, or by digging into

⁶⁴ M.J. Tulau, 1999, *Acid Sulfate Soil Management Priority Areas in the Lower Clarence Floodplain*, Department of Land and Water Conservation, Sydney.

⁶⁵ Description of ASS taken from M.J. Tulau 1999, *Acid Sulfate Soil Management Priority Areas in the Lower Clarence Floodplain*. Jesmond Sammut 1996, *An introduction to acid sulfate soils*, Commonwealth Department of Environment Sport and Territories, Australian Seafood Industry Council, Canberra.

⁶⁶ P.H. Walker 1963, *A Reconnaissance of Soils in the Kempsey District*, CSIRO Soils and Land Use Series no. 44, CSIRO, Melbourne.

⁶⁷ M.J. Tulau 1999 *Acid Sulfate Soil Management Priority Areas in the Lower Clarence Floodplain*.

them – whether this be for drainage systems, canal estates, dredging and road causeways.

A large part of the Clarence floodplain is affected by problems with ASS soils – 10 000 hectares are considered as ‘hotspots’, priority areas for management, and 53 000 hectares of the floodplain have high risk acid sulphate soils. The most damaged areas are areas where flood mitigation has taken place and where the ASS are within 1.5 metres of the surface: Everlasting Swamp, Shark Creek, Alummy Creek and many parts of the lower estuary floodplain.⁶⁸ On the floodplain there are 234km of CRCC drains, and 1200km of privately built feeder drains. Of the total of 160 drains, 150 were found to be in areas of high risk of ASS. The research also found that the toxic water also affected the soil it ran through, reducing the productivity of sugar cane and other crops; researchers made recommendations for ways to reduce this effect on agricultural production.

Rehabilitation and repair – A reassessment of modification

The new knowledge about acid sulphate soils led to a change in perceptions of the floodplain environment, and a change in perceptions of large-scale modification of the floodplain. The drainage works had been carried out in the 1960s under the assumption that the environment was robust in face of this modification, and that there would be few negative consequences from these engineering works. However the new knowledge about acid sulphate soils demonstrated that the floodplain was fragile in the face of large-scale drainage, and that there were significant negative impacts from the drainage works. Further, this new knowledge of ASS also demonstrated that the drainage activities on the land had a negative effect on the health of the estuary.

The new knowledge about ASS also led to a change in the way the floodplain was managed. From the early 1990s management of the floodplain by

⁶⁸ Ibid, p 14. Note some of this is drainage which took place in the 1920s, such as the weir built on Sportsman Creek on the Everlasting Swamp, to prevent salt incursions on low-lying wetlands.

government agencies increasingly took into account of the health of the ecosystem, along with their traditional focus on improving agricultural productivity. In fact management of the floodplain was increasingly based on the assumption that in order to maintain commercial productivity the health of the floodplain ecosystem also had to be maintained. Intensive farming and grazing, which demanded drainage, continued on the Clarence floodplain, the 1990s were a period of expansion of cane growing and with it an expansion of drainage, however the difference was that this intensive land-use now had to take account of dimensions of environmental health, at least to some degree.

The Clarence Floodplain Project provides a clear indication of the change in management in the region, it also reveals the new range of interests, both local and governmental, which were engaged in floodplain management. From the late 1980s the CRCC - Flood Mitigation Authority attempted to change its practices to take account of ASS and the wider interests of environmental health. However professional fishers and the NSW Fisheries campaigned for this activity to be carried out in a more focused way, with a dedicated organisation. In 1997 the Clarence Floodplain Project was formed to specifically implement new management and land-use across the whole floodplain. From 1997 the Project has employed a number of staff and attracted government funding to implement new drainage methods. All of its work is informed by the twin imperatives of maintaining the commercial productivity of land, while increasing environmental health.⁶⁹

A range of local interest groups have been involved in the floodplain project. Along with professional fishers, the local graziers and cane growers associations are actively involved in the project; these are groups which at times have had an adversarial relationship. The Clarence Canegrowers Association strongly recognises that cane growers need to reform environmental management practices to maintain the productivity of cane farming in the sensitive floodplain environment.⁷⁰ The project involves the

⁶⁹ Ian Dinham 2001, 'The Clarence Floodplain Project', Stuart Blanch (ed.), *The Way Forward on Weirs* Conference Proceedings, The Inland Rivers Network, Sydney, Proceedings of Conference, 18-19 August 2000, Sydney. Alan Ciblic, Interview, 28 September 1999.

⁷⁰ Alan Ciblic, Interview, 28 September 1999.

direct input of a range of government departments, NSW Fisheries, the Department of Land and Water Conservation and the Environmental Protection Authority as well as representatives from local councils. The project is funded by a range of state and federal government schemes which support new approaches to resource management, including funding from the National Heritage Trust. The project draws upon a new generation of professionals with expertise in environmental management – environmental engineers, natural resources managers and environmental scientists.

This mix of local interests, government agencies and professionals, is a major change from when the CRCC was carrying out its large-scale engineering operations in 1960s. In the earlier period the main local interests involved were land-holders, with little involvement from fishers; the main government agency was the Department of Public Works, government agencies concerned with conservation were marginalised; and the key professionals were engineers and agronomists with little involvement from professionals with backgrounds in conservation. This shift indicated a cultural change in the approach to management of the floodplain.

The Clarence Floodplain Project, in conjunction with landholders, has made a number of significant changes to the way that the floodplain is managed. It has developed new ways of managing land-use on land affected by ASS to reduce disturbance of soils and reduce the flows of polluted water into the river. It has designed new floodgates and weirs to enable water to flow between the floodplain and the river. This has improved the passage of fish, the health of wetlands and reduced acid levels. New design of floodgates has also allowed landholders on the Coldstream River to inundate wetlands and wet pastures with fresh water, improving conditions of bird habitat, and providing better wet pasture for grazing.⁷¹ Areas such as the Everlasting Swamp, the Coldstream River and Shark Creek, which had been 'weired off' and 'over-drained' were now managed in new ways to begin the process of rehabilitating environment health. Carrying out these changes on the ground did not come about easily: as well as complex biophysical and technical issues, they also involved equally complex social issues. A single drainage system

⁷¹ Roy Bowling, Interview , 17 November 1997.

could be used by a dozen or more landholders, and all had to agree on the new management system, many landholders were content with the old system and held concerns about change, particularly where change seemed to be driven by government departments or conservationists. A number of the changes to drainage practices took a decade of negotiation and discussion to implement.⁷²

The change in perceptions of the floodplain environment occurred because of a number of converging factors. The outbreak of red spot provided a stark indicator that the health of the estuary had declined. Professional fishermen, from their intimate and sustained interaction with the river, noticed this disease in fish; they used their resources to campaign for a solution. Eventually the fishermen gained support from environmental scientists. The outcomes of their research provided an authoritative explanation for the cause of the outbreak, and provided directions for how it could be solved. Management agencies were responsive to this new knowledge of the river, and trialed new ways to manage the floodplain to at least take account of wider environmental health.

In the next chapter we take a broader view of the reassessment of modification on the Clarence River, we lift our focus from floodplain drainage to explore changing responses to developments across the whole river. Professional fishers, a long-term commercial interest, had a key role in changing perceptions of drainage; the next chapter explores the conditions which allowed this wider reassessment of modification to take place.

⁷² Alan Ciblic, Interview, 28 September 1999.

Chapter 6

Pressing for a healthy river on the 'lifestyle' coast

The decades from the late 1970s were a time of great change in the Clarence Region. The rehabilitation of wetlands and new management of toxic acid sulphate soils, in response to the red spot outbreaks, was just one aspect of a wider change in community and government perceptions of modification of the river. Overall, there was a heightened awareness of the importance of maintaining the health of the river, and also heightened recognition of the negative consequences of modification. In previous decades controlling and modifying the river had offered great benefits to the local community; now there was increased recognition of the impacts of these schemes and increased interest protecting the long-term health of the river.

This change in direction occurred through the interaction of a range of interests, from both within and outside the region. Long-term interests in the region – professional fishers, floodplain graziers, Aboriginal people and local conservationists – played a significant role in contributing to this change; for instance professional fishers were a driving force in finding a solution to the red spot outbreaks. Social and economic changes in the area also contributed to this change of direction. In the 1980s many people moved to the area seeking a change in lifestyle, drawn by the healthy nature of the area. Tourism, which relied on a healthy river, became a major industry. The Clarence, along with the wider northern rivers region, changed from being an agricultural region to being a 'lifestyle' region. These new residents and a growing tourist sector were strongly interested in maintaining the health of

the river. In addition, the NSW Government took an increasing interest in protecting the long-term health of coastal rivers, including the Clarence River.

Across these decades there were some signs of decline in the health of the river due to past and current use – decline in diversity and number of fish, decline in water quality, erosion of rivers banks – though nothing as visual and dramatic as the red spot plague. Even with these problems the Clarence River was still broadly healthy; in fact it was one of the healthiest coastal rivers in NSW. The Clarence had limited heavy industry, no major dams, and large parts of the catchment were protected by National Parks and State Forests.¹ However, even in the absence of signs of large-scale decline, there was a heightened concern to maintain the health of the river and limit modification to the river. There was increased concern about a range of impacts on the river, such as extracting water from it, allowing pollutants to flow into it and building dams to disrupt its flow. In addition there were further efforts to repair and rehabilitate damage that had been caused in the past.

This chapter looks at a number of key incidents, which, along with the red spot controversy, indicate the ‘turnaround’ in perceptions in the region. These incidents – concerns about the inland diversion scheme, protests against a wood pulp mill and planning for a large-scale regional water supply – also highlight the sets of interests which shaped the direction of change. The chapter also outlines, in more detail, the social changes in the local area, and changed direction in NSW government policy which provided the context for the turnaround in perceptions of modification.

This change in perceptions of development in the Clarence region stands in contrast to earlier decades when modification was generally seen to have many benefits and few negative consequences for the community (Section I and II). It also stands in contrast to the following section on the Balonne River, where the local community and the state government continued to see modification as being beneficial for the community (Section IV). So this

¹ See for instance, Healthy Rivers Commission 2000, *Independent Inquiry into the Clarence River System: Final Report*, Healthy River Commission, Sydney.

chapter explores why this reassessment of modification occurred in this place, at this time.

Inland diversion scheme – declining support for large projects

The decline in support for the inland diversion scheme provides a good indicator of this change in perceptions of modification. The inland diversion scheme proposed a massive modification of the Clarence. Dr Bradfield first proposed the idea in the 1920s as part of a wider scheme to ‘boomerang’ a number of coastal rivers inland to ‘green the inland’. Following Bradfield, other engineers put forward many proposals to divert the Clarence. Common among the various schemes was a series of dams on the upper tributaries to capture water, and a system of tunnels to carry this water to the head-waters of inland rivers, to provide water for irrigation in the flat dry western areas.

The Clarence River was favoured because it has a massive runoff of four to five million megalitres a year, the highest in the state, with only a small proportion used for urban, industrial or irrigation needs. The scheme was presented as not only providing water for the west, but flood control and water storage for the Clarence region, and hydro-electricity generation. In the post-war decades many local politicians and local civic leaders in the Clarence region strongly supported these diversion schemes. Earl Page, the Federal National Party leader, and a very popular local parliamentary representative, was one of the more prominent local politicians who consistently supported such a scheme.

In the 1980s, in the context of drought in inland regions and reduced cost for large-scale engineering works, state and federal governments renewed their support for proposals for ‘greening the inland’ schemes. In 1981 the Department of Water Resources commissioned a review of all diversion schemes for the Clarence. It analysed and costed 14 separate proposals, which it claimed warranted further study.² Also in 1981 David Coffee, a prominent

² Water Resources Commission of NSW 1981, *Possibilities for Inland Diversion of NSW Coastal Streams - A review of previous proposals for the diversion of water from NSW Coastal Streams to the Inland*, prepared by Rankine and Hill Pty Ltd, Water Resources Commission of NSW, Sydney.

consulting engineer, proposed a new diversion scheme which was more economical and many times larger than previous schemes. The Coffee scheme included hydro-electricity generation and four interconnected dams on the Clarence system, one of which was larger than any storage built on the Australian mainland; the scheme could supply a reliable annual diversion of one million megalitres of water, one quarter of the annual river flow. The Coffee plan became the most economical of all proposals. In 1983 Prime Minister Malcolm Fraser, while in Grafton, announced \$4 million funding for a feasibility study of inland diversion of NSW rivers.³

In 1988 the NSW Minister for Natural Resources, Ian Causley convened a seminar in Coffs Harbour, titled 'Where to from here with inland diversion?' to consider the mechanisms for advancing investigations of the inland diversion scheme.⁴ The seminar heard from David Coffee and spokespeople from various interest groups which supported the diversion, including the National Farmers Federation, large-scale inland irrigators and advocates for power generation. The seminar also heard of the probable negative impacts of the scheme, which would have to be taken into account in considering the proposal. Barry Heyen, the manager of the Clarence River Fishermen's Cooperative, outlined the severe negative impact on fish in the Clarence River and in turn the massive impact on the fishing industry.⁵ Don Geering from the Department of Water Resources, spoke of the very serious environmental considerations, which would have to be taken into account in planning for the scheme. On the Clarence system this included negative impacts on the fishing industry, the endangered Eastern Freshwater cod, water quality, the stability of riverbanks and the growing nature-based tourism sector - which included 3000 visitors per year involved in commercial white water rafting on the Nymboida River, one of the rivers which would be dammed. In addition

³ Jack Beale 1985, 'A scheme to dwarf the Snowy', *Sun-Herald*, 14 April, p. 60. Prime Minister Fraser was voted out of office soon after making this pledge, a key issue in the 1983 election was the Gordon below Franklin Dam in Tasmania, which the Hawke Labor Government opposed.

⁴ Department of Water Resources 1988, *Inland Diversions - Where to from here?*, Seminar proceedings, Grafton District Services Club, 2 December Department of Water Resources, Grafton. Ian Causley was also the State Parliamentary representative for the Clarence region.

⁵ Barry Heyen 1988 'Environmental considerations,' Department of Water Resources 1988, *Inland Diversions - Where to from here?*

Geering pointed out that there were a range of probable impacts on the inland rivers, including a decline in water quality and a rise in ground water tables leading to rising salinity.⁶

With all of these opinions on the table the Department of Water Resources concluded that the inland diversion proposal still had merit. It proposed to continue funding preliminary feasibility studies, including an assessment of the environmental and social impacts, with a possible lead time of 10-15 years for the scheme to be operational. The Department asserted that this scheme was needed at this time to satisfy increasing demand in inland regions for irrigation water – the most cost-effective storages had already been built on these inland rivers.⁷

Local people inform me that in the 1980s the Department constructed a scale model of the Coffee proposal and prominently displayed it in the foyer of the council offices and other public building in Grafton. They recalled that the relief map colourfully showed the series of dams and tunnels which made up the scheme. As part of school excursions, groups of school students would study the model, their teachers pointing out the dams in the upper part of the catchment, and tracing the tunnels, which would carry water under the mountains to rivers west of the Great Dividing Range.

In the late 1990s and early 2000s, during a period of long running drought in inland areas, a range of rural lobby groups revived proposals for diverting the Clarence and other coastal rivers. These groups included the Watering Australia Foundation, Darling Downs 2000, the Spirit of Australia and Farmhand. Diverting the Clarence River was presented as an important part of a strategy for supporting struggling inland communities.

⁶ Don Geering 1988 'Environmental considerations,' Department of Water Resources 1988, *Inland Diversions - Where to from here?*

⁷ Jack Hedderman, Engineer Strategic Projects, Department of Water Resources 1988, 'Review of Proposals', Department of Water Resources 1988, *Inland Diversions - Where to from here?* p 3. The Clarence Valley Conservation Coalition noted that in 1990 that the Department of Water Resources continued to fund preliminary feasibility studies, Clarence Valley Conservation Coalition 1990, 'River Diversion Proposal,' *Groundswell*, vol 2, no 1, p 6.

However in the late 1990s these calls for diversion faced enhanced opposition – civic leaders in the Clarence region and government departments were unanimous in their opposition to the scheme. In the area it was not only sectional interest groups – such as commercial fishermen, Aboriginal groups or environmental groups – who were opposed to the scheme, but also mainstream civic leaders. Mayors from the local councils in the Clarence region consistently expressed their opposition to the diversion scheme, pointing out that this scheme would be damaging not only for the environment but for important industries in the Clarence region – particularly the tourism sector and the fishing industry. The annual NSW Shires Association conference was a forum where these views were contested. Shire leaders from Western NSW continually put forward motions calling for diversions of coastal rivers, and shire leaders from the Clarence would strongly argue against the propositions.

In discussing the opposition to the inland diversion with me, a long-term resident who had a long involvement with the local shire council, said, *Yes we are all environmentalists now, we are all greenies now, we all need to care for the Mighty Clarence.* While distancing himself from the mainstream environmental movement and disputing the extent of environmental problems, such as the extent of red spot in fish, he claimed that now there was no alternative to recognising the needs of the environment. Looking to the future he noted that it was important for the area to keep its ‘clean and green’ image if it wanted to keep attracting tourists and new businesses to the area.

By the late 1990s the Department of Land and Water Conservation (DLWC), in contrast to the government’s position in the late 1980s, argued that it was unlikely that any inland diversion would proceed. In a 1998 report the Department wrote,

It is difficult to believe that any inland diversion scheme could now be realised when considered in the context of current directions in water management and other issues related to general river health.⁸

⁸ Department of Land and Water Conservation 1998, *Submission to the Healthy Rivers Commission*, Department of Land and Water Conservation, Grafton, p 49.

The government had shifted away from building large-scale public water storages, and moved towards taking greater account of natural environmental conditions needed to maintain the health of rivers. In the 1980s a slogan of the Department of Water Resources was 'Doing more with water', in the 1990s a slogan of the DLWC was, 'Clean, healthy and productive catchments for the twenty-first century.'⁹ In addition the government increasingly recognised the importance of maintaining river health, and that large-scale modification of the Clarence would have a negative impact on the health of the river.¹⁰ So in the period of a decade, or less, the NSW Government shifted from investigating the feasibility of a diversion scheme to clearly ruling it out as an option.

Residents from the Clarence tell me that the scale model of the diversion scheme, which had been proudly displayed in the local council chambers, must still be about somewhere. After a bit of looking around, and asking around, I finally find it – placed out of the way between the lifts and the toilets on the third floor of the DLWC building in Prince Street, Grafton. It is a bit dusty and some of the labels have fallen off; however I can still locate the dams on the upper tributaries of the Clarence and trace the network of tunnels carrying water under the mountains and into the western running rivers. The lobby of the DLWC offices, which I had to walk through to find the model, are now filled with posters promoting local Landcare and Rivercare Groups, notices about community consultation for the latest river management plan, and flyers on recycling waste water and revegetating river banks. The fate of this model of diversion – from public prominence to obscurity – reflects the decline in support for the diversion scheme in the local area. This massive modification of the river, which was once held as providing great benefit to the Clarence region and inland areas, was now widely and authoritatively seen as being damaging to the river and community interests in the Clarence Region.

⁹ Department of Land and Water Conservation 1997, *Securing Our Water Future*, Department of Land and Water Conservation, Sydney.

¹⁰ Healthy Rivers Commission 2000, *Independent Inquiry into the Clarence River System, Final report*, Healthy River Commission, Sydney.

Context for reassessment – social change in the Clarence and new direction for government

Rapid social and economic change in the local area and a new direction in the approach of the NSW government provide a context for the reassessment of the modification in the region. From the late 1960s the Clarence region experienced a rapid growth in population, turning around decades of population decline (see table two); in fact in the 1980s the Northern Rivers was the fastest growing region of NSW.¹¹ People flocked to the Clarence, and other coastal regions, from the large cities and declining inland rural areas, seeking a better lifestyle in relaxed coastal areas. The demographer Bernard Salt has called this process of internal migration ‘the big shift.’¹² The Clarence region with its sub-tropical climate, variety of landscapes – coast, river and mountains – and established regional centres, made it an ideal location for people seeking a ‘sea-change.’ The area had long been a tourist destination now many people decided to permanently move to this lush region.

Table Two: Population change in the Clarence region 1961-1991¹³

Period	Population change - %
1961-66	-0.5
1966-71	7.0
1971-76	14.0
1976-81	26.0
1981-86	16.7
1986-91	13.3

¹¹ H. C. Weinand and D.A Lea, 1990, ‘The movers and the stayers: Change in population in Northeastern NSW,’ in D. J. Walmsley (ed), 1990 *Change and Adjustment in Northern NSW*, Department of Geography and Planning, University of New England, Armidale.

¹² Bernard Salt, 2001, *The Big Shift: Welcome to the third culture: The Bernard Salt Report*, Hardie Grant Publishing, Melbourne.

¹³ The Clarence Statistical Region includes the towns of Coffs Harbour and Bellingen, which are outside the Clarence catchment, however these statistics still useful as a general indication of population growth. Note in 1991 the total population of the region was 45 000. H.C. Weinand and D.A Lea, 1990, ‘The movers and the stayers: Change in population in Northeastern NSW,’ p 65. Additional information from Australian Bureau of Statistics 1991.

The movement of people to the Clarence was made up of three main groups, each with its own motivations, and differing settlement patterns.¹⁴ First, there were retirees from metropolitan areas who were seeking a relaxed life-style in coastal resort areas, such as Yamba. The second group were 'rural retreaters' from urban areas, who had enough funds to buy a 'rural retreat' or 'hobby farm'; they wanted to live in a rural setting, however they primarily relied on off-farm income. Typically rural retreaters settled within commuting distance of the major towns of Grafton, Maclean or Yamba. Third, there was a small minority of 'alternative lifestylers' or 'new settlers'. Unlike 'rural retreaters' they had little capital, however they were interested in experimenting with alternative lifestyles and patterns of living – being 'close to nature' was a particularly important part of this project. New settlers tended to live in the more secluded or remote areas of the Clarence region, such as the more remote hill district.¹⁵ Across the Clarence region, dairy and grazing properties, which had falling commercial value as working farms, were sub-divided and sold to these incoming groups. Sub-division and property development became a significant commercial activity in the region, providing benefits for the long-term landholders sub-dividing their properties, and for a growing group of agents and property developers.

