

Introduction

Purpose

Section 16C of the *Disaster Management Act 2003* (Qld) provides the Office of the Inspector-General Emergency Management (IGEM) with functions including:

- to regularly review and assess the effectiveness of disaster management by the State, and district and Local Disaster Management Groups (LDMG)
- to regularly review and assess cooperation between entities responsible for disaster management in the State, including whether the disaster management systems and procedures employed by those entities are compatible and consistent
- to work with entities performing emergency services, departments and the community to identify and improve disaster management capabilities
- to monitor compliance by departments with their disaster management responsibilities
- to identify opportunities for cooperative partnerships to improve disaster management outcomes
- to report to, and advise the Minister about issues relating to these functions.

In accordance with these functions, the IGEM has reviewed the circumstances of the Callide Creek flood event during Tropical Cyclone Marcia to determine whether disaster management arrangements and Callide Dam planning and operations were effective, and to identify opportunities to improve disaster management outcomes.

Terms of Reference

This review will report on:

- The impact to the community of the Callide Valley from the flooding event on Friday 20 February 2015.
- The operation of the Callide Dam in the lead-up to and during the event, including:
 - > whether recommendations from the report on the 'Review of Callide Dam Gate Operations in the January 2013 Flood Event' ¹ were implemented, and did, or would have if implemented, alter the impact to the community
 - > the application of the Emergency Action Plan (EAP) including integration with relevant disaster management plans
 - > whether the operating specifications of the Callide Dam at the time of the event were reasonable.
- Disaster management arrangements, specifically:
 - > risk assessment and hazard mitigation strategies
 - > disaster management planning and disaster operations, including warnings
 - > engagement and communications, including with the community.
- Performance of critical telecommunications infrastructure in the event.

In undertaking the review, the IGEM will seek public submissions and hold meetings in local communities. The IGEM will engage with a range of relevant parties, including government and non-government organisations. The review will include an independent hydrological assessment.

The IGEM will provide recommendations to improve disaster management and community outcomes.

Review Methodology

The review was conducted from late February to June 2015. We met with affected residents, inspected the impacts of the flood event on their properties, and considered written public submissions. The IGEM attended a town meeting to hear residents' concerns. In addition, an experienced and independent market research company was engaged to survey 406 Banana Shire residents regarding the impact of the flooding and associated matters pertaining to the event and disaster management.

We obtained records, written submissions and individual recollections, direct observations, and actions from a broad range of entities including, but not limited to:

- Banana Shire LDMG: individual member interviews, audio recordings and minutes of meetings prior to, during and after the event, the Local Disaster Management Plan and associated documents
- Banana Shire Council: individual interviews with staff, corporate documents, town planning records, internal emails, public engagement material and media releases, logs and other records from the Local Disaster Coordination Centre
- Gladstone District Disaster Management Group (DDMG): individual interviews with members, District Disaster Management Plan, logs and other records from the event management system
- State Disaster Coordination Centre (SDCC): individual interviews, logs relating to Emergency Alert, email communications (including circulated reports and materials), and audio telephone recordings
- Department of Energy and Water Supply (DEWS): written submission, email communications, and records and documentation relating to regulating dam safety
- Department of Natural Resources and Mines (DNRM): written submission, email communications, and records relating to river gauges
- SunWater: individual interviews, corporate documents, Emergency Event Report containing comprehensive event logs, and public engagement material and media releases
- Telstra: individual interviews
- Department of Justice and Regulation (Victoria): Emergency Alert records
- The Bureau of Meteorology (BoM): individual interviews, service level agreement, media releases and warning information, and weather data.

Relevant sections of the draft review report were provided to the above entities for procedural fairness and/or for validating the accuracy of our presentation of the evidence. A second right of reply to the full report was offered to those entities most impacted by our findings and recommendations. SunWater and Banana Shire Council elected to have responses published as appendices to this report: SunWater's response is Appendix C; Banana Shire Council's response (and on behalf of the LDMG) is Appendix D. SunWater's public submission is included as Appendix E in the public interest (although we have redacted sections to protect the operational security of the infrastructure and personal information, and omitted a publicly available appendix).

We carefully considered these responses and where appropriate we have made amendments, deletions or included additional information. Not all suggestions or requests have been actioned and we have reproduced the feedback in full to provide transparency.

Performance of the entities assessed by this review was considered in light of the Standard for Disaster Management in Queensland (the Standard), relevant legislation and/or guidelines as appropriate. Although the Standard was only recently released, it represents the input of disaster management practitioners from across Queensland about good practice, and sets a benchmark for organisations upon which improvement strategies can be based.

Context

*'Sweep of a hundred valleys with rocks and boulders piled,
The sheerness of the cliffside – the scrub-belts dark and wild!
Here when the storms have broken a thousand floods have flowed;
A rugged land of grandeur, this land where Rideout rode.'*

(excerpt from *Rideout's Land* by the late Lex McLennan)²

History of the Callide Valley

The Gaangalu Nation People and the Port Curtis Coral Coast People are the traditional owners of the Callide Valley and its catchment areas.³ Early European settlement of the Callide Valley occurred sometime between the late 1840s and early 1850s.⁴ Many Aboriginal people were relocated to reserves, such as Woorabinda and Taroom, after the introduction of the *Aboriginals Protection and Restriction of the Sale of Opium Act 1897 (Qld)*.⁵ A few Aboriginal people worked for graziers.⁶