The process of in-migration was a major social change for the Clarence region. The wave of new residents did not hold a connection to the traditional rural industries in the region, or the previously dominant ideas of rural development. The new people who settled throughout the Clarence were not financially reliant on rural industries and did not have a background in the traditional rural industries of dairy, timber, grazing and sugar cane.¹⁶ Many of

¹⁴ Three categories taken from H.C. Weinand and D.A. Lea 1990, 'The movers and the stayers: Change in population in Northeastern NSW,' in D. J. Walmsley (ed), *Change and Adjustment in Northern NSW*, p 71.

¹⁵ See for instance, Peter Cuming 1985, *Multiple Occupancy of Rural Land in the Clarence Valley: A survey of participants and the lifestyle*, project funded by the Housing Commission of New South Wales, sponsored by the Nymboida Shire Council, unpublished report, archive of Peter Cuming, Maclean.

¹⁶ Three categories taken from H.C. Weinand and D.A. Lea 1990, 'The movers and the stayers: Change in population in Northeastern NSW,' in D. J. Walmsley (ed), *Change and Adjustment in Northern NSW*, p 71. As Weinand and Lea have pointed out, these new people in the region are, 'urban orientated and urban employed but are attracted to rural environments while not being dependent economically upon them,' p 71.

the new residents had a strong connection to the area's natural environment: in interviews many new migrants said that the reason they moved to the Clarence was the rich nature of the area, the views, the healthy river and the sense of being surrounded by nature while still being close to vibrant communities.

Jo Kijas, in a study of contest over place in the Coffs Harbour district (an area just south of the Clarence region which experienced a similar process of population growth) pointed out that these new residents were opposed to the previous community consensus of the need for development. Kijas has explored how this concern of new residents manifested in campaigns to protect the region's natural environment from damaging development, even if this meant a cost to commercial development in the region.¹⁷

An increase in the number of environmental groups in the Clarence region is one indicator of the environmental concern of these new residents of the region. The Clarence Valley Field Naturalists, a very active group in the 1960s, was complemented from the late 1970s by a range of new and very active environment groups including the National Parks Association Clarence River Branch, the Clarence Valley Conservation Council, the Clarence Environment Centre, The Greens, Maclean Valleywatch, Coutts Crossing Conservation Group, North Coast Environment Council and the North East Forest Alliance. These groups, made up of both long-term and new residents, were active in campaigns against various developments and in support of protecting nature; members of environmental groups were appointed as community representatives on river management bodies and gained representation on local shire councils.¹⁸ An indication of the strength of the environmental movement in the region was the diversity of groups and the range of their involvements. Several of these groups were supported by state and national

¹⁷ Johanna, Kijas, 2002, *Moving to the Coast: Internal migration and place contestation in Northern New South Wales*, PhD Thesis, University of Technology, Sydney. Kijas points out that there had been an earlier wave of migration to the region in the 1950s, however this earlier group had broadly fitted in with the dominant local values – particularly the concern about the need for profitable rural industries.

¹⁸ Greens representative on number of local councils – Maclean and Nymbodia. Greg Clancy, Interview, 28 July 1998. See also Ian Watson 1990, *Fighting Over the Forests*, Allen and Unwin, Sydney.

environment groups, such as the Nature Conservation Council of NSW and The Wilderness Society.

Along with the prominence of new residents, Aboriginal people, the region's traditional owners, gained increased recognition as an important interest group in the region. As fruits of the long-running land rights movement, Aboriginal communities established community organisations, such as Land Councils, to publicly promote their concerns. Aboriginal communities also gained ownership of land, developed economic enterprises and established cultural centres. The Aboriginal community used sacred site regulations (among other regulations) to protect areas by the river which were important to them. In particular Aboriginal communities gained increasing recognition in debates about land and water management in the region.¹⁹

While there was rapid population growth on the coast, in the majority of rural areas the long running trend of rural depopulation continued, spurred on by continuing decline in prices for the traditional rural commodities of sheep, cattle, dairy and wheat. However, along with coastal areas, a number of rural areas with specific characteristics defied this trend and experienced an increase in population. Large regional centres, and their surrounding areas within commuting distance, continued to grow; these towns were referred to as 'sponge towns', drawing in the services and populations from smaller towns.²⁰ The other exception to ongoing decline in population in rural areas during this period, as the demographers Weinhard and Lea point out, was 'rural areas featuring major agricultural developments such as the irrigated cotton areas of the black soil plains.'²¹ The Balonne floodplain, part of the black soil plains, experienced population growth based on the rapid expansion of irrigated cotton growing, an intensive and profitable form of farming described as 'industrial farming' or 'factory farming,' which involved extraction of large volumes of water and clearing of significant parts of the floodplain.

¹⁹ Linki Gordon, Interview , 24 July 1998. Della Walker, Interview , 21 July 1998.

²⁰ Grafton may be considered as a 'sponge town' other examples include the large inland NSW cities of Armidale, Dubbo and Wagga Wagga.

²¹ H.C. Weinand and D.A. Lea 1990, 'The movers and the stayers: Change in population in Northeastern NSW,' in D. J. Walmsley (ed), *Change and Adjustment in Northern NSW* p 63.

So while both the Clarence region and the Balonne Region had the common experience of population growth, there was a significant contrast in the basis of this population growth. People moved to the Clarence for the lifestyle and to be next to nature, transforming the region from an 'agricultural' region to a 'lifestyle' region. People moved to the Balonne on the basis of the intensification of agricultural land-use. This contrasting inland experience is explored in the following section (Section IV).

Broadening of economic opportunities

From the 1970s the Clarence region, along with a growth in population, also experienced the growth of new commercial activities, particularly tourism. This economic change in the area provided increased impetus for protecting the natural health of the river.

Since the turn of the century tourism had a presence in the Clarence region, based around rail travel and guesthouse tourism in Yamba and along the river. However from the 1970s, with the expansion of mass tourism, tourism developed into a major commercial activity in the Clarence and in the wider north coast region. Tourists flocked to the region in the summer school holidays and during fishing seasons, such as the mid year bream season on the Lower River.²² Tourism was most focused on the coastal strip, but also had an influence on the whole region. Caravan parks, motels, farm-stays and wilderness lodges were developed throughout the region. The river was a key focus for tourism, fishing and recreational boating were important tourist activities in the lower river, and white water canoeing and fishing were important activities on the Nymboida River.²³

A healthy riverine environment was important for the profitability of tourism. Tourism is a very fickle market and if the river showed signs of being polluted

²² Janet Purcell, Interview, 2 October 1999.

²³ Hall 1990 'From Cottage to Condominium: Recreation, tourism and regional development in northern NSW,' in D. J. Walmsley (ed), *Change and Adjustment in Northern NSW*. Terry Kass, 1989, 'Regional History of the North Coast: A discussion paper on recent settlement', p29-30, Department of Planning, Grafton.

then tourists would holiday elsewhere. Property development – catering for the tourist industry and increasing population – also became an important commercial interest in the region. Similar to tourism, property development relied on a healthy riverine environment for its profitability – property buyers would be less likely to pay solid prices for waterfront properties where the river was considered toxic or unhealthy.

Besides tourism and property development, a range of other commercial activities developed on the Clarence region. Alternative and niche crops became an important commercial sector. These included organic crops (tea tree, honey), native herbs (such as lemon myrtle), horticulture (including cut flowers) and private farm forestry. The Clarence had good rainfall and good access to the large markets of Sydney and Brisbane. In addition, Grafton continued to be a regional centre for government departments, providing employment for a broad range of professionals. This diversity of economic activity provided alternatives to the traditional rural activities of dairy, cattle and timber, which were all suffering declining profitability. The timber industry, for example was affected by industry restructuring and restricted access to resources, while dairy had declined from hundreds of producers in the 1950s to a handful of niche dairies by the 1990s. Grazing had also become less profitable – few cattle sales were held in the region, and the local abattoir was constantly threatened with closure.²⁴ In addition the land which grazing relied on was becoming increasingly degraded – large-scale erosion was very visible, but only one of the signs of decline. Sugar cane and fishing were the only traditional economic activities that maintained their viability, though even these industries faced constant threats from changes in government regulations and markets.

The new range of economic activities in the Clarence meant that the region had the luxury of choosing between different options to fulfil the aim of vibrant economic development. In particular, it had the luxury of choosing options for development which took account of the long-term health of the environment.

²⁴ Ian Watson, 1990, *Fighting Over the Forests*, Allen and Unwin, Sydney. Terry Kass 1989, *Regional History of the North Coast: A discussion paper on recent settlement*. Mick, Moy 1994, *Cattle industry on the Clarence*, Mick Moy, Grafton.

The Balonne region in this period also experienced ongoing downturn in the traditional sectors of sheep and cattle grazing – the profitability of these sectors had greatly declined. However in the Balonne Region, in contrast to the Clarence, the only obvious alternative economic activity to the traditional grazing was large-scale irrigated cropping – an intensive style of agriculture which had significant impact on the long-term health of the riverine environment. So in order to maintain a vibrant economy the communities around the Balonne River had much more restricted choices than communities in the Clarence region. As noted above the following section (Section IV) looks at how this played out in the Balonne region.

External change – new direction of NSW Government

Also from the late 1970s the NSW Government, in managing rivers and regulating development, increasingly took account of the long-term environmental health of coastal rivers. The Government's interest in river health was based on a recognition of the fragility of the riverine environment and a recognition that river health was important for a broad range of interests – commercial, recreational and cultural.²⁵ At minimum this was a change in rhetoric, whereby the interests of environmental health had to at least be considered in development proposals. However in the Clarence region, where a range of government agencies actively implemented this new policy direction and activist groups lobbied the government to enforce its own policies, it probably shaped environmental outcomes. The change in direction by government agencies had a number of interconnected dimensions – monitoring river health, protecting the catchment, regulating development and broadening stakeholders involved in decision making.

From the mid-1980s the State Pollution Control Commission, and later the Environmental Protection Authority, undertook systematic monitoring of the water quality in the Clarence River. This research provided an authoritative measure of the health of the river. Studies of the Clarence River found that the

²⁵ For a concise statement of this recognition see Healthy Rivers Commission 2000, *Independent Inquiry into the Clarence River System, Final Report*.

river was not as healthy as commonly thought; that even with such an abundance of water, and limited heavy industry, the river was still troubled by sewage and other pollution flowing into it.²⁶ From the early 1980s the state government introduced an environmental impact assessment regime: all developments, public and private, had to identify possible and probable environmental impacts, and identify steps to mitigate any impacts. While an environmental impact assessment regime did not necessarily ensure good environmental outcomes, it at least provided a forum where environmental issues had to be considered. New land and water management bodies were established with oversight of whole catchments and a brief to take account of environmental health while managing competing uses of the catchment. The Clarence Total Catchment Management Committee, established in 1990, was one example of this new breed of management body.

The NSW government was also active in protecting the health of the rivers through protecting and rehabilitating native vegetation in the catchment. A great deal of the catchment was protected as State Forests. However, in response to increasing pressure to log remaining rainforest areas, and sustained environmental protests, the Wran government in 1982 made a decision to end rainforest logging and convert large areas of State Forest into National Parks, creating the Washpool National Park and expanding other parks. When the Wran government announced this decision in Grafton in 1982 it created a great deal of anger in the Clarence community, and was seen as a big win for the environmental movement at the expense of the timber industry, which was one of the largest industries in the region.²⁷ As a flow on from this decision, the Nymboida River was declared as NSW's first 'wilderness river' and the Washpool National Park was listed as a World Heritage area, providing a high level of protection for much of the catchment of the Washpool River. The Washpool is claimed by many residents to have the freshest water, and best tasting fish, in the district.

²⁶ State Pollution Control Commission 1987, *Water Quality in the Clarence River*, Northern Rivers Study no. 3, State Pollution Control Commission, Sydney.

²⁷ Ian Watson, 1990, *Fighting Over the Forests*.

The state and federal governments were also actively involved in rehabilitating damaged areas outside National Parks. Through the Landcare program, which began in 1985, the government provided funding to community groups to carry out rehabilitation activities in their local area. The Landcare program was very active in the Clarence region, with over 60 active groups. A main focus of activity was revegetating riverbanks and wetlands and planting trees to protect areas damaged by erosion.

As well as protecting land, government agencies were active in the complex task of protecting, and rehabilitating, the habitat needed for native fish. In response to the red spot outbreaks, government agencies reformed the practice of floodplain drainage and increased efforts towards rehabilitating wetlands. On the upper Clarence River, NSW Fisheries were active in developing a recovery plan for the endangered Eastern Freshwater Cod, which is only found in the upper reaches of the Clarence and Richmond Rivers. The Eastern Freshwater Cod, a relative of the Murray cod, faced extinction from reduced river flows, sedimentation of river channels and over fishing. NSW Fisheries documented the river flow conditions needed for the survival of this species, specifically the minimum flow rates need for successful breeding, and attempted to ensure that this was taken into account in management of the river.²⁸

The government had always sought participation from community interests in environmental decision-making, for instance in the 1960s representatives of local shires, dairy farmers and sugar cane farmers were all actively involved in planning for the flood mitigation program.²⁹ However from the 1980s the government broadened its definition of who were considered to be stakeholders in environmental decision-making. Groups with a keen interest in the health of the river, which had previously been excluded from decision-making process – such as commercial fishers, environmental groups, and the local Aboriginal community – gained acknowledgment as important stakeholders, and their participation was sought out in decision making

²⁸ Healthy Rivers Commission 2000, *Independent Inquiry into the Clarence River System, Final report*.

²⁹ See Chapter 3.

processes. Professional fishers were active in the new Floodplain Management Authority, which reformed drainage of the lower river. Giving groups a seat at the decision-making table did not ensure that their views would be taken into account, however at least it created a forum where a greater diversity of concerns could be raised.

The Healthy River Commission (HRC), established in 1995, confirmed the new direction of the NSW Government. The Commission carried out in-depth inquiries into the management of all major NSW coastal river catchments, including the Clarence River.³⁰ In its report on the Clarence River the Commission stated that its inquiry was sparked by a concern about the degree of modification of the rivers,

This [report] is in response to the decline in river health observed throughout the state. A growing number of people perceive that too much water has been taken out of many rivers, too many pollutants have drained back into them, too much of the protective riverside vegetation has been removed and weeds have been allowed to grow rampant on their banks.³¹

In its report the Commission recognised the range of pressures on the Clarence system and reviewed all aspects of management of the Clarence River. It provided strong recommendations for reforming river management to bring it into line with current state-wide best practice.³²

This new direction in managing coastal rivers was a significant change from the 1960s when the state government strongly supported large-scale modification of rivers, such as the flood mitigation scheme, with little consideration of the possible negative consequences for the environment. Such a scheme would not be able to proceed under the current direction of government policy.

³⁰ Healthy Rivers Commission 2000, *Independent Inquiry into the Clarence River System, Final report*.

³¹ *Ibid.* p 3.

³² *Ibid.*

In the inland Balonne area, by contrast, the Queensland state government continued with the earlier policy of supporting significant modification of inland rivers for irrigation development. Even from the late 1980s, the Queensland government placed limited environmental regulation on large-scale private irrigation developments on the Balonne. However in the wider Murray-Darling Basin, there was increased concern with the extent of modification of the river, specifically the degree of extraction of water. Newly established inter-governmental authorities, particularly the Murray-Darling Basin Ministerial Council, attempted to limit the extent of modification of rivers in the basin and rehabilitate areas which were damaged. This contrasting inland experience is explored in the following section (section IV).

Dispute over wood pulp mill – local concerns about river pollution

In the late 1980s many local residents strongly opposed the building of a wood pulp mill on the Lower Clarence River. A key focus of the opposition was that pollution from the plant would damage the health of the river.

In 1988 Harris-Daishowa, a majority Japanese-owned company, put forward a proposal to build a large-scale wood pulp mill on the lower Clarence River. Wood pulp mills transform timber – predominantly logs direct from forests – into fine wood pulp, which is used in producing paper products; the wood pulp from the Clarence River plant was intended to be exported to paper producers in Japan. The developers proposed that the Clarence plant would use world best practice processing technology – called bleached hardwood kraft pulp processing. The Clarence region was attractive to Harris-Daishowa because the region had extensive timber resources, good service infrastructure, and good transport links.

The proposal was strongly supported by powerful interests in the region: the Forestry and Forest Products Industry Council; the state government's Northern Rivers Regional Development Board and the NSW Minister for Natural Resources, Ian Causley, from the National Party, who was also the parliamentary representative for the Clarence region. These groups presented the pulp mill as providing an appropriate outlet for the region's timber

resources and an important contribution to regional development, in an area with limited industry.³³

However this proposal met with strong opposition within the region. Those opposed to the mill asserted that the benefits for regional development were not worth the risks to the health of the river – the Clarence was no place for heavy industrial development. Local residents were also concerned that turning timber to pulp was a waste of the region's forestry resources, and would encourage an unsustainable increase in logging. A range of local groups were involved in the campaign opposing the pulp mill: the Clarence Valley Conservation Coalition; the Clarence River Fishermen's Cooperative; the Clarence Environment Centre and the North Coast Environment Council.³⁴ The campaign was also supported by the international environmental organisation Greenpeace, which had an interest in opposing industrial pollution – Greenpeace claimed that the proposed mill would pump tons of organochlorides, including dioxin, into the Clarence River.³⁵ Organochlorides are highly toxic chemicals, which accumulate in the aquatic food chain; there is no safe level for releases of organochlorides.³⁶

Local environment groups collated research on similar pulp mills in Canada that also used best-practice methods. They found that each river system had been severely degraded, if not from the chemicals created in the bleaching process, then from the wastewater, which is pumped into the rivers. This wastewater contained finely suspended organic residue, which ended up coating bankside vegetation with a thick grey scum and clouding the river water, choking out the light needed for seagrass and other estuary vegetation

³³ Eric Rolls, 1993, 'Poisoning Paradise,' *The Independent Monthly*, December, p 37-41. Clarence Valley Conservation Council 1990, 'Pulp Mill Questions Remain,' *Groundswell: The journal of the Clarence Valley Conservation Council Inc.*, vol 2, no 1, August, p 4.

³⁴ This section is based on interviews with: Greg Clancy, Interview, 23 November 1997, 28 July 1998, Stan Mussared, Interview, 21 November 1997, Jeff Richards, Interview, 5 October 1999, Bill Noonan, Interview, 23 November 1997.

³⁵ Eric Rolls 1993, 'Poisoning Paradise,' *The Independent Monthly*, December, p 37-41.

³⁶ *Ibid* pp39-40.

to grow. Under these conditions the living river was turned into a drain; creating a habitat in which few native fish could survive.³⁷

Environmental groups actively campaigned within the region – lobbying local civic leaders, organising petitions and holding public meetings across the Clarence region. Bill Noonan, a long-term resident who was actively involved in the campaign, remembers public meetings in the lower river towns which packed the community halls and had people spilling out of the doors.³⁸ Janet Purcell, who had recently moved to the fishing village of Iluka on the lower Clarence, remembers reading a flyer about the pulp mill on a public notice board and immediately knowing that she had to oppose it. She could not believe anyone could contemplate such a risk to the health of the river. Reflecting on this moment years later, she said that perhaps she felt so strongly about it because she knew the importance of a healthy river to Iluka, which relied on fishing and tourism. Also, she now feels, perhaps she felt so strongly because she was pregnant at the time and so was deeply concerned about health and the future.³⁹

Jeff Richards, an ex-fisherman, recalls that the Fishermen’s Cooperative was heavily involved in the campaign and its resources and lobbying skills contributed to the campaign being effective.⁴⁰ Stan Mussared, who was active in environmental campaigns in the region, recalls that the large campaign against the pulp mill built on the earlier, and successful campaigns against intensive rainforest logging in Washpool area.⁴¹ One indication of the level of concern was that a petition opposing the mill was signed by 12 700 people.⁴²

On the 23rd March 1990 the NSW Minister for Natural Resources, Ian Causley, announced that the NSW government had ‘shelved indefinitely’ plans for a pulp mill in the area. Environmentalists welcomed this decision, but were

³⁷ Ibid p 40.

³⁸ Bill Noonan, Interview, 23 November 1997.

³⁹ Janet Purcell, Interview, 2 October 1999.

⁴⁰ Jeff Richards, Interview, 5 October 1999.

⁴¹ Stan Mussared, Interview, 21 November 1997.

⁴² Eric Rolls, 1993, ‘Poisoning Paradise,’ *The Independent Monthly*, December, p 39.

concerned that the decision was timed to shore up the declining electoral support for the National Party on the eve of a federal election.⁴³ However, at the 24 March 1990 federal election, Ian Robinson, the sitting National Party representative, lost the seat of Page, which covered the Clarence region, with a swing of 5.2% against him; much higher than the statewide swing against the National Party. Analysis of this election result by Chris Duncan, a rural sociologist, has pointed out that this swing against the Nationals in Page, the National Party's traditional heartland, could be explained by the large in-migration to the region – that is, the influx of a large population who did not hold the traditional National Party support for rural development. Further and more specifically, Duncan argues that opposition to the toxic waste emitting pulp mill in the Page electorate could also account for this swing against Ian Robinson.⁴⁴

The brief and successful campaign against the pulp mill provides an indicator of the depth of concern about modification of the Clarence River. The opposition to the pulp mill revealed a new and enlarged mix of local and external interests that held concerns about modification of the river. The pulp mill dispute also showed that local politicians had to take heed of the depth of local residents' concerns.

Plans for extracting water – increased governmental interests in long-term health

The process of planning for a new urban water supply scheme for the Clarence region in the 1990s also revealed heightened concerns from local residents about modification of the river. In addition this process revealed new roles for the state government in taking increased account of impacts on long-term environmental health in approving large-scale public projects. The concern about the wood pulp mill focused on the possibility of pollutants

⁴³ Clarence Valley Conservation Council *Groundswell*, p 4. Environmentalists' concerns were realised when in 1992 plans for the pulp mill were revived, however again after a opposition from local residents the proposal was withdrawn.

⁴⁴ Chris, Duncan, 1994 'Tim Fischer's Dilemmas: The Nationals and the 1990 Federal election,' *Rural Society*, vol 2, no 4.

flowing into the river; with the regional water supply scheme the concern focused on extracting water from the river.⁴⁵

Population growth in the Clarence region made the dilemma of providing reliable water supplies more apparent – with increased population there was increased demand for reliable urban water supplies. Such supplies for the Clarence region depended on the flows of the Nymboida River: water was extracted from the Nymboida River, one of the upper tributaries of the Clarence, piped to a storage tank near Grafton, and then piped around the district. However the storage tank held only a week's supply of water, so the region faced water shortages at times when the demand for water exceeded the flow of the Nymboida River.⁴⁶ Drawing water at times of extremely low flows was also more damaging for the riverine ecology. In the late 1980s and early 1990s demand for water exceeded supply on numerous occasions and the water supply authority – the Lower Clarence County Council (LCCC) – had to apply water restrictions, often for months at a time, and often during the hot summer months.

Coffs Harbour, south of the Clarence Region, while outside the Clarence catchment, also drew its urban water supplies from a tributary of the Clarence, the Orara River, a smaller river than the Nymboida. Coffs Harbour faced similar problems to the Clarence region – a rapid increase in population placing increased demand on a limited water supply. Coffs Harbour had a storage dam of 5000 ML, however because of the high demand for water and variable river flows, Coffs Harbour also frequently had water restrictions.

In the early 1990s the Lower Clarence County Council proposed a new regional water supply scheme to resolve these problems of urban water supply for the Clarence region and Coffs Harbour. The scheme involved a

⁴⁵ This section draws on interviews with residents who were involved with this process, including the community consultation: Peter Wrightson, Maclean, 29 September 1999; Greg Clancy, Interviews, 23 November 1997 and 28 July 1998; Stan Mussared, Interview, 21 November 1997; Jeff Richards, Interview, 5 October 1999; Bill Noonan, Interview, 23 November 1997. For information about the scheme see, North Coast Water 2003, *About North Coast Water*, North Coast Water, [viewed December 2003], <www.ncwater.nsw.gov.au/about/>.

⁴⁶ High flows would be 100 ML per day, but at times could get as low as 6 ML per day. The region required around 20 – 30 ML per day.

number of elements – continuing to extract water from the Nymboida river, building a large off river storage dam, filled by water from the Nymboida, to hold more than a year’s supply of water, and building a pipeline to link the new storage dam with the Coffs Harbour storage, to supplement the supply for Coffs Harbour (Figure 12). The scheme aimed to provide secure water supplies for the current population and for the growth in population over the coming fifty years, while reducing the necessity of extracting water at times of low river flow.⁴⁷ A resource manager described the scheme to me as being very straightforward, it was just creating a large ‘bucket’ which they could fill from the Nymboida when the river was running and then draw down from as needed.

The NSW State Government imposed a raft of planning guidelines that the County Council had to comply with before they would grant approval for the development to proceed. The County Council had to show that the project was sound in terms of three main criteria: in terms of engineering, that structurally it was sound; in terms of economics, that it was a valid expenditure of public funds; and finally, that it was environmentally sound, that the proponents had considered possible and probable environmental impacts and identified ways to monitor and mitigate the identified impacts. The proposal had to satisfy each of these criteria for it to proceed.⁴⁸

Imposing these three assessment criteria was a major shift from previous decades when large-scale public projects only had to satisfy two dimensions of assessment, that it was sound in terms of engineering and relatively lenient economic assessments. For instance each section of the flood mitigation scheme had to satisfy rigorous engineering assessments and limited economic assessments; however there were no mechanisms to consider environmental impact. The first environmental impact assessments were conducted in 1980, after the bulk of the drainage work had been carried out, with only a narrow range of environmental factors considered.

⁴⁷ Material for Lower Clarence County Council 1997, *History of the Clarence Valley Water Supplies*, Lower Clarence County Council, Grafton.

⁴⁸ Personal correspondence with Stuart White, Institute for Sustainable Futures, University of Technology, Sydney.

As part of the assessment process the County Council had to consider the option of reducing the demand for water, rather than just considering increasing the size of the water supply. This included considering reduction in water use through planning regulations, such as insisting on rainwater tanks and grey water re-use in new developments, and public education, such as encouraging consumers to use water efficient showerheads.⁴⁹

The environmental impact assessment had to consider possible impacts on flora, fauna, river health and Aboriginal cultural heritage among other factors, and identify ways of mitigating these impacts. The assessment of impacts on river health had to take account of flow requirement outlined in the recovery plan for the Eastern Freshwater Cod, which identified the flow levels needed during its breeding cycle. Assessing the impact on Aboriginal cultural heritage involved conducting surveys of material heritage and consultation with the local Aboriginal communities. A range of government conservation agencies – the Environmental Protection Authority, the National Parks and Wildlife Service, the Department of Land and Water Conservation – were involved in the assessment process.

The County Council was also required to conduct a wide ranging process of community consultation. To promote community participation in the planning process the County Council established a shop front project office in South Grafton, which made documentation relating to the project available to the public. The County Council also established a Community Advisory Group, held public meetings throughout the catchment and sought ways to involve Aboriginal communities in the planning process. The County Council won an award for the conduct of its community participation strategy.

Once the County Council had conducted the assessment process the proposal was reviewed by a high level Independent Review Committee to ensure that the proposal met all state government planning criteria. This review took place in 1999, almost five years after the scheme was first proposed.

⁴⁹ Ibid.

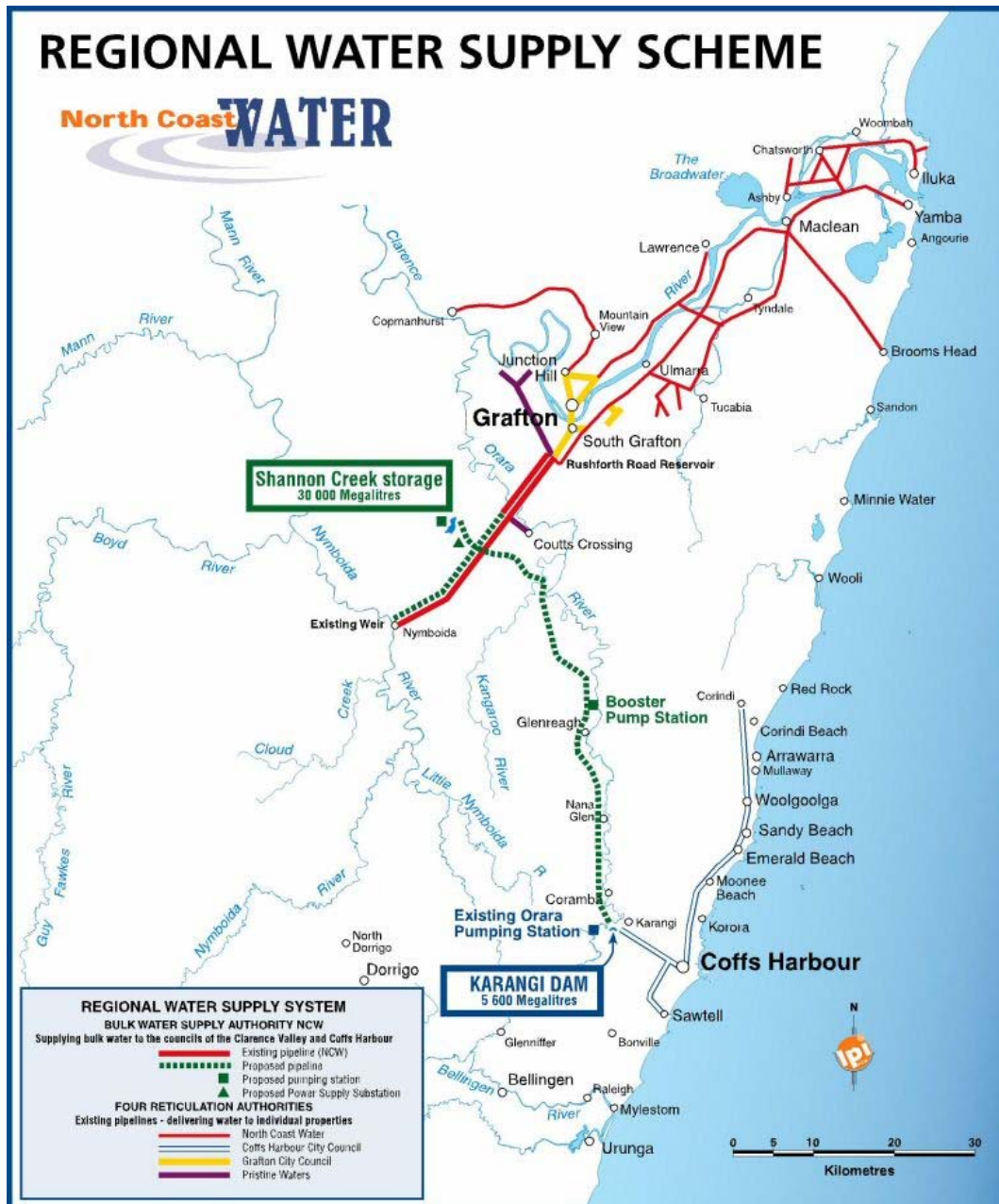


Figure 12: Clarence Region Water Supply Scheme 2003

The Shannon Creek dam (30 000 mega litres) was a key part of the Regional Water Supply Scheme.

Within the local area there was wide-spread concern about the proposal. A range of local residents held concerns about the degree of extraction of water from the Clarence River system, the size of the proposed dam and the fact that water was being transferred out to the Clarence catchment to supply Coffs Harbour.

Social research conducted by the County Council found that within the area there was a high sensitivity to the regional water supply scheme, and more broadly a high level of concern about any modification of the river system. Underlying the opposition to the regional water supply scheme was also concern about the inland diversion proposals, which often featured in the media in the 1990s. There were no major dams on the Clarence River and many residents wanted to see the Clarence River remaining free of major developments. The County Council, in order to gain public approval for the scheme, put a great deal of effort into addressing these community concerns.

Local environment groups – particularly the Clarence Valley Conservation Coalition, and Clarence Environment Centre and the Maclean Valleywatch – were actively involved in campaigning against the proposal. Their concern focused on the size of the project and the limited consideration of alternatives to the increased extraction and storage of water, such as strict demand management and putting a ceiling on the population of the region. Members of the environment groups participated in the Community Advisory Group, however after a number of years of involvement, they decided to withdraw from the public consultation process.⁵⁰ They dramatised their stance by staging a walk out of a Community Advisory Group meeting.⁵¹ The environmentalists felt that the County Council were using the rhetoric of public participation in decision-making, while not adequately modifying their proposals in response to concerns put forward by community groups.

On the 22 March 2000, over five years after the scheme was first proposed, the NSW Minister for Urban Affairs and Planning, Dr Andrew Refshauge, gave

⁵⁰ Peter Wrightson, Interview, 29 September 1999. Press release from the Clarence Environment Centre and the Clarence Valley Conservation Coalition, 'Green groups boycott meeting', 23 October 1997.

⁵¹ Peter Wrightson, Interview, 29 September 1999.

approval for the Lower Clarence County Council to proceed with the Regional Water Supply Project. This decision was based on the report and recommendations of the Independent Commission of Inquiry.⁵²

The approved proposal had to take account of a raft of environmental concerns and, in a number of instances, the planning and assessment process modified the original proposal. The initial preferred option was for a dam at Kangaroo Creek. However this dam site was rejected, primarily because the dam would damage significant Aboriginal material heritage. An alternative site at Shannon Creek was selected. The Shannon Creek dam was limited to 30 000ML, with capacity for expansion at a later date if there was demand for more water. The scheme had to operate under very strict rules for extracting water, particularly that extraction could only take place when the river flow reached certain levels.⁵³ The final scheme included a significant demand management component, including applying strict planning requirements on new urban developments.⁵⁴

In this coastal region the state government created a regulatory environment whereby public developments had to take significant account of the long-term environmental consequences. In addition the planning process revealed a high level of sensitivity in the region about modification of the river.

Convergence of interest in pressing for river health

The change in perceptions of modification was a major turn-around in the region. In earlier decades large-scale modification of the river had been seen as beneficial for the region; just a few decades later the same kind of developments were seen as having significant negative consequences. A number of factors contributed to the change in perceptions of modification of the river in the Clarence region. Changes in the local area played a part – the

⁵² Lower Clarence Country Council, Timeline, www.ncwater.nsw.gov.au/about/ [accessed 15 March 2003]. In 2001 changed name to North Coast Water.

⁵³ The maximum annual volume extracted was limited to 20 000 ML, 2.5% of the average annual flow of the Nymboida River.

⁵⁴ Lower Clarence Country Council web site, www.ncwater.nsw.gov.au/about/. 'Protecting the health of our rivers.'

influence of new residents and a new range of economic activities – as did changes in the direction of the state government. However long-term interests in the region also contributed to the change in perceptions of modification, along with these recent developments.

Interactions over key environmental issues in the region revealed the convergence of these differing interests. The red spot fish disease was highlighted by professional fishers, and once the cause was identified state government agencies were active in working towards finding new ways to manage the toxic acid sulphate soils. The broad ranging environmental assessment and planning process for the regional water supply scheme, reflected the changed direction by the NSW Government. The dispute over the wood pulp mill revealed the heightened concerns in the local area about pollution flowing into the river system.

Long-term residents in the region had a range of responses to this change in perceptions of modification. Some groups felt vindicated that finally their concerns had been recognised; others defiantly held that their earlier view about the benefits of modification were still relevant. However these more traditional views no longer had the same resonance or support in the region.

Vindicated for earlier opposition

A number of groups who in the 1960s held concerns about the impacts of an earlier development in the region – the flood mitigation scheme – felt vindicated that finally there was increased recognition of the negative consequences of development. However each of these groups – professional fishers, Aboriginal people, established environmental groups and floodplain graziers – had different experiences of this change.

Professional fishers felt vindicated that wetlands, and other areas important for fish breeding, were finally gaining a degree of protection and attempts were being made towards some rehabilitation. The Fishermen's Cooperative, and Oceanwatch (the fishing industry's conservation organisation), continued to be active in pressing for rehabilitation of important fish habitat in the

river.⁵⁵ However, while ocean fishing continued to thrive, commercial estuary fishing was constantly under threat of being closed down because of the pressure on fish stocks. Fishing licences had been revoked in many estuaries in NSW; the Clarence was one of the last coastal estuaries in NSW where professional fishing was still permitted.

Aboriginal people from the Clarence felt vindicated that the health of the river was gaining some increased protection and that finally they were gaining some recognition as traditional owners of the river, at least symbolically in terms of being consulted in management of the river. Linki Gordon, a Bundjalung elder and long-term activist, felt that finally there was some turn-around in management of the river,

Blackfellas have been telling them for years and years that you can't keep taking, and not put anything back.

Well now they are starting to wake up to that fact – they're starting to put a little bit back into it.

But will it keep going, I'd like to see it keep growing now, and you know keep on going.⁵⁶

However the community goal of a more direct role in management of land and water remained elusive.

Floodplain graziers and conservationists, members of the Clarence Valley Field Naturalists Club, had been opposed to the total drainage of wet pastures, back swamps and wetlands. Graziers were primarily concerned with loss of good quality grasses and conservationists were primarily concerned with loss of bird habitat. Both graziers and conservationists felt vindicated that as part of the new management regime, in response to problems with acid sulphate soils, complex wetlands such as Chaffin Swamp on the Coldstream River and the Everlasting Swamp were protected and rehabilitated. In the 1990s, for example, the northern section of the Everlasting Swamp was flooded again, and once again became a haven for birds.⁵⁷ In addition,

⁵⁵ Krissy Auld, 1998, *Wetland Rehabilitation on the Lower Clarence Floodplain, Opportunities and Priorities for Action*, Oceanwatch, Sydney.

⁵⁶ Linki Gordon, Interview , 24 July 1998.

⁵⁷ Greg Clancy, Interview, 28 July 1998.

management authorities, working with local graziers, developed management regimes so that wet pastures and back swamps were not totally drained but had a layer of water covering the land, providing conditions for good quality grasses to grow.⁵⁸ A number of floodplain graziers, including Roy Bowling from Tucabia on the Coldstream, still owned land, so they could see the fruits of years of campaigning. Roy was proud to take visitors around wetlands on the Coldstream and to speak of the complex history, both natural and human, of these wetlands.

While people who had been involved at the time remembered these campaigns, the contemporary environment movement in the area, which had different membership, priorities and politics, largely forgot these campaigns. In 2002 the Clarence Valley Field Naturalists on its 80th anniversary made the decision to close down, citing lack of membership as the primary reason.

Defiance – older ideas no longer resonate

The more traditional views about the benefits of modification were still strongly held by some residents in the region, particularly older men – people who in their lifetime had seen the benefits from technology and modification of the river. In oral history interviews, some of these older residents would recognise that these views were unpopular, prefacing their remarks with *I'll be strung up for saying this*, or *Saying this will get me shot around here*. However, they would then go on to express their deeply held views about how large-scale development of the river was still relevant today. These views had two major intertwining currents, the need for regional development and the destructive nature of the river.

One argument put forward was that large schemes, including the inland diversion scheme, are necessary to support regional development in dry inland communities and in turn to support national development goals. Further, it is argued that the government will eventually use its powers to push the project through; just as the government had used its powers to push through the Snowy Mountains Scheme in post-war decades. What was

⁵⁸ Roy Bowling, Interview , 17 November 1997

relevant then is still relevant today. Another argument put forward, particularly by older farmers who had experienced hardship from the floods of 1940s and 1950s, is that the river needs to be controlled because natural river floods were destructive to farmland and the wider community. These older residents claimed that the problem is that the area hadn't experienced a run of large floods for decades and so people in the area today have forgotten just how destructive floods could be. Nature was destructive in the past, and would be destructive again, and so the river needed to be controlled.

These were the views which drove the modification of rivers in the post-war decades. However these views no longer aligned with the experience in the community, or the direction of the state. The role taken by the state and federal governments in relation to modification of rivers had changed over these decades. The NSW and federal governments recognised that the environmental and economic costs of such large water infrastructure projects outweighed the benefits. The state would not support building any more Snowy Mountains Schemes in southeast Australia.

The perception of the destructive nature of the river during floods no longer held the same meaning in the region, not only because residents had forgotten about floods, but because residents now had a different experience of floods. No longer did the community rely on dairy, grazing and cane to the extent it did in the 1950s. Floods would continue to be difficult, damaging and perhaps dangerous – the flood in 1996 was all of these things. However because the community did not rely on agriculture to the same degree as previously, even a string of floods would not threaten the existence of the community as it had done in the 1950s. While these ideas were strongly held by older residents, these ideas no longer resonated with the experience of the community, and no longer aligned with the direction of government.

However in the inland region, the Balonne Floodplain, these ideas of the benefits of modifying rivers continued to resonate with the experience of local residents and the direction of the state government. Yet there were also new interests which highlighted the negative consequences of development. It is to this contrasting experience that we now turn.

Section IV: Continuing support for modification, Balonne River 1950s and 1960s

Chapter 7

A new wave of development: Revitalising the region

From the late 1980s there was new wave of development along the Balonne River in southwest Queensland. In a decade there was a massive expansion of irrigated agriculture in the area, almost exclusively for growing cotton. With the increase in irrigated agriculture there was a massive expansion in the water storage capacity in the district.

During the 1960s and 1970s irrigated cropping had developed around the St George area, drawing water from the large public storages, the Jack Taylor Weir and the Beardmore Dam, with storage capacities of 10 GL and 82 GL, respectively.¹ However this new phase of irrigation development was based on private water storages on the edges of the river, which had five metre high earthen walls. These were filled by pumping water from the river's periodic flows, called 'water-harvesting.' The expansion of irrigation in the 1960s and 1970s was centred around St George and the large public storages. Some of this new water-harvesting development took place around St George, however the greatest area of development was on the floodplain between

¹ Initially the Beardmore Dam was considered to hold 110 GL. However it was resurveyed in the 1990s and found to hold approximately 82 GL.

Dirranbandi and the Queensland border, on land previously used for grazing.²

The increase in water storages in the 1990s was significant, with the storage capacity of the area increasing by a factor of six. In the late 1980s the main storages in the area were the large public dams at St George, which between them held approximately 100 GL. In the mid-1980s there was a very limited amount of private water storage in the district. By 1999 there was 675 GL of private storage – this was approximately a six-fold increase in the water storage capacity. This storage capacity represented approximately half the annual river flow of 1 100 GL. This was a rapid change to the river and to the local area.

One property, Cubbie Station, on the floodplain below Dirranbandi, accounted for a significant portion of this development. Cubbie Station, over 100 000 acres and 35km long, was the first property to develop on the floodplain, and relied totally on private water storage. Before this development it was not considered possible to irrigate on such a variable system without the security of a large public storage. Once it proved that irrigation based on water-harvesting was possible on this highly variable system, numerous other properties developed on the floodplain.

Cubbie Station began development in 1988. By the late 1990s it had over 15 000 acres of irrigated cropping and a storage capacity of 460 GL. Cubbie Station aimed to store enough water to provide for three seasons, in case the river didn't run. However the full storage capacity would only be filled by very large floods, which only came once every ten years.³ It is one of the largest irrigation properties in Queensland and one of the largest private water owners in Australia.

² The development only took place on the Queensland side of the floodplain. The NSW side of the floodplain was governed by a stricter set of regulations which did not allow this style of irrigation development. However during this period there was significant development of irrigated agriculture on the Darling, Namoi and Gywdir Rivers in northwestern NSW.

³ Average annual extractions may be around 100 GL.

Some comparisons make sense of the scale of this storage capacity. Sydney Harbour is generally said to contain 500 GL and Sydney, a city of 4.2 million people uses 562 GL per year. The storage on Cubbie Station alone is greater than each of the two storages on the Namoi River in northern NSW, where irrigated cotton began in the 1960s. Keepit Dam has a capacity of 423 GL and Spilt Rock Dam has a capacity of 397 GL.⁴

Everything about Cubbie Station is massive: the irrigation channels which move water around the property are as large as the nearby river channels, and the compacted earth dam walls run for kilometres. It bears little resemblance to the surrounding grazing properties. The property, and in particular the water storages, are clearly visible in satellite images of the floodplain (see figure 13). The property relies on huge machinery – earth-moving equipment and tractors – which wouldn't look out of place on a mining operation. This form of agriculture is sometimes called 'power-farming' or 'industrial-farming'. It is a highly controlled form of agriculture which relies on high energy inputs (machinery, fertilisers and pesticides) to create high yield output, in this case high quality cotton.

The expansion of irrigated cropping was an economic change for the area. In the 1990s cotton was one of the few bright spots in Australian agriculture – Australian farmers could produce the crop very efficiently and achieve good prices on the global market. Investment flooded into cotton and cotton properties could, in general, make a good return on their investment. The buoyant prospects for cotton stood in contrast to the ongoing decline of the wool, sheep and cattle sectors, the global markets for which had been in decline since the 1970s. The development of cotton led to a significant turnaround in the economic fortunes of Dirranbandi district, which relied on grazing and had been rocked by the decline of the grazing sector. In the St George district this new wave of irrigation development built upon the economic prosperity which the region had gained from the irrigation development of the 1960s and 1970s. Across the Balonne area irrigated

⁴ Peter Crabb 1997, *Murray-Darling Basin Resources*, Murray-Darling Basin Commission, Canberra, p 36.

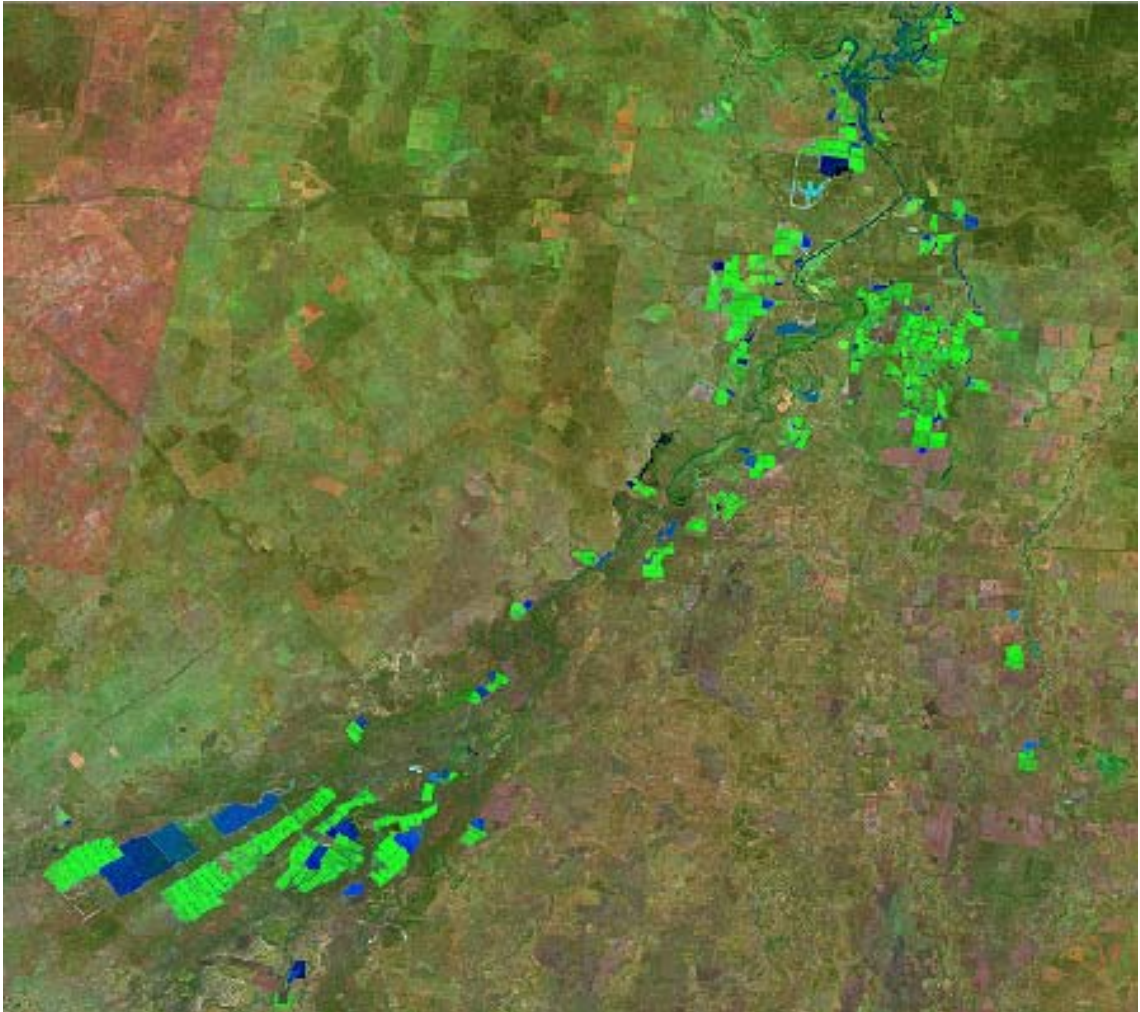


Figure 13: Satellite image of the Balonne floodplain 1999/2000

Cubbie Station, its crops and water storages is clearly visible in the bottom left of this image, the property spreads for 35km down the floodplain. St George is in the top right of the image. The government run St George Irrigation Area is on the right-hand side, and recent development on the left side.

[Landsat image 1999/2000]

agriculture became the biggest economic activity in the region, far overshadowing the economic activity from grazing.

Many long-term residents were amazed by the scale of the development in what had always been considered grazing country. Jack Hammond had lived on grazing properties on the floodplain all his life:

People just didn't conceive that such a huge development could ever take place - not only from the point of view of the necessity for the huge machinery and the planning and that sort of thing, but the financial resources as well.

And obviously, they've got a lot of everything. [. . .] It has largely altered the run of the rivers on the floodplain... or the water on the floodplain.⁵

This wave of development caused significant changes to the natural flows of the rivers, compounding the impacts of the earlier irrigation development in the region.⁶ If the full extent of the pumping capacity was used it could have a significant impact on the river's intermittent flows, particularly the small and medium flows which periodically pulsed through the system. Some people from the floodplain claimed that when the pumps were turned on they could actually see the river run backwards. Studies claimed that Narran Lakes, and series of wetlands on the NSW side of floodplain, had a 40% reduction in flows, meaning that the wetlands were filled less frequently and with less water.⁷ Graziers on the floodplain, in Queensland directly below the large developments, and those further down the floodplain in NSW, experienced a severe reduction in the flooding they relied on for pasture growth. Ecological studies indicated that in the late 1990s, with the level of extractions, sections of the river system were 'stressed' and under threat of declining ecological

⁵ Jack Hammond, Interview, 6 October 1997.

⁶ As discussed in Chapter 4.

⁷ Poh-Ling Tan 2001, *Dividing the Waters: A Critical Analysis of Law Reform in Water Allocation and Management in Australia from 1989-1999*, Doctor of Philosophy Thesis, The Australian National University.

health.⁸ In addition with the level of extraction there was a reduction of water flowing through to the Darling River.⁹

This wave of development continued the modification of the river which began in the 1950s and 1960s. In both these waves of developments there was a strong desire to capture and store the river's intermittent flows. In the 1950s and 1960s landholders built small weirs and used horses and then tractors to construct ring tanks to hold water. The government saw constructing water storages as a key strategy for regional development.¹⁰ In this region with low rainfall and variable river flows, being able to store water held the key to increasing the commercially productive use of the land – providing more security for grazing or allowing for diversification into irrigated agriculture. However this recent development while it had a similar intention, was different to the earlier development in a number of respects: it was on a much larger scale; it was based on large private storages rather than public storages; and it was carried out by private interests, as opposed to the state government, though the government provided the regulatory framework. In addition this wave of development took place on the floodplain, a flat area with complex patterns of flooding. Some of the water was pumped from what was called 'overland flows', that is, water which had already left the river channel.

This era of development was in contrast to the direction taken in the coastal Clarence region in the 1980s and 1990s. In the 1950s and 1960s there was significant modification of the Clarence River and broad support for these developments.¹¹ Then in the 1980s and 1990s there was a significant turn-around in the region. There were increased efforts to protect and rehabilitate the natural qualities of the river, and increased scrutiny of developments which would have negative impacts on the river. Some large-scale projects, such as a pulp mill and an inland diversion scheme, did not proceed because of environmental considerations. Large-scale projects which did proceed were

⁸ Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*, Department of Natural Resources, Toowoomba.

⁹ Ibid.

¹⁰ Explored in Chapter three.

¹¹ Explored in Chapters one and two.

subject to a comprehensive environmental assessment process. For instance the off-river dam for the Region Water Supply scheme had to pass a range of assessments. This was 30 GL, only 7% of the size of the storage capacity on Cubbie Station.¹² So in the coastal region in this same period there was a contrasting perception of modification of the river.

* * *

This section, of two chapters, explores the perceptions of this wave of development in the region – the ways in which it was seen to be beneficial, and the ways in which it was seen to have negative consequences. These are the sets of ideas which informed support for the development and which drove opposition to this modification of the river.

This chapter (chapter seven) explores the ways that irrigators presented the benefits of these developments, and ways in which this was supported in the local community; it also explores the ways in which the state government facilitated this phase of change.

The following chapter (chapter eight) looks at the ways in which impacts of the development were noticed and the recognition these views gained in debate about this issue. A number of groups from within the region held concerns about this development, including: floodplain graziers, recreational fishers and Aboriginal people. The concerns which these groups held about the earlier era of development were compounded by this new wave of development. A key change in this period was the increased involvement of groups from outside the area – in particular conservationists and river scientists – who also held concerns about this development. In addition the developments on the Balonne River came under scrutiny from new government agencies, such as the Murray-Darling Basin Ministerial Council, which were concerned with reforming river management to take account of environmental sustainability.

¹² Explored in Chapters five and six.

Context of development – decline in grazing, interest in sustainable use

The way in which the debates over the benefits and costs of the modification played out was shaped by two key contexts. First, the local context of the decline in the grazing sector, and secondly, the catchment-wide context of growing interest in reforming the management of rivers to take greater account of environmental sustainability. These two factors made contest over development in the 1990s different to contest over development in the 1950s and 1960s. Here I will look briefly at these contexts before exploring the support for the scheme.

A downturn in the grazing sector, which began in the 1970s, had a significant impact in the Balonne region, as it did in many other rural areas. The downturn was caused by a collapse in global prices for wool and also a decline in local prices for cattle. While prices for commodities fell, the cost of running a property increased, making it difficult to remain financially viable.¹³ The grazing sector lost the prestige and security which it built up in the relatively good decades of the 1950s and 1960s. The economic hardships led to many social changes; land-holders took on more work themselves and employed fewer people. Many land-holders, and town residents, moved away from the area seeking new opportunities. There was a decline in the population and services in towns, such as Dirranbandi, which relied on grazing.

In the 1990s there was increased concern about the declining health of the rivers in the Murray-Darling Basin. In the 1980s and early 1990s heightened salinity levels in the lower Murray River began to have a severe impact on irrigation and on the water supplies for towns and cities, including Adelaide which drew its water from the Lower Murray River. Saline water would damage plants and was not suitable for drinking. Scientific research pointed out that a key cause of declining water quality was the level of extraction of water from the river and clearing of native vegetation. That is, the natural flow conditions were critical for the health of rivers. Research also indicated that if

¹³ Powell, J. M. 1991, *Plains of promise, rivers of destiny: water management and the development of Queensland 1824-1990*, Boolarong Publications, Brisbane, pp 301-320.

reforms were not implemented the health of the river system would continue to decline, with major impacts on commercial irrigation in the Lower Murray River and also on the water supply for towns and cities including Adelaide.¹⁴ Signs of declining river health were not confined to the heavily developed Murray River. In the summer of 1991-92 the Darling River experienced an outbreak of toxic blue-green algae which extended for 1000 kilometres along the river – this algae was toxic for humans and stock. The outbreak was taken as an indication that the health of the river was in decline.

In response to this decline in the health of rivers there was increased interest in reforming river management practices. The water reform agenda was led by state governments of South Australia, Victoria and New South Wales, which were directly affected by this decline in water quality. The federal government, also had an interest in protecting the long-term health of the economy and the environment in the Murray-Darling Basin, one of Australia's richest agricultural areas. The reform agenda was informed by two key concepts: the need to consider environmental sustainability in the management of rivers, and the need to include the whole catchment in river management (see Figure 14). Taking account of the whole of the Murray-Darling catchment, which covered several states, meant breaking down the exclusive power of each state to determine its own river management. In this way Queensland was drawn into increasing inter-governmental regulation about the management of the Basin.

The Murray-Darling Basin Ministerial Council (MDBMC), which was established in 1992, was one of the key inter-governmental agencies which carried out this reform. It was concerned with reforming management of all rivers in the basin to maintain the health of the river-system.¹⁵ The Council of Australian Governments (COAG) also established a water reform agenda in the 1995. This reform agenda was concerned, in part, with implementing more rigorous economic and environmental assessments of public spending for

¹⁴ Murray-Darling Basin Ministerial Council 1999, *The Salinity Audit of the Murray-Darling Basin: A 100 year perspective*, Murray-Darling Basin Ministerial Council, Canberra.

¹⁵ Peter Crabb 1997, *Murray-Darling Basin Resources*, p 289.



Figure 14: The Murray-Darling Basin

A key part of the water reform agenda was promoting the concept of an interconnected catchment – that what happened at the top of the basin had effects further down in the basin. This map shows the way that this catchment cuts across State boundaries.

dams and other water storages. This reform agenda was carried out by the National Competition Council.

The national and metropolitan media also reflected this heightened concern with decline in rivers. In many media reports the development on the Lower Balonne was singled out as representing the worst of river management practices. This article from the Australian newspaper in 2001 is typical of the way development on the Balonne River was reported:

Australian, 31 March 2001

The dams that drank a river

Up in Queensland's land of cotton, downstream water woes are soon forgotten. And, as Amanda Hodge reports, the state Government is still looking away.

EVEN 600m above ground level, no map reference or global positioning equipment is required to pinpoint exactly where Queensland's cotton country lies. Amid the natural chaos of an Australian horizon looms a bizarrely ordered patchwork of hazy white cotton interspersed by vast belts of water. Euphemistically called "ring tanks" or turkey nest dams, these water storages, which look like lakes, mark the beginning of the St George and Dirranbandi cotton fields.

Flying over this region offers a window to one of the largest and most rapid metamorphoses this country has experienced. From struggling grazing country 10 years ago, a frenzy of dam building and land clearing has turned the Condamine-Balonne river system into a slave to cotton, an immensely profitable but ultimately risky business.

Cotton, as the industry is at pains to point out, is far from this country's thirstiest crop, using less water than rice, maize, soybeans and citrus. But it's clear that the breakneck development in southern Queensland has indelibly altered this landscape. About 400km from Brisbane and an ideological world away from the troubled Murray mouth, the region's claim to fame is the largest collection of privately owned dams in Australia. Covering 40,000ha of Coolabah country, the dams vary in aspect from big to colossal, rushed to panicked.

At least half of them were pushed up in the past two years. More tellingly, most were constructed after 1994, when Queensland's southern neighbours signed on to a water cap restricting diversions from the Murray-Darling river system.¹⁶

¹⁶ Amanda Hodge 2001, 'The dams that drank a river,' *The Australian*, 31 March.

This article gives a sense of the way that this development was seen to be out of step with current concern about environmental management. This widespread concern about the scale of this development forms an important context for the way in which debates over this development played out.

Bringing benefit to the community – positioning of large-scale water-harvesters

In the Balonne region in the 1990s water meant wealth – irrigated agriculture generated a great deal of economic activity. This was in the same way that in the 1950s sheep meant wealth.

One good crop from Cubbie Station alone was worth \$50 million.¹⁷ Irrigators presented themselves as bringing beneficial change to the region – providing much needed commercial activity which supported local communities.¹⁸ In addition they argued that their activities were a responsible use of the region's water resources, that their developments had no negative impacts on the river, and if there were negative impacts then they were outweighed by the benefits to the community. Irrigators broadly presented themselves as practising good stewardship, using the land productively to bring benefits to the community, without damaging the land.

Irrigators presented themselves in this role in a range of fora – media interviews, oral history interviews, public relations material and local public meetings.¹⁹ The irrigators associated with Cubbie Station, particularly the manager John Grabbe, were the most consistent public advocates for the

¹⁷ Peter Lewis 2002, 'Whose water is it anyway?', *Landline*, Australian Broadcasting Corporation, [viewed 30 March 2004], <www.abc.net.au/landline/stories/s635037.htm>.

¹⁸ In this chapter I use the terms 'water-harvesters' and 'irrigators' to describe the large-scale irrigators. The new developments from the late 1980s were carried out by water-harvesters and they are represented by the St George Water-Harvesters and Dirranbandi and District Irrigators. The groups are separate from the smaller-scale irrigators who have licenses the large public storages (which in the local area are called Channel irrigators, for those in the public St George Irrigation area, and river irrigators, those farmers on the Balonne River up to 50Km south of St George) some of whom may also have water harvesting licenses.

¹⁹ This section is based on interviews with the following irrigators who were involved in water-harvesting, John Grabbe, Russel Dowling, Chad Prescott, Colin Chandler; and interviews with irrigators from the St George irrigation area, John Dowling, Albert Brimblecombe, Mal Armstrong. See also Ticky Fullerton 2001, *Watershed: Deciding our water future*, ABC Books, Sydney, pp 226-234. For public relations material see the 'Smartrivers' website, which included press releases from the water-harvesters, Smartrivers, *Smartrivers*, St George Water Harvesters and Dirranbandi District Irrigators, [viewed 2 December 2003], <www.smartrivers.com/reports.htm>.

irrigators' position. Cubbie Station, because it was the largest irrigation development on the floodplain, was constantly under scrutiny from regulators, floodplain graziers, other water-users and the media.

Across these fora the water-harvesters presented a fairly consistent position. The themes irrigators mentioned in public fora were similar to the themes expressed in interviews I conducted with prominent irrigators from the region. In each of these forums the irrigator's position was shaped by the strategic need to mobilise support for their interests in a highly pressured and litigious environment.

However while there was a general consistency in the arguments, there was one crucial difference between the early and mid-1990s, and the late 1990s. In the early 1990s, when water-harvesting was still developing, irrigators put forward arguments about the potential benefits to the community, such as the benefits from having a cotton gin in Dirranbandi. In the late 1990s and early 2000s, when irrigation was established but under regulatory pressure for reductions, irrigators put forward arguments about what would be lost if water-harvesting was reduced in the area.²⁰

While cotton growing was highly mechanised it did generate significant employment, in developing properties, and in growing and processing crops. A range of professionals and farm workers were required on irrigated cropping properties, including earthmoving contractors, tractor drivers, spraying contractors, mechanics, agronomists, stick pickers and cotton chippers. A feature of this development was that the large properties had only a skeleton staff of farm managers and the bulk of the work was carried out by contractors. So a network of contractors, who had each invested in their own equipment, developed around these properties. Cubbie Station was known in the district as a very fair employer and swift in paying for services, something contractors appreciated. Cubbie Station also made efforts to employ local people to carry out farm work, for instance it contracted the local Aboriginal

²⁰ See in particular the public relations campaign on the Smartrivers web site, Smartrivers, *Smartrivers*, St George Water Harvesters and Dirranbandi District Irrigators.

Community Development Employment Program (CDEP) to provide cotton chippers.

The economic activity generated by irrigation in turn created demand for support services in the towns of Dirranbandi and St George. There was increased business for motels, cafes, hotels, service stations, builders, mechanics, couriers and many other businesses. This consolidated the growth of St George, which had prospered on the basis of the earlier wave of irrigation development. However this development was a major change for Dirranbandi which had been in decline with the collapse of the grazing sector. A cotton gin built in Dirranbandi in the late 1990s also increased employment in the region.

While this provided much employment for the area there were limits. The work was dependent on the availability of water. When only a limited area of crop would be planted, or no crop at all, the work would also dry up. In addition the farm work, such as cotton-chipping and working in the cotton gin, was low -skilled and often took place under difficult conditions. While the growth in irrigation provided benefit to the area, much of the economic activity occurred outside the area – fuel, machinery and specialist services all came from outside the region. In addition some properties, particularly during the development phase, operated staff on a fly-in and fly-out basis, similar to remote mining operations, so these staff had limited impact in the local area.

As well as providing employment, irrigators also played the symbolic role of supporting the local towns, acting as a 'patron'. In the mid-1990s Dirranbandi was threatened by a large flood. The shire council didn't have any earthmoving equipment available to build a levee bank to protect the town. So Des Stevenson, the owner of Cubbie Station, sent across some huge earthmoving equipment and pushed up a levee bank, securing the town from inundation. The owners of Cubbie Station also supported local social events. For instance, one year it lent one of its helicopters to the town fete, dropping lollies and gifts on the local oval for kids to scramble and collect. These gestures may appear superficial, but they were meaningful and memorable for many residents of Dirranbandi.

These roles – of generating economic activity in the region and supporting local towns – are roles which graziers had played in previous decades. However with the downturn in the grazing sector, particularly with the collapse of the wool price, graziers could no longer generate this economic activity which supported the district. The irrigation sector succeeded graziers in these roles because irrigation produced commodities which were valued by the global markets. In the Balonne region in the 1990s, besides irrigated agriculture, there were no other obvious commercial activities to generate economic activity in the region.

Wise use of rivers

Irrigators consistently claimed that creating these benefits for the region had few negative consequences for the environment. Large-scale irrigators put forward a number of arguments to support their claim that their use of the river was responsible and appropriate.

Irrigators claimed that the river system was essentially unchanged by the large-scale extraction of water. Irrigators highlighted that the very large floods still ran through the system similarly to how they always had – inundating large parts of the floodplain and running through to the Darling River. Irrigators pointed out that while they had capacity to store vast amounts of water, they only had limited affect on these large flows, which may happen once every ten years.²¹ Further, irrigators asserted that while it was often claimed that the degree of extractions damaged the floodplain eco-system, this could not be conclusively proven. The floodplain landscape is a highly variable eco-system. The river may not run for years at a time and grazing and earlier storages had transformed the natural environment, so it was not easy to see changes to the floodplain landscape.

Irrigators also claimed that within their own farms they carried out best practice environmental management. Irrigators implemented practices such as keeping waste water on their property, managing the use of chemicals and monitoring any salinity. In general large-scale irrigators had the financial

²¹ Peter Lewis 2002, 'Whose water is it anyway?'

resources and skills to implement such environmental management. In addition the cotton industry bodies, in response to public pressure, were active in promoting environmental management.²²

Further, irrigators claimed that if there were limited negative impacts on the environment then it was balanced by the benefits they generated. That is, that the benefits created were worth the cost to the environment. Similarly irrigators also argued that if there was an economic effect on downstream graziers, who relied on beneficial flooding, then this was also justified by the greater economic benefit generated by irrigation.²³ That is, irrigation could produce a much greater economic return from a volume of water than grazing would with the same amount of water.

Irrigators also put forward another argument about their environmental management. They consistently claimed that they only carried out activities which were licensed and regulated by the government. In particular irrigators argued that it was a condition of their water-harvesting licences that they use the licences within a specified time period, or they could be revoked. So responsibility for environmental management lay with the government which regulated irrigation development.

A key point is that these claims made by irrigators, about the benefits from irrigation and the limited consequences for the environment, gained strong support within the local area and within sections of the government.

Experiencing the benefits of development – support within the local community

The expansion of irrigation was strongly supported by many residents of the region. Around the towns of St George and Dirranbandi you do not have to travel far to find people who would offer a good word for irrigation and the

²² Gibb Environmental Services and Arbour International 1991, *An Environmental Audit of the Australian Cotton Industry*, a report commissioned by The Australian Cotton Foundation, Sydney.

²³ John Grabbe interview in Peter Lewis 2002, 'Whose water is it anyway?'

opportunities it brought to the district. For residents of the St George area the new phase of development built upon the growth from the earlier expansion of irrigation. For residents of the Dirranbandi district, further down on the floodplain, the expansion of irrigation was seen to revitalise the area, turning around the long term decline in the district caused by the crash in the grazing sector. However, while it was broadly supported there was also ambivalence in the area about this wave of development.

The Dirranbandi district, along with many pastoral areas, had experienced decline with the downturn of the grazing sector since the 1970s. The decline in markets for wool, sheep and cattle had strong social impacts in the area. Graziers had less income, less security and less money to carry out improvements. With less economic activity generated by grazing there was a downturn in the towns of Dirranbandi and Hebel, which were support towns for grazing. There was less work for town residents and less demand for the services which the town provided. Residents of the towns, and land-holders, left, seeking new opportunities elsewhere.

With the expansion of irrigation on the floodplain there was a sense of revitalisation and new opportunities in the district. Marlene Murchison, from St George, observed the shifting fortunes of Dirranbandi,

*Dirranbandi when I first knew it was a big place.
Over the last 20 years they have carted the houses from Dirran and
Bollon, shifted them to St George.
It is only now with this talk of a cotton gin the houses are coming back
to Dirran.²⁴*

The houses being physically moved back to town were evocative of the revitalisation of the community. Along with people came new businesses, services and opportunities. The population of Dirranbandi had dropped to about 300, by the end of the 1990s it grew to 1000. Shops and cafes which had been boarded up re-opened and new businesses move to town.

²⁴ Ken Murchison, St George, 7 October 1997.

A long-term resident related a story to me which made sense of the ways in which irrigation was seen to have created benefits for this region. Paul, now in his mid 50s, has lived in the area all his life. He grew up on grazing property and now runs a mixed irrigation and grazing property, his own children also work on the property after studying at agricultural college. Paul has thought a lot about the benefits irrigation has brought to the area. He speaks not of the change in this area, but the comparison between this area and surrounding districts which rely on grazing.

Paul describes a recent trip to Cunnamulla, a grazing area west of St George. He says that driving out there he hardly passes another car on the road – there is very little activity in the area, very little development and little investment in improvements. He says that around Cunnamulla land-holders are mainly older people, *‘just care taking the land’* and they employ few people.

Coming back to Dirranbandi and St George, Paul says he saw many more cars on the road, a lot of activity in the towns and around the different farms. He knew that he was coming back into a richer, more vibrant region. Even in times of drought there is activity in this area: *This area is healthy because there is progress. People are doing things getting ahead.* Paul says that people relying on irrigation are in a much more ‘secure position’ than those just relying on a cheque for their wool clip.

For Paul one of the most appealing things about this district is that it holds and attracts young people, including skilled young people just out of agricultural college. He says that when he was young ‘sheep were it’, everyone wanted to be a grazier, however now grazing people don’t see much future in it. He says that with irrigation this is a very young and changing district, very receptive to new ideas and new people.

This comparison between the two areas indicates the benefits irrigation is seen to bring to the area – irrigation can provide for a vibrant community, a community which can hold and attract people, particularly young people. The nearby districts which rely totally on grazing can’t sustain such healthy communities. It also indicates that in these western regions, there were few

economic activities which could support vibrant communities besides irrigated cropping.

The expansion of irrigation also offered some specific opportunities for graziers in the area, who were caught by the downturn in grazing. In particular properties on the floodplain – those which were suitable for irrigation or had water licences – could fetch a good price on the market, to be developed as irrigation properties. In some cases the water licences were worth more than the land. Many graziers also developed small irrigation schemes, of a few thousand acres, to complement their grazing activities. Land-holders could draw upon the network of contractors already in the area to service the large properties. In some cases land-holders developed partnerships with the large properties, drawing on their expertise. Developing small-scale irrigation schemes assisted with keeping younger generations on the family property. In many cases the irrigation schemes were developed by the younger generation while the older generation focused on grazing or moved into retirement.

A history of progress

The idea that irrigation brought benefits to the local community also infused the writing of local history of in the area. The 1996 sesquicentenary of the region, marking 150 years since the explorer Sir Thomas Mitchell passed through the area, was an occasion for history making, for telling stories about the past in the present. As part of the celebrations the local shire commissioned and published a history of the area.²⁵ The publication depicts the history of the area as a narrative of progressive change, in which the district slowly develops from bush to sophisticated farms and modern towns. The river plays an important part in the progress of the district. This history ends with the author taking stock of progress in the district,

As the Sesquicentenary Celebrations take place in 1996, visitors come to a town where recent flooding has enlivened the spirits of

²⁵ Carolyn Nolan 1996, *St George's Bridge: A Sesquicentennial History*, Balonne Shire Council, St George.

many. Cotton is King where once the town had thrived on the profits of sheep and cattle industries. Brick houses are part of a new way of life that includes computers and fax machines and videos, electricity now comes from Roma via the State grid. And the old crafts still survive and a Century Quilt is being made to show the progression of time, its four panels to represent firstly the aboriginals [sic] and the explorers, then the settlers and graziers and their buildings, another panel is to depict the town, and the final panel is to represent the importance of dams and crops.²⁶

This presentation of the area's history presents a common theme to that revealed in oral history interviews – that irrigation provides many benefits to the area, benefits which had previously been provided by grazing, and that irrigation allows the area to move with the times.

This account of the area's progress relies on modification of the river, however it is assumed that the river is robust and unchanged in the face of development, or if it is changed then it is worth it for the benefits it brings. Many local residents asserted, in line with the claims by irrigators, that the river still broadly performed as it as always had. Many went further, saying that in the past this water just went to waste – soaking into the floodplain or evaporating – and now it was being used productively.

Fish were a commonplace marker of the health of the river. While it was widely recognised that the quantity of native fish had declined, casual fishers could still occasionally catch native fish, such as yellowbelly and perch. Even the prized Murray cod could still occasionally be caught, though they were not as large as in the past. However the decline in native fish was broadly perceived to be caused by the invasion of the exotic European Carp rather than by changes from irrigation. Carp are an invasive fish, called the 'rabbit of the river'. They were introduced to the area in the late 1970s, and by the 1990s were in plague proportions – if you went fishing you were more likely to catch a carp than any other fish. If there was a decline in native fish numbers the

²⁶Ibid, p 109.

carp was seen as the most likely cause, as opposed to water harvesting. So it was easy to sustain the idea that the scale of development had little negative impact on the river system.

Ambivalence about development

While this new phase of development was seen to bring benefits to the region, many residents also held some ambivalence about it. Many residents were concerned about the scale of the development and in particular the dominance of a small number of very large irrigation properties. While they welcomed the expansion of irrigation they would have preferred if it was on a large number of small properties, to spread the benefits around. Some were also concerned about the clearing of floodplain land which they regarded as good grazing country. Also there were concerns about the use of agricultural chemicals on the irrigation farms and the affect of chemicals drifting from irrigation properties to grazing properties. Also a key concern was the loss of beneficial flooding to floodplain graziers. Floodplain graziers actively campaigned against a number of the larger developments (this is explored in the following chapter).

However, while many held ambivalence about the development, weighing heavier in their minds were the benefits it brought to the area. In this situation the local community had few other immediate alternative commercial activities, besides irrigation, to generate economic activity and provide social benefits for the region. In this region there was not the luxury of choosing between economic activities, it was, in some ways, seen as a question of survival. This was in contrast to the coastal Clarence region where there was also a decline in traditional rural industries, of dairy and grazing and sugarcane, but also a range of alternative economic activities, such as tourism, which demand protection of the long-term health of the environment.

Facilitating Development – role of the Queensland Government

While the Queensland Government did not initiate this phase of development, it facilitated it, providing the conditions which allowed it to occur. Further, once the development was established, the Queensland Government in its management of the river had a tendency to protect the existing users.²⁷

The state government, in the broadest sense, is responsible for the long term management of the river and its water. In particular the state government has the role of administering and regulating licences extracting water, and for regulating the construction of irrigation infrastructure, such as the storage dams. Regulating construction on the floodplain is particularly important; large structures, such as dams and levee banks, can affect the ways that water flows across the floodplain.

Regulating the extraction of water

Through issuing licences to extract water, the state government played a role in the escalation of water use. The legal scholar Tan, in analysing water management on the floodplain, charted a significant increase in licences. Tan points out that between 1973 – 1988 the number of surface water licences was steady at around 13 000 to 14 000 licences. Not all of these licences would have been constantly in use, some were called ‘sleeper’ licences and were used intermittently, and some were never used, being called ‘dozer’ licences. In 1989/90 there were 14 683, then in 1989/90 there was a sharp increase in the number of licences, taking the total to 21 927.²⁸ Tan points out that it is significant that there was a state election in 1989, in which the National Party lost after more than 30 years in government. Tan notes that speculation has been raised about the possibility of political interference in the licensing process in that year. Before the election the Minister approved applications

²⁷ This section is based on numerous interviews with floodplain graziers, Leith Bouilly and Reg Betts, who were involved in campaigning against numerous decisions made by the state government. This section also draws on Poh-Ling Tan 2001, *Dividing the Waters: A Critical Analysis of Law Reform in Water Allocation and Management in Australia from 1989-1999*.

²⁸ Licenses operated at different trigger flows, the early licenses began at very low flows, such as 300 ML flow per day (measured at St George) later licenses began at flows of 10 000ML or 60 000 ML, which may only occur every ten years. A flow of 20 000 ML per day was considered a flood. Each license could extract a specified amount of water per day.

which had been made as far back as 1982.²⁹ Whatever the case, the government allowed this significant increase in water-harvesting licences.

The government was not overly onerous in its regulation of the use of these licences. Each licence had specified 'starting flows' which had to be reached before pumping could begin, and a specified volume which could be pumped. However, the state government did not require volumetric or time monitoring of these licences making it difficult to monitor use of the licences.³⁰ The government also showed some flexibility in the regulation of licences. Licences were tied to particular properties, but the state government was flexible in allowing transfer of licences and amalgamations of licences, in ways which facilitated development.³¹ Each licence attracted an annual administrative fee, however the government allowed the bundling of licences, which reduced the administration fees. For instance Cubbie Station held fifty licences, however the Department allowed these to be treated as one entity for the purpose of paying fees. The licences attracted a fee in the order of \$4000 per year.³²

In October 1991 the Goss Labor government placed a moratorium on the issuing of new water-harvesting licences. This was in response to floodplain graziers raising concerns about the need to limit the level of water-harvesting.³³ However the government allowed existing licences to be developed, including the development of sleeper and dozer licences which may not have been used for some time.

²⁹ Poh-Ling Tan 2001, *Dividing the Waters: A Critical Analysis of Law Reform in Water Allocation and Management in Australia from 1989-1999*, p 547.

³⁰ Ibid.

³¹ Ibid.

³² Ibid. This fee was for the administrative charge not the water. This fee was much less than the fee paid by license holders from the storage dams, however water-harvesters did not have security.

³³ Ibid p 553. The Goss Labor Government ended 30 years of National Party rule.

Regulating construction on the floodplain

The government also facilitated development by regulating irrigation structures on the floodplain. The state government had the power to request environmental impact and safety assessments as part of the licensing process for structures on the floodplain, such as levees and storage dams. However in key instances the government used its discretion to waive these assessment conditions.³⁴ The local shire also could have drawn upon powers to regulate construction on the floodplain however the local shire chose not to take up these planning powers.³⁵

In 1992 the Goss Labor Government attempted to increase the regulation of structures of the floodplain by declaring the floodplain a 'designated area.' This designated area was in part a response to concerns from floodplain graziers about the negative impact of infrastructure on floodplain flows. The declaration of a 'designated area' allowed greater co-ordination of the siting of structures to manage flows of water across the floodplain.³⁶ Within the local area there was very strong opposition to this regulation, with large irrigators claiming that this regulation would place severe limits on any development on the floodplain. Very heated exchanges took place at public meetings which the Department held in Dirranbandi to discuss the issue.

Despite the local opposition the Goss Government declared the floodplain a designated area in February 1992.³⁷ However following this declaration it was challenged in court by Des Stevenson, the owner of Cubbie Station, on a technicality – that the final designated area was slightly smaller than what was advertised in some newspapers. The court ruled in Stevenson's favour and overturned the designated area. The government could have appealed this decision, but chose not to. In addition there were clear steps which the government could have taken to remedy this situation, however these steps were not taken. Tan notes that there was speculation in the area that this

³⁴ Ibid. This was challenged in court by graziers below the structure, with mixed success.

³⁵ Ibid p 552.

³⁶ Ibid p 552. In New South Wales 13 floodplains had a similar regulatory regime.

³⁷ Ibid p 553.

technical breach was initiated by the Department so that the measure would fail, however as Tan notes this is a conspiracy theory that is difficult to prove and too far fetched for many.³⁸

In order to resolve the issue of water-sharing and floodplain management issues the Department in 1992 established the Lower Balonne Advisory Council (LBAC). Floodplain graziers had lobbied for this structure after the limited success of litigation and increased regulation. The LBAC commissioned research and developed a set of principles to guide development on the floodplain. However while these principles reflected good planning practice, it had no powers of enforcement. Also while a range of interests were represented on the Council, including floodplain graziers from Queensland and NSW, there were no environmental representatives. Graziers attempted to advocate for good environmental outcomes, however their interests did not always coincide with environmental interests.³⁹ So while the Advisory Council made some advances, working co-operatively to resolve disputes between water-users, it had a number of limitations.

New pressure for reform

From the mid-1990s the Queensland Government came under increasing pressure to reform water management on the Lower Balonne from the water reform agenda initiated by the federal government, through the Council of Australian Governments and the Murray-Darling Basin Ministerial Council (MDBMC), among other government agencies. One of the most significant components of this reform agenda was the 'cap' on extraction of water declared by the MDBMC. In June 1995 the MDBMC, in a bold decision, declared a 'cap' on extractions of water throughout the basin – this decision was in recognition that the ecological limits of extraction had been reached or exceeded. In most sub-catchments the 'cap' or limit, was set at the 1994/1995 level of extractions.

³⁸ Ibid p 554.

³⁹ Leith Bouilly, Interview, 11 October 1997. In addition there were no indigenous representatives on the committee.

This changed the dynamic of floodplain management – with increased external influences, and more scrutiny of state management. The Queensland Government’s response to the pressure, and the outcome of attempts to limit extractions, are followed up in the following chapter. However in broad terms the process of setting the ‘cap’ was delayed, which allowed the amount of development on the floodplain to expand greatly. The delay in establishing a cap on extractions, even in face of administrative and legal pressure from the Murray-Darling Basin Ministerial Council, was in keeping with the Queensland Government’s role of facilitating development on the floodplain.⁴⁰

Benefits of development on the floodplain

The Queensland Government’s role of supporting modification of the river was a continuation of the government’s direction in earlier decades. In the 1950s and 1960s the state government promoted increased use of the river by building large public water storages to supply irrigated cropping.⁴¹ While this recent wave of development was carried out by private interests the government provided the conditions for it to occur and, further, while it had the power to limit this development it did not use this power.

This role of the Queensland Government, however, was in contrast to the role of governments in the south of the Murray-Darling Basin, which in the face of declining river health were moving towards limiting extraction of water and considering returning water to the river. The role of the Queensland Government was also in contrast to the NSW Government in the coastal Clarence region. The NSW Government during the 1980s increased significantly the regulation of developments which were considered to impact on the health of rivers. For instance, this meant increased assessment and

⁴⁰ For comment on delay in meeting the cap, see Independent Audit Group 1999, *Review of Cap Implementation 1998/99*, Murray-Darling Basin Commission, Canberra. Independent Audit Group 2004, *Review of Cap Implementation 2002/03*, Murray-Darling Basin Commission, Canberra.

⁴¹ Discussed in Chapter three.

planning for public developments, such as the Region Water Supply Scheme and the inland diversion scheme.⁴²

While intentions are always difficult to determine, particularly for a body as complex as a state with many different actors, it is possible to speculate on a number of reasons for this role played by the Queensland Government. The government may have been unable to control this development. It could be argued that water regulation is a very complex area and the large-scale irrigators used water-harvesting licences in ways which they were not originally intended. In addition large-scale irrigators were active in protecting the security of their access to the resource. In this situation it was difficult to regulate development on the Lower Balonne Floodplain.

However this pattern of development, in its general outline, may have broadly suited the government's interest in regional development. The government may have seen its role as providing the conditions to facilitate the most commercially productive use of land. This is an imperative which informed earlier government strategies of regional development and could be seen to have informed the government's role in relation to this development.

Whatever the case, if it was intentional or not, throughout the 1990s the state government provided the conditions which allowed the development of large-scale irrigation on the Balonne floodplain. This was widely seen as revitalising the local area, providing a range of opportunities and benefits, particularly in terms of increasing the vibrancy of local communities, which had been affected by rural decline.

This situation was in contrast to the coastal Clarence region, which also experienced decline in traditional sectors of grazing, dairy and timber, however this coastal region had a range of other commercial sectors which could provide opportunities for the community, and which were not as damaging for the long-term health of the environment. In this way, the coastal community had the option of choosing a path for continued economic development which was not as damaging for the long-term health of the environment. So in a different area the same goals of sustaining the community could be achieved by a path which involved less impact on the

⁴² Discussed in Chapter six.

long-term health of the environment. In this way, the local conditions – the social and physical conditions – shaped the options which the communities had to achieve the important goal of social sustainability.

Chapter 8

Water for the rivers: New support for river health

In fact, if they keep on taking water from the river, I think that they're going to ruin the system entirely.

Long-term resident, St George 1997

The expansion of irrigation on the Balonne River during the 1990s marked a rapid change to the river-system. This wave of development greatly increased the capacity to extract and store the river's ephemeral flows. Many saw this wave of expansion of irrigation as a positive development, bringing new opportunities to the region. The expansion of irrigated agriculture increased economic activity in the region, which had been hard hit by a downturn in the grazing sector.

Others saw, however, that while there may be economic benefits from this development, there were also many negative consequences. In particular these concerns centred on the decline in the river's natural flow patterns – the reduction in flows that should spread across the floodplain, filling wetlands and finally reaching the Darling River. This chapter explores these concerns about this development, focussing in particular on the recognition that these concerns gained in the management of the river at this time.

Groups in the Balonne region who were concerned about the developments in the 1950s and 1960s – floodplain graziers, fishers and Aboriginal people –

were also concerned about this stage of development. This new phase of development compounded the problems that residents had noticed in earlier decades, such as decline in floods and decline in conditions for native fish.

In the 1990s groups outside the region, in particular conservationists and river scientists, were also concerned about the environmental impacts of these developments. The interest from outside organisations reflected the heightened interest in the sustainable use of rivers, and this was a major change from the 1950s and 1960s when there was broad support for developments in inland rivers.¹ In addition, the Queensland Government's management of the floodplain came under increased scrutiny from intergovernmental bodies, including the Murray-Darling Basin Ministerial Council, which were concerned with the sustainable use of rivers.

In the coastal Clarence River region in the 1980s and 1990s there was also an heightened interest in the sustainable use of the rivers. In the Clarence region these concerns gained strong recognition in the management of the river and all developments had to at least take account of the possible environmental impacts of the development.² This chapter provides a comparative account of how similar concerns about the impacts of development played out in this inland catchment.

Reduction in beneficial flooding – floodplain graziers

Graziers on the floodplain were the interest group in the region who were most active in opposing the developments. Floodplain graziers were concerned about the decline in the natural flooding regimes, since graziers relied on periodic floods to rejuvenate the deep alluvial black soils and promote pasture growth. It was the combination of the deep black soils and regular floods which made the floodplain valuable grazing country. The large-scale irrigation developments in the 1990s amplified the impacts graziers experienced following the building of the public storages in the 1960s. The

¹ As explored in Chapters three and four.

² As explored in Chapters five and six.

large proportion of the river flows extracted into private storages meant less water flowing across the floodplain.

Graziers were also concerned about the impact on floodplain flows from the irrigation infrastructure – the storages, channels and levee banks. Irrigators on the floodplain built levee banks to protect areas of cropping and also to direct water to be pumped; in some cases levee banks were over ten kilometres long. These structures affected the way that floods spread across the floodplain: flows were blocked to areas normally flooded, and large volumes of water flowed into areas which normally weren't flooded.

The graziers most directly affected by the irrigation development were those directly below the large development of Cubbie Station. All graziers on the floodplain, however, including those further down in Queensland and across the border in NSW, were affected by the reduction in flows. Jack Hammond, a grazier from the floodplain, said that graziers were *put on queer street* by this reduction in flows.³

Reg Betts, from 'Balgil', downstream from Cubbie Station, was very active in opposing the irrigation development. He estimates that the decline in floods, particularly the decline in the small and medium floods, reduced the carrying capacity of his family's property by a third, which equated to about 3000 sheep. The flow on from this is a reduction in \$300 000 from their wool cheque each year. Reg Betts points out that the decline in flows led to a change in his experience of the floodplain:

*The simple fact is all this was lambing country, all this flood country was lambing country, now we've got no flood country. We are cutting back on lambs and if you cut back on lambs means you cutback on sheep numbers and without the sheep numbers somebody has got to suffer, it's usually the worker, so the worker drops out.*⁴

With the decline in carrying capacity there was also a flow-on in terms of a reduction in prices for grazing properties. To add weight to their claims,

³ Jack Hammond, Interview, 6 October 1997.

⁴ Reg Betts interview reported in Peter Lewis 2002, 'Whose water is it anyway?', *Landline*, Australian Broadcasting Corporation, viewed broadcast 30 March 2004, <www.abc.net.au/landline/stories/s635037.htm>.

graziers attempted to document the various impacts of the development. In the early 1990s the floodplain graziers co-ordinated a research report which found that, by a conservative estimate, a flood gave a commercial benefit to graziers of \$42.9 million dollars over three years – this was a benefit to the grazing sector that also flowed on to the local and regional community.⁵

Graziers were also concerned about the changes to the natural diversity of the floodplain – a change in grasses, timber cover and a decline in water-holes.⁶ Through the experience of grazing they had some understanding of, and affection for, aspects of the natural diversity of the floodplain.

Graziers used a range of strategies in campaigning against the irrigation development including: lobbying politicians and the local shire; court action to direct the state government to enforce its own regulations and calling for increased regulation, through the ‘designated area’ provisions.⁷ They had limited success in these endeavours and the ‘designated area’ proposal was lost on a technicality. Following the failure of the ‘designated area’ proposal, the graziers shifted their efforts to a local decision-making body, the Lower Balonne Advisory Council, which conducted research on floodplain flows and developed principles for management of the floodplain and for sharing the floodplain’s water resources.⁸ A number of graziers were involved in these efforts including Reg Betts, Leith Bouilly from ‘Kelso’ on the Briaire Creek, below Cubbie Station and Rory Treweeke from ‘Angledool’, on the Narran River in NSW.

While graziers were very active and committed campaigners they had only limited success in gaining outcomes from these processes. In Reg Betts’ opinion they managed to head-off some of the most excessive aspects of the irrigation developments, however, they had only some effect on limiting the general pattern of expansion.⁹ Graziers found that there were few legal and

⁵ Mottell Pty Ltd, 1996, *Lower Balonne Integrated Flood Plain Resources Study*, Mottell Pty Ltd, Swan Hill, p 6.

⁶ Reg Betts, Interview, 11 October 1997. Leith Bouilly, Interview, 23 July 1996.

⁷Ibid.

⁸ Ibid.

⁹ Reg Betts, Interview, 11 October 1997.

policy frameworks to support their concerns, particularly those regarding flows of water across the floodplain and regulation of construction on the floodplain. Even where there were regulations in place, the government was often unable or unwilling to apply them. It was a significant change in role for graziers, since historically graziers had been the predominant commercial group within the region and their concerns has been broadly supported by governments. In this case they played a defensive role and found little support within government regulations.

In addition, graziers gained little support from the local community; in fact, there was often direct antagonism towards the graziers who strongly challenged the irrigation developments. For instance, during public meetings to discuss the 'designated area' proposals, the handful of graziers who spoke in support of the proposal were drowned out by over 100 other local residents and irrigators who strongly opposed to increased regulation.¹⁰ In these debates, graziers, along with the state government, were perceived by other local residents as threatening the future of irrigation in the area. While historically grazing had economically supported the region, in the 1990s cotton was seen as providing for the economic future of the district.

While graziers gained little support for their concerns within the region, they built strong networks of support outside the area. They formed useful alliances with urban-based environmental groups. In 1994, for instance, the Inland Rivers Network held a workshop on Reg Betts' property under the title 'Water for the Rivers', which brought together a range of people who were concerned about the scale of the development.¹¹

Their most productive source of support, however, came from the growing field of natural resource management, or integrated catchment management. This was an approach to managing rivers which was increasingly informing government management agencies, such as Total Catchment Management and the Murray-Darling Basin Initiative. This approach recognised the

¹⁰ Leith Bouilly, Interview, 23 July 1996.

¹¹ Interview Reg Betts. Inland Rivers Network 1994, Minutes: Meeting Held at 'Balgí', Hebel, Queensland, on 16-17 April, 1994, IRN Archive.

interdependence of productive commercial land-use, healthy environments and vibrant communities.¹² Increased community participation in decision-making was a key part of this approach. Leith Bouilly, a grazier from the Balonne Floodplain, moved into positions as a community representative in natural resource management agencies. Among other roles, Leith Bouilly served as chair of the Murray-Darling Basin Commission's Community Advisory Council; this council played an important role in promoting integrated catchment management in the basin. So while graziers gained little support within the local area, they built strong alliances and support bases with new interests outside the region.

Concern about decline in fish – recreational fishers

Many people who spent time fishing along the Balonne River held concerns about the effect on native fish from the increased extraction of water. While graziers were primarily concerned with a decline in the commercial productivity of land, fishers were concerned with the decline in fish habitat. Fishing, a popular activity in the region, gave people an opportunity to observe the river and its changing conditions; regular fishers noticed that with the increase in extraction there was a decline in native fish, which relied on the natural flow regimes. As one long-term resident said, *I've got a horrible suspicion there won't be any fish left in the thing in another 10 or 20 years.*

The increase in extractions in the 1990s was seen to have compounded the problems caused by the modification of the river in the 1950s and 1960s. The decline in the river noticed in earlier decades – the increasing siltation of water-holes, a decline in flows and water quality – were all seen to be amplified with the increase in extraction. Fishers also saw that the actual physical activity of extracting water had an impact on fish. Fish were attracted to moving water and so would be attracted to the currents which pumps created. Once close to the pump they could be sucked up into them. If the fish did survive being sucked through pumps and made it into the large storages, there was little chance that they could make it back to the river. This

¹² See for instance Murray-Darling Basin Ministerial Council 2001, *Integrated Catchment Management in the Murray-Darling Basin 2001-2010: Delivering a sustainable future*, Murray-Darling Basin Ministerial Council, Canberra.

perception of the river, and the changes to it, came from long-term observation of fish and from a strong interest in the river continuing to support native fish populations.

From the early 1980s native fish faced an additional problem – the expansion of European Carp. Carp are a fast breeding exotic fish that compete for habitat with native fish. From the early 1970s they spread throughout the Murray-Darling Basin. By the mid-1990s carp made up approximately a quarter of all fish in the inland rivers - if you went fishing you were as likely to catch a carp as any native fish. Along with the increase in extraction of water, carp also made conditions difficult for native fish.¹³

While these concerns were strongly held by fishers, their concerns gained little recognition in public debate in the region. In St George and Dirranbandi there were recreational fishing clubs, but these clubs did not have the resources or capacity to engage in public debates over water-harvesting, even when they held strong views. In addition with the multiple impacts on the conditions for native fish, particularly the impact of carp, it was difficult to isolate water harvesting as a cause of decline without detailed scientific research. Perhaps more importantly, while fishers held concerns about the change in the rivers, they also had a range of associations with the irrigators and, in some ways, an interest in the continued prosperity of the irrigation sector – in small country towns it is a luxury to be able to rock the boat.

The situation faced by recreational fishers in the Balonne region was in contrast to that of commercial fishers on the Clarence, where professional fishers were able to be strong advocates against development on the river.¹⁴ On the Clarence the professional fishermen had a commercial interest in protecting the condition for fish and the Fishermen's Co-operative provided a focal point for their lobbying efforts. The role of fishers on the Balonne was also in contrast to the role taken by graziers in the area – floodplain graziers were very active in campaigning for more equitable water-sharing arrangements between graziers and irrigators.

¹³ Peter Crabb 1997, *Murray-Darling Basin Resources*, Murray-Darling Basin Commission, Canberra.

¹⁴ Explored in Chapters five and six.

Concerns about a changed landscape – Aboriginal people

Aboriginal people in the area also held concerns about the scale of the development. These concerns differed from non-Aboriginal people in the district, in that they reflected a particular indigenous experience of the landscape. Land continued to be an important point of identity and politics for Aboriginal people in this region.¹⁵ With the expansion of irrigation, aspects of the landscape that were important to Aboriginal people were seen to change greatly.¹⁶

Randall Taylor, a young Murri man from Dirranbandi and a regional representative on the Aboriginal and Torres Strait Island Commission, held strong concerns about changes in the area. His family has a long association with this area; his father is a long-term resident of Dirranbandi and his grandparents lived at Angledool, on the Narran River, just across the border in NSW. Randall sees some benefits from this wave of development, but is concerned about its long-term impacts,

In a way it's a good thing for the town, like there's been a lot of money and that's coming in and going to the locals and things like that.

But where is it going to head, in ten years' time? It makes you wonder. Now they're going to walk away with millions and millions of dollars and you're going to be left there with a desert or something.

I've said before in ten years time – what's going to happen? Like, one good thing I'll give Cubbie though, they recycle their water, they've got it set up so that when the water goes through the crop it goes back down to the bottom and they transport it back to the top again. It's still a lot of water to be used but they're trying, I suppose. Because

¹⁵ Heather Goodall 1996, *Invasion to Embassy: Land in Aboriginal Politics in New South Wales, 1770 - 1972*, Allen and Unwin, Sydney.

¹⁶ Heather Goodall 1999, 'Contesting Changes on the Paroo and Its Sister Rivers', in Richard Kingsford (ed), *A free-flowing river: the ecology of the Paroo River*, NSW National Parks and Wildlife Service, Sydney, pp 179-200.

*they've got 40-odd paddocks there of cotton... I wouldn't know how many acres or hectares that is, but it's a lot.*¹⁷

Randall knew Cubbie Station when it was a pastoral property, since his father William worked for many years as a fencer on Cubbie Station and surrounding properties. Randall says that when he was young his father would occasionally bring home some artefact which he found out on the property, just show it to them and pass it around. Then he'd just take it back and put it back where he found it. On weekends he would occasionally take them out to Cubbie Station and show them things – point out old Aboriginal sites, show them around the land and often they would do a bit of shooting while they were out there. While it was a grazing landscape it still contained some markers of the pre-settlement landscape, and these markers continued to be used to teach younger generations about the land and history, even if in very subtle ways.

When Cubbie Station was developed for irrigation the whole landscape was changed – the vegetation was cleared, the land levelled with laser assisted earthmoving equipment, and huge storages and channels were constructed. The landscape is now unrecognisable to Randall and his father William, and any markers of past Aboriginal settlement have now disappeared.

Before the irrigation structures were built, the Queensland Government did not impose any requirement to undertake archaeological surveys or consult with the local Aboriginal communities. By contrast, in coastal NSW archaeological surveys and consultation with Aboriginal people were required for all large-scale projects; for instance, such surveys were part of the assessment for the Regional Water Supply scheme in the Clarence River.¹⁸ In the mid-1990s archaeological surveys were required for any large-scale developments on the NSW side of the floodplain.

Aboriginal people were also concerned about wider impacts on the river system. The level of extraction of water was seen to affect many aspects of the river which Aboriginal people valued – native fish and yabbies, the health of

¹⁷ Randall Taylor, Interview, 14 October 1997.

¹⁸ Discussed in Chapter six.

riverside vegetation and the quality of water for drinking and swimming.¹⁹ These were particular concerns for Aboriginal communities because some communities, such as Goodooga on the NSW side of the floodplain, relied heavily on the river for their drinking water, and in addition fishing was an important recreation and source of food for Aboriginal people on the floodplain.²⁰

Narran Lakes, a series of wetlands on the NSW side of the floodplain, was a focus of concerns about the decline in river flows.²¹ Roy Barker, a Murawari man from Lightning Ridge, has a keen interest in preserving and interpreting the history of the area, and is happy to share stories about the area with outsiders such as myself. On a hot January day he takes me on a drive out to Narran Lakes, and along the way he points out the pastoral properties which he, and his father Jimmy Barker, worked on over the years. At the edge of the lake he explains to me that Narran Lakes traditionally has been shared by a number of Aboriginal groups and is the centre of important creation stories.²²

After talking for a time, Roy points out that the edge of the lake where we are standing is in fact a huge midden. Roy says that archaeologists call this an 'elaborate midden complex.' For a hundred metres around us, or more, the earth is deep with knapped stones, mussel shells and fragments of animal bone. It is a physical marker of centuries of feasting on yabbies, mussels, water birds and other river creatures.²³

Roy and many other Aboriginal people were concerned about the impact that water-harvesting was having on these wetlands. Under natural conditions the lake received a good flow approximately every three years. However, if all the irrigation storage capacity is used the time between regular flows would

¹⁹ Condamine-Balonne WAMP Indigenous Working Party 1999, *Condamine-Balonne Indigenous Report*, Department of Natural Resources, Toowoomba.

²⁰ *Ibid.*

²¹ *Ibid.*

²² Roy Barker, Interview, 22 January 2001.

²³ *Ibid.*

stretch out to many years. The decrease in flows would have an impact on the birdlife and creatures that have relied on these wetlands for centuries.²⁴

These concerns, held by Aboriginal people, differed from the concerns of the non-indigenous residents of the area. Aboriginal people's expectations of the river were layered by the experience in their own lifetime of knowing the area as a grazing landscape, and also by a continuity with pre-settlement Aboriginal associations with the landscape. The scale of the water harvesting was seen to threaten what they valued about the landscape. Aboriginal people used a range of strategies to gain recognition for their views – for instance, they actively used the media to communicate their concerns, participated in management processes, and Aboriginal groups from Brewarrina, on the Darling River, campaigned on the issue.²⁵

Aboriginal views, however, similar to the views of fishers, gained only limited recognition in environmental decision-making in the region. For instance there was no indigenous representative on the Lower Balonne Floodplain Advisory Council, which was established in 1992.²⁶ In the Water Allocation and Management Process that began in the mid-1990s, there was a process of consultation with Aboriginal people and this consultation formed part of the final report.²⁷ Randall Taylor welcomed this increase in consultation, but he was concerned at how much had been lost:

My main concern is that if there are any major changes in the water that the Aboriginals be involved in any of the decisions – that's sort of where I'm coming from.

And at the moment that is the way it's heading.

But you know, it makes you wonder... how many changes have been done without any local Aboriginal knowledge involved?²⁸

²⁴ Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*, Department of Natural Resources, Toowoomba, p 48.

²⁵ Roy Barker, Interview, 22 January 2001.

²⁶ Though the Mottle report, co-ordinated by floodplain graziers, did take account of impacts on Aboriginal sites on the floodplain. Mottell Pty Ltd, 1996, *Lower Balonne Integrated Flood Plain Resources Study*.

²⁷ Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*, p 26.

²⁸ Randall Taylor, Interview, 14 October 1997.

The experience of Aboriginal people and recreational fishers highlights the difficulty of non-commercial views gaining recognition in management of the river.

New interest in long term river health

In the 1990s groups from outside the Balonne region, and outside Queensland, became increasingly involved in debates over management of the river. This included the involvement of conservation groups, river scientists and intergovernmental agencies concerned with sustainable river management. The involvement of these groups reflected the broad context of heightened awareness of the decline in the health of inland rivers, and the heightened interest in ecologically sustainable use of the rivers. This interest also reflected the scale of development on the floodplain – the massive scale of the development attracted interest and scrutiny.

The concerns of these groups and interests broadly aligned with the interests of the graziers, fishers and Aboriginal people in the Balonne region. The involvement of these new interests lent support to local groups' actions to protect what they valued about the landscape.

Protecting biodiversity – conservation groups

A range of conservation groups were active in these debates over development on the floodplain. The groups involved included: World Wildlife Fund (WWF); Australian Conservation Foundation (ACF); Queensland Conservation Council (QCC); the Inland Rivers Network (IRN); the NSW National Parks Association (NPA) and the Wilderness Society. Each of these groups, at some stage over the 1990s, were active in their own ways in campaigning to protect the biodiversity of the area.

The activities of these conservation groups in the debates over water-harvesting was a product of the growth in the conservation movement through the 1980s and 1990s. It also reflected the conservation movement's long-term interest in protecting wetlands as habitat for water-birds. However,

more specifically, the involvement of these groups was shaped by the conservation movement's increasing interest in protecting biodiversity in rural areas, broadening out from its traditional focus on protecting biodiversity through conservation reserves.²⁹ For instance, in the 1980s the Australian Conservation Foundation formed an alliance with the National Farmers Federation to establish Landcare, a government-funded scheme that facilitated farmers carrying out on-ground conservation work. The ACF was also active in campaigning for the health of rivers in the Murray-Darling Basin.

The iconic Narran Lakes, and the habitat they provided for migrating waterbirds, was a particular focus for conservationists. Conservationists were concerned about the loss of habitat for waterbirds if the wetlands did not receive regular flooding. The WWF, with other organisations, successfully campaigned to have Narran Lakes listed under the international Ramsar convention, which recognised significant wetlands. In developing the listing the WWF worked in alliance with local Aboriginal people to ensure that their interests were recognised. This listing provided additional impetus for governments to provide adequate water to maintain the health of the wetland. Narran Lakes were also seen by conservationists as an indicator for overall health of the river-system – maintaining flows for Narran Lakes had benefits for the overall river-system.

More eyes on the river – freshwater ecologists

From the early 1990s, river scientists began conducting detailed research on the conditions of the Balonne floodplain. River scientists provided highly tuned and authoritative monitoring of the river's biophysical condition. This research provided information on how these complex inland river systems functioned, how they responded to modification and what was needed for their continuing health. River scientists were also articulate advocates for protecting environmental health.

²⁹ Drew Hutton and Libby Connors 1999, *A History of the Australian Environment Movement*, Cambridge University Press, Cambridge.

Funding for research in freshwater ecology increased during the 1980s, prompted by the heightened awareness of the decline in inland rivers. The Co-operative Research Centre for Freshwater Ecology (CRC) was a focal point for this growing area of research and Peter Cullen from the CRC was a leading researcher in this area.³⁰ The work of the CRC was informed by ideas of natural resource management: that healthy riverine environments were not only important in themselves, but for the commercial and other interests that relied on the river-systems. Rural floodplains, and how they responded to changing conditions, were a particular focus of this research.³¹

Scientists from the CRC for Freshwater Research, and from other scientific bodies, conducted extensive research on the Balonne floodplain as consultants for resource management processes and on independent research projects.³² River scientists conducted detailed monitoring of a wide number of indicators of the health of the riverine environment: fish habitat; bird-life; macro-invertebrates; micro-invertebrates; vegetation; salinity and turbidity. As well as monitoring the current conditions of the river, this research predicted the likely future impacts from the current patterns of development.

This body of research informed the Queensland Government's Draft Water Allocation Management Plan, which was released in June 2000. For this report a Technical Advisory Panel reported on ecological condition of the river. The Panel found that the Lower Balonne, downstream from Dirranbandi, had poor conditions in terms of macro-invertebrates and that fish habitat in the Culgoa River in particular were poor. The Panel noted the overall poor health of the Lower Balonne:

³⁰ Cooperative Research Centre Freshwater Ecology 2003, *Home Page*, Cooperative Research Centre Freshwater Ecology, viewed 12 December 2003, <<http://enterprise.canberra.edu.au/WWW/www-crcfe.nsf>>.

³¹ David Mussared 1997, *Living on the Flood Plains*, Co-operative Research Centre for Freshwater Ecology and the Murray-Darling Basin Commission, Canberra.

³² In this section I am drawing on the Draft WAMP report, and the Review report by Cullen. These two reports provide an authoritative summary of the body of river research carried out on the Balonne Floodplain. Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*. Peter Cullen, Richard Marchant and Russell Mein 2003, *Review of Science Underpinning the Assessment of the Ecological Condition at the Lower Balonne System*, Report to the Queensland Government by the Independent Scientific Review Panel.

Of particular concern is the poor river health condition as has been assessed under the national AusRivAS program in the Lower Balonne tributary streams. These particular assessments are the lowest of any Queensland rivers assessed to date under this program.³³

The Panel noted that, 'the current conditions are unlikely to reflect the long-term ecological response to the recent increases in the levels of water diversions within the basin'.³⁴ That is, that because of the time-lag of ecological impacts, problems may not become evident for twenty years, and the poor condition of the Lower Balonne reflected past developments on the river, not the current wave of developments. The scientific research also indicated that with the current level of developments the ecological condition of the river was only going to decline further. This point was made clear in environmental flow assessments for a variety of points along the floodplain, and these predicted a pattern of continuing decline.³⁵

In addition, this body of research noted that the levels of extraction in the Balonne would lead to a range of impacts: a loss of productivity of floodplain grasslands, and a reduction in the number and extent of billabongs and pools, which are key refuges for fish and other wildlife in drought periods.³⁶ This scientific research vindicated the concerns held by floodplain graziers, fishers and Aboriginal people about the impacts of the developments.

In terms of future management of the river, ecologists noted that a reduction in the levels of extraction was needed to maintain river health. River scientists also pointed out that it was imperative to return some of the natural flow pattern to the river; that is to allow periodic flows to pulse through the system. Scientists advocated for what was called 'event based flow management', whereby regular flows are allowed to pulse through the system, maintaining the river's natural flow pattern. An important target was

³³ Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*, p 17.

³⁴ Ibid.

³⁵ Ibid. pp 42 – 50.

³⁶ Peter Cullen, Richard Marchant and Russell Mein 2003, *Review of Science Underpinning the Assessment of the Ecological Condition at the Lower Balonne System*.

that large flows reach Narran Lakes at least once every three and a half years. Under these proposals irrigators would be restricted from harvesting water at certain times to allow these flows to run through the system.

River scientists pointed out the importance of reforming river management practices. Scientists noted that experience from other river systems had shown that it was technically and politically more difficult to restore degraded systems rather than to prevent degradation in the first place.³⁷

Changing the balance – catchment wide reforms

In the 1990s there were increased efforts towards reforming the ways state governments managed rivers. This reform agenda was in response to increased evidence that the ecological condition of river system was in decline and would continue to decline with the current patterns of use. For decades river management had been driven by the aim of maximizing the use of the river for commercial interests; this idea had informed efforts by governments to build dams and issue licences to consumptive users. However, in the 1990s there was increased recognition that rivers had to be managed for ecological sustainability, as well as being managed for productive use. In fact there was a growing recognition that a continuing decline in ecological health would actually undermine the consumptive, or commercial, use of rivers. In this way protecting the ecological health of the river was not only a conservation issue but an issue of maintaining the commercial use of rivers.

A number of government organisations were involved in delivering this reform agenda. The Murray-Darling Basin Ministerial Council, formed in 1992, had responsibility for managing the rivers of the Murray-Darling Basin and from the early 1990s implemented measures to reform river management.³⁸ In 1994 and 1995 the Council of Australian Government (COAG) also set out on a course of reforming the management of water, focusing on water regulation and water pricing. This reform agenda was

³⁷ Ibid.

³⁸ Peter Crabb 1997, *Murray-Darling Basin Resources*, pp 282 – 290.

carried out by the National Competition Council (NCC).³⁹ Water management was traditionally a state government concern, however, and these reforms imposed a new layer of regulation on the ways that state governments managed their rivers and water.

This reform agenda had an influence on the Queensland Government's management of the Balonne River, prompting the government to give increased consideration to environmental sustainability in its management of the river. This reform agenda prompted some reconsideration of river management, however the Queensland Government delayed implementing this reform agenda, allowing modification of the river to continue. In addition, this reform agenda, and the Queensland Government's implementation of it, had a tendency to protect established water-users.⁴⁰ So for the Balonne River system the outcomes of this reform agenda were delayed and ambiguous. Here we explore three instances that illuminate the influence of this reform agenda on the management of the floodplain.

Increased assessment of public developments – National Competition Council

In the early 1990s the Queensland Government faced a recurrent dilemma – increased demand from irrigators on the limited water storage in the St George region. This situation arose partly because the Beardmore Dam was found to have 20% less storage capacity than was previously thought and also because of an earlier government decision to release additional water licences for the dam. Small irrigators in the region, who relied on Beardmore Dam, were deeply concerned about this situation. In fact the dispute between different irrigators about security of access to the resource was often referred to as a 'water war'.⁴¹

³⁹ National Competition Council 2003, *About the NCC*, National Competition Council, accessed 12 December 2003, www.ncc.gov.au/index.asp.

⁴⁰ Poh-Ling Tan 2000, 'Conflict over Water Resources in Queensland: All Eyes on the Lower Balonne', *Environmental and Planning Law Journal*, vol 17.

⁴¹ Mal Armstrong, Interview, 12 February 1997. In the early 1990s the Beardmore Dam was resurveyed and found to contain 82 GL instead of 101 GL.

In order to improve the resource security for small irrigators the state government in 1998 proposed to build a 55 GL off-stream water storage near St George, with an estimated cost for the storage of \$15 million.⁴² Planning for the dam and its operations had been going on for a many years. Under the new COAG water reforms, however, the Queensland Government had to submit an economic and environmental assessment to the National Competition Council (NCC). In July 1999 the NCC reported that the dam was a financial and environmental liability: 'on almost all analysis of the information provided to the council ... the decision to proceed with this project was neither economically viable nor ecologically sustainable.'⁴³ This was not just a lame recommendation; if the Queensland Government proceeded with the development it would be penalised \$15 million in reduced National Competition Policy payments. With this threat of financial penalty the Queensland Government dropped the proposal to build the dam – it argued that it would be difficult to build the dam without this funding.⁴⁴

This decision marked a turning point. The intervention by the NCC meant that proposals for building public water storages had to meet additional economic and environment assessments, and in addition these reforms were backed by significant financial penalties.⁴⁵ These water reforms meant that additional considerations had to be taken into account in making these decisions.

Meeting salinity targets – challenging Cubbie Station

In 2002 the Queensland Government's river management was again affected by the wider reform process. As part of the strategy to combat salinity the Queensland Government had to reduce clearing of vegetation and increase the

⁴² Brian Williams 1998, '\$15m back-up dam to plug 'water wars' out west,' *Courier Mail*, 28 October.

⁴³ NCC report, quoted in, Lachlan Heywood 1999, 'Funding for dam dries up,' *Courier Mail*, 28 July.

⁴⁴ Ibid.

⁴⁵ There was some speculation that the State Government did not put forward the strongest case possible and that the quality of the proposal was affected by the conflict between irrigators, see Ibid. However the NCC decision still indicates a shift in the assessment of new water storages.

end stream flows for the Condamine-Balonne by 30%. End of stream flows refers to the volume of water which flows from the Condamine-Balonne catchment into the Darling River. This was part of a reform agenda to increase the environmental outcomes from each catchment in the Murray-Darling Basin, reforms overseen by the National Competition Council. Peter Beattie, the Queensland Premier, claimed that if the government did not meet these targets it stood to lose \$128 million in National Competition Policy payments.⁴⁶

These reforms were in response to research that predicted a dramatic increase in the salinity levels of rivers. This research predicted that over the next 20 to 50 years, with current levels of development, the salinity of rivers in the Murray-Darling Basin would increase to levels at which it would be more frequently not usable for humans, stock or irrigation. In addition, research indicated there would also be an increase in land-based salinity – salinity hazard maps for Queensland showed that 26 million hectares of the Queensland part of the Murray-Darling Basin would be severely affected by salinity in 20 to 50 years. The Lower Balonne in particular was seen as a hazard area for increasing salinity (see Figure 15).

In a surprising move Premier Beattie, in July 2002, proposed to meet these reform targets by buying Cubbie Station and returning its water allocation to the river. The Premier argued that the amount of water extracted by Cubbie Station would almost meet the 30% target. The Premier also proposed increased controls on land clearing.⁴⁷

The proposal was widely criticised by the owners of Cubbie Station and by residents of the Dirranbandi region. The Premier travelled to Dirranbandi to discuss the proposal with John Grabbe, the manager of Cubbie Station and to discuss the proposal with local residents (Figure 16). A public meeting was attended by over 400 people who unanimously opposed the proposal. A media report commented:

⁴⁶ Matthew Franklin 2002, 'Creeping salt "fatal to towns,"' *The Courier-Mail*, 11 July.

⁴⁷ Ibid.

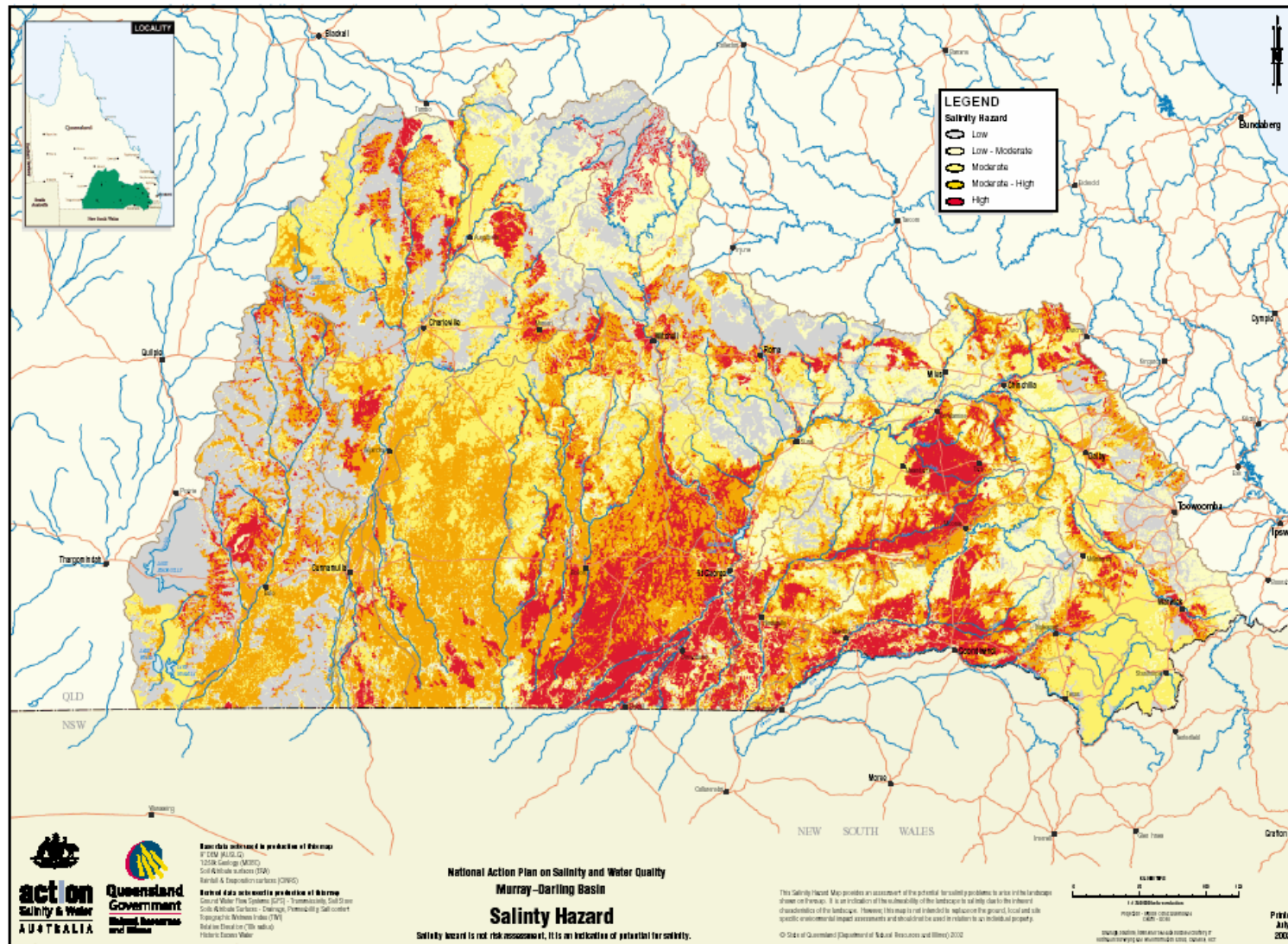


Figure 15: Salinity Hazard Map July 2002

In the 2000s salinity hazard map promoted the ideas that dry-land salinity would increase because of current land-use practices. Much of the Balonne is marked as red, meaning high risk for future salinity.

A royal visit would have been hard pressed to draw a bigger crowd than yesterday's protest meeting at the Dirranbandi Civic Centre. . . . Most in attendance would be wiped out if King Cotton left town.⁴⁸

Following these meetings the Premier dropped the proposal to purchase Cubbie Station.⁴⁹

This proposal by the Premier, while it did not have any outcomes in terms of river management, indicated a shift in attitudes towards the large-scale irrigators – the Premier was willing to publicly discuss acting directly against a large-scale irrigator. It is significant that the impetus for the proposal was a reform agenda to protect the long-term health of the river. While this proposal marked a shift in attitudes, when it came to reforming river management, as discussed below, the government showed a tendency to support existing water users.

Setting limits on water use – the Murray-Darling Basin ‘Cap’

In June 1995 the Murray-Darling Basin Ministerial Council (MDBMC) made one of its most significant decisions – it decided to limit the extraction from the river. The MDMC agreed to cap water use, for most catchments, at the 1994/95 levels as a first step towards restoring the health of the river system.

The Queensland Government agreed to the cap, but on the condition that implementation would be delayed until the government had conducted a comprehensive water management plan for each catchment, including the Condamine-Balonne. This process was called the Water Allocation Management Process, or WAMP. The purpose of this planning process was to establish the appropriate balance between water extraction and the needs of the riverine environment. Initially this plan was to be completed during 1997. In 1995, as a first step towards limiting water use, the Queensland Government announced a moratorium on the issuing of new water-harvesting

⁴⁸ Ibid.

⁴⁹ Brendan O'Malley 2002, 'City joins bush to bash Beattie,' *Courier-Mail*, 19 July.



Figure 16: Peter Beattie at Cubbie Station July 2002

In July 2002 the Queensland Premier meet with John Grabbe, farm manager of Cubbie Station, to discuss a proposal to buy Cubbie Station and return its water to the river. The Premier did not proceed with the proposal.

[image: ABC Landline, online]

licences. However, the government did allow existing licences to be developed, pending the completion of the WAMP.⁵⁰

The Draft WAMP was released in December 2000, a number of years later than initially expected.⁵¹ The report noted the decline in the health of the river system and predicted an increasing decline if the current level of development continued. The draft report put forward three scenarios for limiting extractions: A) the mid-1999 levels; B) current levels but increase environmental flows, and C) 1997 levels. Options B and C would have involved reductions in extraction of approximately 10% and 27%.⁵² The report noted that a significant reduction in extraction was needed to maintain the health of the river.

On the basis on the Draft WAMP, on the 20th of September 2000 the Queensland Government declared a moratorium on any further construction of irrigation infrastructure (storages dams, pumps etc). This was another major step by the government towards limiting extractions. In 2002 however, in a contradictory move, the government allowed an increase in maximum height of off-stream storages from five metres to eight metres. Increasing the height of storages had been a long-term goal of irrigators. This decision allowed irrigators the capacity to store more water and with deeper storages there was less evaporation. So while the government limited further works they increased the capacity of already established works.

Within the Balonne region there was very strong opposition to the recommendations in the WAMP – many saw that economic revival of the area would be threatened if the resource security of irrigation was limited. In the context of this debate community spokespeople highlighted the benefits to the area from irrigation. For instance, Bill Wruth from the Balonne Community

⁵⁰ Poh-Ling Tan 2000, 'Conflict over Water Resources in Queensland: All Eyes on the Lower Balonne'. This included 'sleeper' licenses (those used occasionally) and 'dozer' licenses, those which had never been used.

⁵¹ Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*.

⁵² Department of Natural Resources 2000, *Draft Water Allocation and Management Plan Condamine-Balonne Basin*, p 21.

Advancement Committee, in a media report, spoke of the benefits irrigation provided to the district:

Irrigated agriculture in the region has resuscitated Dirranbandi for example, from a town with a population of 400 with an house block price of \$150 to a population of 1100 and average house block price between \$5000 and \$7000.

The booming community solidarity within the region is testament to the employment and social infrastructure made possible by the economic prosperity brought about by irrigated agriculture.⁵³

Irrigators from the region organised a public campaign to oppose the findings. As part of the campaign irrigators deployed a range of strategies; they held public meetings in the area; lobbied politicians; advertised on billboards in Brisbane and set up a website called 'smartrivers' to put their case. A key tag line in the campaign was, 'how would you feel if your future was taken away from you?'⁵⁴ In this campaign the large-scale irrigators made a number of claims: that there would be social and economic decline in the area if irrigation was limited; that they had only followed government regulation and there was no damage to the environment from irrigation practices.

The water-harvesters commissioned their own scientific research and social and economic assessment, and used this research to challenge the science which underpinned the draft WAMP in court. In particular, they challenged the claim that the recent water-harvesting had led to a decline in the environment. The court upheld their challenge, agreeing that the scientific research, in three particular sites, could not prove what it claimed.⁵⁵

Following this court ruling the Queensland Government again delayed establishing the cap. This decision was criticised by Peter Cullen, a leading freshwater ecologist and Tim Fischer, the Federal National Party leader, himself at times a strong critic of the 'cap' process. These critics argued that

⁵³ Quoted in Queensland Country Life 2001, 'Committee sees disaster ahead' 21 June, *Queensland Country Life*.

⁵⁴ The Campaign was organised by the St George Water Harvesters and Dirranbandi District Irrigators. Smartrivers 2003, *Smartrivers*, St George Water Harvesters and Dirranbandi District Irrigators, accessed 2 December 2003, <<http://www.smartrivers.com/reports.htm>>.

⁵⁵ Smartrivers 2003, *Smartrivers*.

even with this court ruling the Queensland government should not delay establishing the cap.⁵⁶

The government ordered a review of the science underpinning the water reforms and a new water planning report. Professor Peter Cullen from the CRC for Freshwater Research headed the scientific review panel. This panel broadly confirmed the science that supported the initial WAMP, but noted that it may be difficult to prove environmental damage from the current level of development. The panel noted, nevertheless, that it was clear that the current level of development, if all possible extraction were used, would lead to a decline in the ecological health of the floodplain and further that salinity could also become a problem from rising groundwater.⁵⁷ A revised draft Water Resources Plan was released in December 2003.⁵⁸

The proposed management framework provided a number of benefits for the long-term health of the region, reflecting the recommendations of the Review Panel. The key management proposals included: event based flow management (to protect low and medium flows); increased regulation of overland flows on the floodplain (including volumetric monitoring) and more detailed assessment of any irrigation structure works on the floodplain.⁵⁹ These proposals went some way towards satisfying the concerns about the long-term health of the environment that had been raised by graziers, fishers, Aboriginal people and conservationists.

However, the proposed management framework also protected existing water users and meet some of the key demands of large-scale irrigators. The plan proposed that all existing works on the floodplain, including those that had been constructed without a licence, would be licensed. The plan offered more security to existing water licences, making them permanent instead of being

⁵⁶ Pastoral Times 2001, 'No cap is 'cowboy' irrigation: Fischer,' *Pastoral Times*, 27 July.

⁵⁷ Peter Cullen, Richard Marchant and Russell Mein 2003, *Review of Science Underpinning the Assessment of the Ecological Condition at the Lower Balonne System*.

⁵⁸ Department of Natural Resources and Mines 2003, *Draft Water Resources Plan Condamine and Balonne*, Department of Natural Resources and Mines, Toowoomba.

⁵⁹ Department of Natural Resources and Mines 2003, *Draft Water Resources Plan Condamine and Balonne*.

for only ten years' duration. In addition, event based flow management would be applied with the minimum impact to irrigators – reductions in extractions in low flows would be compensated by increased extractions from high flows. Following a period review, it was intended that on the basis of this report the cap would finally be established in mid-2004.⁶⁰

The Murray-Darling Basin Ministerial Council established a cap on extraction from the rivers under its management in 1995, because of a concern that the levels of extraction in the basin were unsustainable and were a cause of environment degradation. However, the Queensland Government for many years delayed establishing a cap and in this time there was a massive increase in the levels of extraction and the capacity of private storages. Between 1993 and 1999, the levels of extraction almost doubled and between 1997/98 and 1998/99 the private storage capacity increased from 475 GL to 675 GL.⁶¹

* * *

The Queensland Government had facilitated the initial development on the floodplain. The government was also unable or unwilling to limit the expansion of the development on the floodplain, even with prompting from an external agency and governmental agencies, and when the need for limits was supported by scientific research. The reform agenda did clearly limit government developments, as seen with the NCC blocking the additional St George dam. The Queensland Government, however, continually delayed implementing the cap on extractions, allowing development on the floodplain to expand greatly. In part, this reflected the complexity of the planning process and the active campaigning of large-scale irrigators, who were a very well organised lobby group. It must also be acknowledged, however, that the Queensland Government had historically supported the development of water resources as a way of fostering regional development – bringing

⁶⁰ Independent Audit Group 2004, *Review of Cap Implementation 2002/03*, Murray-Darling Basin Commission, Canberra. Asa Wahlquist 2004, 'Biggest guzzlers in bush, not suburbs,' *The Australian*, 26-27 June, p 6.

⁶¹ Poh-Ling Tan 2000, 'Conflict over Water Resources in Queensland: All Eyes on the Lower Balonne' p 568, Independent Audit Group 1999, *Review of Cap Implementation 1998/99*, p 23.

benefits to regional communities and developing the Queensland ecology.⁶² In the 1990s irrigated agriculture was one of the few commercial sectors that expanded in these western regions, and perhaps the expansion of irrigated cropping aligned with the government's interests in supporting regional development.

During the 1990s the Balonne river system was greatly modified by the rapid expansion of irrigated agriculture. This development took place in the face of considerable opposition, including arguments from scientific research about the need to limit this development. This phase of development was strongly supported within the local area and local residents strongly opposed reforms to limit development in the region. In part this support for the irrigation development was informed by the fact that in this region there were few other options to ensure the continued vibrancy of the community. The support in this area was in contrast to the experience in the Clarence region where there was strong opposition to modification of the river in this period. One point of contrast between the two areas was that the Clarence community had many other options for attracting and holding populations – in fact growing sections of the community, and key economic interests, demanded protection of the long-term health of the environment.

⁶² J.M. Powell 1991, *Plains of promise, rivers of destiny: Water management and the development of Queensland 1824-1990*, Boolarong Publications, Brisbane, pp 166-174.

Conclusion

The politics of water: Recognising the benefits and costs of modifying rivers

This thesis has set out to explore ideas around controlling and modifying rivers. In particular it has explored the ways that the benefits and costs of modifying rivers are assessed, noticed and measured. Tracing these contending responses to modification is important because these sets of ideas orient people in debates about modification of rivers: ideas that modification is beneficial informs efforts to modify rivers; and by contrast, ideas that controlling rivers has negative consequences inform efforts to protect natural systems and limit modification.

These themes are of great relevance today – there continues to be debate about impacts of past control of rivers and strong concern about maintaining the ecological health of rivers. For instance, currently there are major efforts to return some of the natural flow conditions to Murray River, in order to restore its deteriorating health. As part of these efforts the Murray-Darling Basin Ministerial Council under the ‘Living Murray’ initiative recently decided to return 500 GL to water to the Murray River. This decision marks a major turn-around from past practice of continually increasing the amount of water extracted from the river system. Scientific research points out that this is an important first step but may not be adequate for maintaining the health of the river.

However, at the same time ideas of the benefits of large-scale modification continue to hold wide appeal. In 2002, in the context of a long-running

drought in south-eastern Australia, prominent public figures revived the idea of damming the Clarence River and diverting its water inland to support struggling rural communities. This was raised under the banner of the 'Farmhand' organisation and was the focus of public debate for some time. So while there are increased efforts to protect and restore the river health, ideas of the benefits of large-scale projects continue to circulate widely.

This thesis has explored these contending perceptions of modification through studies of two distinctive areas, the coastal Clarence River and the inland Balonne River, in two periods the 1950s and the 1960s, and recent decades. This conclusion reviews the key points of the four sections which make up the body of this thesis. This conclusion also outlines some of the themes of this thesis - the differing responses of local groups, the shifting role of governments, and the ways that locality shapes contests over modification. But first, the conclusion reviews the key conclusions of the four sections of the thesis.

Experience of modification in two distinct rivers

In the 1950s and 1960s, in both the coastal and inland regions, modification of rivers was broadly perceived, by the community and governments, as being beneficial for the region. Large-scale developments were undertaken on both rivers.

In the Clarence region in the 1960s a large-scale flood mitigation project was undertaken. This project aimed to reduce the damage floods caused to commercial land-use. The flood mitigation scheme was supported by a range of interests: local landholders, local councils, the state government, and through funding the federal governments. This scheme changed the ways that floods interacted with the floodplain and created the conditions for the expansion of agriculture, particularly sugar cane growing. However a number of groups within the region saw that this large-scale development had negative consequences for what they valued about the river: floodplain graziers were concerned about the decline in wet pastures; commercial fishers were concerned about decline in fish habitat; Aboriginal people were concerned about the decline in the health of the river, and conservationists

were concerned about the decline in habitat for water-birds. However within the local area these concerns were marginalised, gaining little recognition in decision making about this scheme.

In the Balonne region, from the 1950s to the 1970s, there was a rapid expansion of the water storages in this semi-arid area, fulfilling a long-held desire to be able to capture the river's variable flow. Private land-holders developed small dams and weirs to provide security for grazing and to allow diversification into irrigated cropping. The Queensland Government constructed large storages to provide water for irrigated agriculture – this was a pilot scheme to test the potential of irrigation in semi-arid areas. This phase of development was supported by a range of interests: local land-holders, town residents and civic leaders and the Queensland Government. Some groups within the area saw that as well as bringing benefits this wave of development also had negative consequences: floodplain graziers were concerned about the loss of regular floods, fishers who were concerned about the decline in fish habitat and local residents were concerned about the loss of Aboriginal material heritage. Similar to the Clarence the benefits from development were seen to be much greater than the costs, and these concerns gained limited recognition in decision-making at the time.

However in the 1980s and 1990s there was a difference in the experience in these two regions – in the Balonne region modification of the river continued to be seen as bringing benefits to the region, and was widely supported. In the coastal Clarence region there was heightened concern, within the community and by the government, that modification of the river had severe negative impacts. There were increased efforts towards limiting the impacts from large-scale development and rehabilitating areas which had been damaged in the past.

In the Clarence region the outbreak of the red spot fish disease, in the 1980s, was a clear indicator of the decline in the ecological conditions of the river. After campaigning by professional fishermen, scientific research proved that this disease was caused by drainage practices which disturbed toxic estuarine soils - a condition called acid sulphate soils. These potentially toxic soils had always existed on the floodplain, however the scale of the drainage works

disturbed these soils, causing toxic water to be released into the river. The problem of acid sulphate soils affected the river in ways which were recognisable and meaningful to significant sections of the Clarence community, and prompted efforts to reform the management of the floodplain. Besides the problem of acid sulphate soils there were a number of other indicators of deterioration in the river's health, particularly a decline in water quality.

In the Clarence region in the 1980s and 1990s there were new interest groups in the region who had a strong interest in maintaining the long-term health of the environment. In the 1980s there was a significant influx of new residents to the area and a growth of new commercial sectors, particularly tourism. Agricultural interests, which had supported the earlier modification of the river, were no longer the life-blood of the local community. A healthy river was very important to these new residents and new commercial interests. One of the reasons that people moved to the north coast was to be next to nature, and the tourist sector had a strong interest in maintaining the health of the river with fishing being a major drawcard for the region. Opposition to a proposed wood pulp-mill, which had the potential to pollute the river, was one manifestation of this increased interest in the long-term health of the environment. In the 1980s the NSW Government also increasingly acted to protect the long-term health of coastal rivers. The government placed increased environmental assessment criteria on large-scale development - this placed additional scrutiny on developments, such as the Regional Water Supply Scheme. So in the 1980s and 1990s a range of interests in the Clarence region had a concern for the long-term health of the environment.

In the Balonne in the 1990s broad sections of the local community and sections of the government continued to perceive that the benefits from large-scale modification far outweighed the negative impacts of development. In the 1990s there was a rapid expansion of irrigated cotton growing and with this an expansion in private water storages, which drastically altered the flows in the river system. While many residents were ambivalent about the scale of the development they welcomed the increase in economic activity in the region. The region had been hard-hit by the decline in grazing sector and the expansion of irrigated agriculture was seen to revitalise the region. The

Queensland Government supported this development through providing the conditions which allowed it to take place.

A number of groups in the local area saw that this wave of development had severe negative consequences for valued aspects of the river-system - floodplain graziers were concerned about the loss of livelihood from the further decline in periodic floods, recreational fishers were concerned that the scale of the development undermined conditions for native fish, and Aboriginal people were concerned about the effects on valued wetlands. In the 1990s interest groups from outside the region, particularly conservationists and river scientists, were also concerned about this development. In addition, new intergovernmental bodies, such as the Murray-Darling Basin Ministerial Council, were interested in protecting the long-term health of the river and attempted to limit the scale of development. However within the Balonne region the benefits from irrigated agriculture were strongly seen to outweigh the costs, and many local residents strongly opposed any attempts to increase the regulations on irrigated agriculture.

Ways that perceptions of modification play out in rural communities

From this study a number of insights can be drawn about the ways that modification is perceived, and the way that the benefits and costs of modification are contested in rural communities. This study provides insights into the ways in which perceptions of modification play out in three different dimensions. First, the ways that the differing interactions with landscape inform the perceptions of modification. Second, the shifting role of governments in relation to modification of rivers. Third, the ways that locality, the local social and environmental conditions, shapes perceptions of modification.

Commercial land-holders including graziers, dairy farmers and irrigators, clearly saw the benefits of water resource developments. In both regions a range of commercial land-holders strongly desired to control the variability of the rivers in order to take some of the risk out of running a property. In the Clarence region dairy farmers, sugar cane growers and graziers experienced

the damaging effects of floods and desired ways to lessen the impacts of floods. In the Balonne region graziers and irrigators desired ways to store water from the river's variable flows. For graziers increased water storages allowed more security in riding out droughts and allowed farms to be stocked more intensively. For irrigators secure water storage allowed them to grow high-yield crops – irrigators could calculate how much yield they could get from each mega-litre of water. These groups of land-holders experienced the benefits of development schemes – flood mitigation schemes or expansions in water supplies – in terms of more productive and profitable land-use.

However a range of groups – based on their particular interactions with rivers – saw that modifying rivers had negative consequences on valued aspects of the river landscape. Fishing is an important activity for connecting with the natural conditions of rivers. Fishing provides an opportunity to observe the life below the water line, to gain an understanding of the natural conditions fish need and the ways that modification of rivers may affect the conditions for fish habitat. Fishing is an activity undertaken by a range of people – professional fishers, recreational fishers and Aboriginal people. However each of these groups has different styles of fishing and target different types of fish. In both the Clarence and Balonne regions fishers noticed changes to fish habitat from modification. On the Clarence fishers were concerned about the decline in interaction between the river and floodplain from floodgates and weirs – fish no longer had access to the nursery areas provided by swamps. In the 1980s professional fishers on the Clarence noticed the outbreaks of red spot ulcers on fish and sought explanations for this deterioration in the conditions for fish. On the Balonne River fishers noticed a range of subtle changes in the river from the modifications in the 1960s – including increased siltation and decline in water clarity. This situation was compounded in the 1990s with the new wave of development and the spread of carp; fishers feared that the river would no longer be a place for native fish.

Conservationists – people interested in the natural biodiversity of the riverine landscape – were another group who noticed the negative consequences of modification. Waterbirds are a particular indicator of changes to the landscape. Waterbirds rely on natural wetlands for habitat, and draining or a reduction in flooding, leads to a deterioration of wetlands. Conservationists

on the Clarence River in the 1960s were concerned about the decline in bird habitat due to large-scale drainage; in the 1970s this reduction in biodiversity was documented by government conservation agencies. Conservation groups were also active in protecting bird habitat in the 1980s and 1990s. Conservationists in the 1990s were concerned about maintaining the Narran Lakes wetlands on the Balonne floodplain for waterbird habitat.

Aboriginal people in both regions were also concerned about the negative consequences of modification based on their particular interactions with the rivers. Aboriginal people have a multi-layered experience of the landscape, which shapes their perception of impacts of modification. Their experience of the landscape is shaped by contemporary associations with rivers, for instance through fishing and living beside rivers. However this contemporary experience is layered by a continuing connection to the pre-settlement landscape. So, for instance, Aboriginal people in the inland region, similar to conservationists, were concerned about the decline in flows reaching Narran Lakes; however Aboriginal people's concerns about the changes to this wetland were informed by the deep Aboriginal associations with this place.

Floodplain graziers on both the Clarence and the Balonne floodplain also valued the natural diversity of the floodplains and noticed a decline from modification of the rivers. On the Clarence, graziers valued the broad acres of natural wet pastures on the edge of the floodplain which grew swamp couch. With deep drainage these grasses were seen to decline. On the Balonne floodplain graziers relied on the periodic floods to rejuvenate pasture, including Mitchell grass, on the heavy black soils. With the reduction in regular flooding graziers experienced a decline in the quality of pasture.

So a range of groups, from their particular interactions with the riverine landscape, noticed that modification had negative consequences. Some of these interactions were based on commercial activities, such as professional fishing and grazing. Through these commercial activities fishers and graziers valued the natural variability of the landscape and were concerned about the negative impacts of development. This range of groups had differing capacities to publicly raise their concerns. Some groups had well organised lobby groups, such as conservationists, inland floodplain graziers and

professional fishers. Gaining the backing of scientific research was a crucial factor in making authoritative claims about decline. For instance, the scientific research into red spot on the Clarence provided an authoritative explanation for this outbreak. The body of scientific research about recent changes on the Balonne floodplain also lent support to the concerns of graziers, Aboriginal people and fishers about decline on the floodplain.

So this thesis illuminates the ways in which the specific experience of the riverine landscape shapes perceptions of modification. Further, this thesis illuminates the ways in which groups gain differing degrees of public recognition for their concerns. These insights into the perceptions of different groups rely on detailed research, drawing on life history interviews, of the experiences of this range of groups.

Shifting role of governments

From the post-war decades to the present the role of governments in relation to modification of rivers has changed significantly. In the 1950s and 1960s governments, at all levels, saw large-scale modification of rivers as bringing great benefits to regions, the states and the nation. However, in the 1980s and 1990s governments became increasingly aware of the negative consequences of modifying rivers and in response increased efforts to protect the long-term health of rivers.

In the 1950s and 1960s governments in both regions, invested in large-scale water infrastructure projects. These water infrastructure projects were seen as playing a key role fostering regional development. On the Clarence River, local, state and federal governments supported the large-scale flood mitigation program. This scheme was the largest of its type undertaken in New South Wales. In the Balonne region the Queensland Government constructed large-scale dams to supply irrigated agriculture at St George. This scheme was a pilot scheme to test if irrigated agriculture could be the basis for regional development in semi-arid areas. These developments were undertaken based on the perception that the rivers were robust in the face of development, that there would be limited negative consequences from

development, and that if there were any negative impacts they would be outweighed by the benefits from development.

However in the 1980s and 1990s governments became increasingly aware of the negative consequences of modification of rivers and increased efforts to protect the long-term health of rivers. This new direction was based on a recognition that the health of river systems had deteriorated as a consequence of large-scale modification. This deterioration in rivers was particularly recognised when it impacted on use of the rivers for commercial uses and for towns - for instance a key trigger for increased government action was the impact of declining water quality (particularly increasing salinity) on irrigation and towns. Saline water was unfit for drinking or irrigation. This change in direction was informed by the increasing body of river science, which provided authoritative indicators of the ecological condition of rivers and the predictions of future river conditions. Government management of rivers increasingly took account of whole river catchments, based on a recognition that activities in one part of a catchment could have impacts further down the catchment. For catchments covering a number of states, such as the Murray-Darling Basin, this new management regime cut across state boundaries.

In the 1990s the New South Wales government was very active in reforming the management of coastal rivers, including the Clarence River. With the new direction of the NSW Government large-scale modification projects faced increased assessment and scrutiny. In the 1990s it was commonplace for residents to comment that under the current environmental impact assessment large-scale flood mitigation schemes would never happen – they would never make it through all the red tape. Also from the mid-1990s intergovernmental bodies, such as the Murray-Darling Basin Ministerial Council and the Council of Australian Governments, increased their efforts to maintain and restore the health of the Murray-Darling Basin. So in the 1990s some sections of government recognised that as well as managing rivers for a range of commercial users, river management needed to take account of the long-term health of rivers. However, this reform agenda played out in differing ways in different localities – that is, locality affected the ways in which the negative consequences of modification were recognised and acted on.

Influence of local social and environmental conditions

This thesis also illuminates the ways in which locality – the local social and environmental conditions – shapes perceptions of modification, that is the ways that the benefits and negative consequences of modification are assessed and recognised. The comparative analysis undertaken in this thesis allows insights into the ways that large-scale modification of rivers is perceived in two distinct localities.

In 1950s and 1960s, in both the Clarence and Balonne regions, large-scale modification of the rivers was widely perceived, by the community and governments, as being beneficial for the regions. In both areas major developments were undertaken and these were widely seen as being a great asset for regions – improving the conditions for commercial land-use with flow-on benefits to the whole community.

However in the 1980s and 1990s there was a great difference between the two regions in terms of perceptions of significant modifications. In the Balonne region large-scale modification of the rivers continued to be widely seen as bringing great benefits to the region; there was strong support for large-scale agriculture and strong opposition to attempts to increase regulation of irrigated agriculture. By contrast, in the Clarence region large-scale modification of the river was widely seen, by the local community and government, to have significant negative consequences for the region. In the Clarence region there was strong opposition to large-scale projects and increased efforts to protect and restore the long-term health of the environment. This divergent experience was shaped, in significant ways, by the specific social and environmental conditions in each locality.

In the Balonne region in the 1990s the social context shaped the support for irrigated agriculture. In the Balonne, with the decline in the grazing sector and lack of other commercial activities, irrigated agriculture appeared as the only commercial activity which could generate economic activity in the region and provide social sustainability. In western regions it was irrigated cropping that continued to attract and hold residents. Regions which relied only on grazing

continued to experience a significant decline in services and population. In this context, while there was ambivalence about the scale of development, there was broad support for it.

In addition, in this region the negative environmental consequences of this development were not immediately obvious. The floodplain landscape is incredibly variable and there was a significant time lag for deterioration to become evident. Ecologists predicted that there would be deterioration of the environment, however it would be thirty or forty years before it became widely evident. In addition this landscape had already been significantly modified by grazing and earlier developments which masked the specific effects of increased water storages. So in this context large-scale irrigation was widely seen as bringing great benefits with few negative consequences.

While this thesis has focused on irrigation development in Queensland, it is important to note that in the 1980s and 1990s there also a significant expansion of irrigated cropping on the Darling, Namoi and Gwydir Rivers in New South Wales – a region often referred to as the black soil country. In these areas large scale-irrigation was similarly supported and efforts toward increased regulation strongly resisted. So this similar experience in New South Wales highlights that similar locality has more of an impact on these outcomes than state boundaries.

The differing perception of modifications in the Clarence region was shaped by the different social and environmental conditions. Through the 1980s the Clarence community, along with other north coast communities, changed greatly. In the Clarence region there was a broadening of economic activities, particularly tourism, and an influx of new residents. Both tourists and new settlers were attracted to the area because of the perceived natural qualities of the river. The continued sustainability of tourism relied on the environment being healthy. So in the Clarence region there was a strong demand, from residents and key commercial interests, for limiting large-scale modification of the river, and maintaining the long-term health of the river. Further, the Clarence community had the luxury of choosing options for economic development which did not damage the long-term health of the environment. For instance residents could strongly oppose the wood pulp-mill proposal,

knowing that there would be other options for sustained economic development.

In addition, deterioration in the health of the river had impacted on the Clarence community in obvious and immediate ways. For instance the red spot disease in fish, caused by acid sulphate soils, had significant impacts on the commercial fishing industry and potential impacts on the important tourism industry. So there was a heightened sense that the health of the river was undermined by large-scale modification.

So in this way locality – the local social and environmental conditions – shapes the ways in which the costs and benefits of modification of rivers are recognised, assessed and measured. This in turn has implications for the ways in which continued modification, or efforts to limit modification, are supported or challenged. However local social conditions and the local environment are constantly changing, often in unexpected ways. So assessments of the benefits and costs of modification are never settled and continue to be contested.

Bibliography

Sections

- 1. Interviews – Clarence region**
- 2. Interviews – Balonne region**
- 3. Archival material, non- government – Clarence region**
- 4. Archival material, non-government – Balonne region**
- 5. Archival material, government – Clarence region**
- 6. Government reports – Clarence region**
- 7. Government reports – Balonne region**
- 8. Books and articles – Clarence region**
- 9. Books and articles – Balonne region**
- 10. Electronic and audio visual resources**
- 11. Newspapers**
- 12. Academic theses**
- 13. Books and articles**

Abbreviations.

CRL = Clarence Regional Library

CRCC = Clarence River County Council

NPWS = National Parks and Wildlife Service

CVFN = Clarence Valley Field Naturalists

ABC = Australian Broadcasting Corporation

1. Interviews – Clarence Region

All tapes held by Damian Lucas.

** indicates notes taken during interview (as opposed to recorded on tape)*

Erin Bartlett, Pillar Valley, 27 July 1998.

Ray Black, Yamba, 5 October 1999.

Roy and Jean Bowling, Tucabia, 21 May 1997, 17 November 1997, 23 July 1998.

Greg Clancy, Coutts Crossing, 23 November 1997, 28 July 1998.

Frank Clark, Southgate, 28 July 1998.

Alan Ciblic, Grafton, 28 September 1999.

Peter Cumings, Maclean, 6 October 1999.

John and Norma Enseby, Lawrence, 24 July 1998.

Linki Gordon, Baryulgil, 19 November 1997, 24 July 1998.

Jodi Kell, Maclean, 3 October 1999.

Athol McPhee, Grafton, 21 November 1997, 30 July 1998.

Sonya and Yvonne Mears, Mountain View, 8 October 1999.

Stan and Magda Mussared, Waterview Heights, 21 November 1997.

Bill Noonan, Grafton, 23 November 1997.

Ori Pastega, Grafton, 15 November 1997, 23 July 1998.

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Janet Purcell, Yamba, 2 October 1999.

Jeff Richards, Tullymorgan, 5 October 1999.

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Peter Wrightson, Maclean, 29 September 1999.

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** indicates notes taken during interview (as opposed to recorded on tape)*

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Appendix

Five Feet High and Rising [CD]

Lucas, Damian 1999, *Five Feet High and Rising – Experiencing the Mighty Clarence River*, Radio Eye - ABC Radio National, forty minute radio feature, first broadcast 13 March. Additional production by Elisia Yeo, Nick Franklin and Andre Shabinov.