The Callide Valley's agricultural and pastoral beginnings

In 1854 a pastoral run called 'Prairie' was set up as an agricultural demonstration farm to promote 'closer settlement' in the area now known as Biloela.⁷ In 1855 the 'Banana' run was established and named after a bullock that was used as a decoy to round up wild cattle.⁸ Closer settlement policies brought hopeful 'selectors' to Queensland from the 1860s.⁹ The Banana Divisional Board commenced in 1880 and was the first form of local government.¹⁰

Queensland pastoralists struggled with the variability and unpredictability of the climate.¹¹ Years of dry creek beds in the Callide Valley were interspersed with flooding rains.¹² Due to a lack of experience as graziers, poor land selection, and pests (rabbits, cattle ticks and prickly-pear), many selectors were ultimately unsuccessful.¹³

The Federation Drought of 1895 to 1902 had its peak in 1902 when drought affected 70% of Queensland, including the Callide Valley.¹⁴ In 1918, the area was flooded and two children were drowned.¹⁵ Water is said to have been just over two metres high in the Jambin township.¹⁶ To Biloela's west was a 'sea of water'.¹⁷

In newspapers, in Parliament and even in poetry, there was increasing interest in mitigating droughts by harnessing water during times of plenty with bores and dams.¹⁸ In 1919, Edward Granville (Ted) Theodore became the Premier of Queensland with a plan to reinvigorate large-scale rural settlement with irrigation projects in the Burnett and Callide Valleys.¹⁹

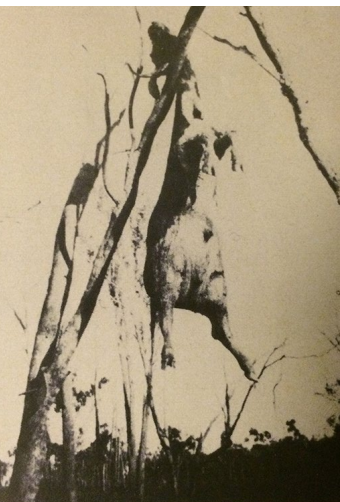
Premier Theodore introduced the *Irrigation Act 1922*.²⁰ The Dawson Valley town of Castle Creek was renamed Theodore after the Premier.²¹ It was a model town for the vision Premier Theodore had for rural Queensland, with its irrigated gardens, and palm-lined avenues and boulevards.²² Premier Theodore's 'Queensland System' was based on cooperative marketing, infrastructure development, scientific research into farming methods and comprehensive agricultural education programs.²³

The *Upper Burnett and Callide Land Settlement Act of 1923 (Qld)* resulted in a population of 131 expanding to 1,000 between 1924 and 1929.²⁴

Due to improved knowledge of farming methods, use of better equipment, and government support, large-scale cultivation became possible.²⁵ Premier Theodore's plans to bring 50,000 people to the area were thwarted by drought in the late 1920s, falling commodity prices and reduced demand.²⁶

Big flood of 1928

Drought was soon replaced by flooding in April 1928.²⁷ A tropical cyclone impacted near Mackay, resulting in significant floods in the Callide, Dawson and Dee Valleys.²⁸ There were reportedly nine deaths, houses washed away and many stock were lost.²⁹ One and a half metres of water was said to be in the Jambin Hotel.³⁰ Fences between Jambin and Rannes were all taken by the floods, and cattle carcasses left behind, six to seven metres up in the trees.³¹ Some settlers, dispirited and unaware they had built their homes on a floodplain, moved away from the area when their crops and dwellings were damaged.³²



**Above: Flood victim
1928 Flood near Goovigen.**

*Reproduced from
'The Big Valley Story'*



**Right: Rescuing stock during
the 1928 flooding in Goovigen,
Queensland.**

*Image found on the internet,
credited to the State Library
of Queensland*

Great Depression and climatic challenges

By the time the Great Depression impacted Queensland's economy in 1929, thousands of family farms had been abandoned.³³ In May 1930, extensive flooding south of Maryborough saw bridge damage, crop and cattle losses, and the drowning of a man in Callide Creek.³⁴ In 1932, the area suffered again from drought.³⁵ Rain in 1933 brought some relief, though also flash floods.³⁶ Cotton production peaked in 1934.³⁷ In November 1937, flood waters washed away the railway between Mt Morgan and Theodore, with flooding in the region again in 1939 and across Queensland in 1940.³⁸



Left: Russian immigrant selector Mr Kolishkin, a cotton farmer in the Callide Valley closer settlement area, beside his tractor and disc plough, circa 1936.

John Ovley Library,
State Library of Queensland

1942 flood

In February 1942, a tropical cyclone hit north Queensland near Cardwell and then travelled down the coast to the north of Mackay.³⁹ Rannes and Wowan were evacuated, though flooding still resulted in loss of life in the Dawson and Callide Valleys.⁴⁰ There was also widespread property loss, and the devastation was said to be more severe than the 'big flood' of 1928.⁴¹

One farmer wrote about the 'desolation' to his farm on the Callide Creek: one of his employees disappeared and was assumed drowned, and all cattle, fences and crops were destroyed by the 'raging torrent'.⁴² Another recalled that the 'Callide rose swiftly particularly the area between the Kroombit and the Callide. Fears were held for the safety of many farmers along the Jambin Road'.⁴³

Drought, dams and other development

The Callide Mine began production in 1944 after several individual leases were consolidated into one company.⁴⁴

Once more, drought in 1946 was relieved by heavy rains and flooding throughout much of south east Queensland in February and December 1947.⁴⁵ In March 1949, a tropical cyclone struck Gladstone and then continued over Rockhampton.⁴⁶ Flash flooding in the Callide Valley killed two, with one man drowned at Thangool and another at Biloela.⁴⁷

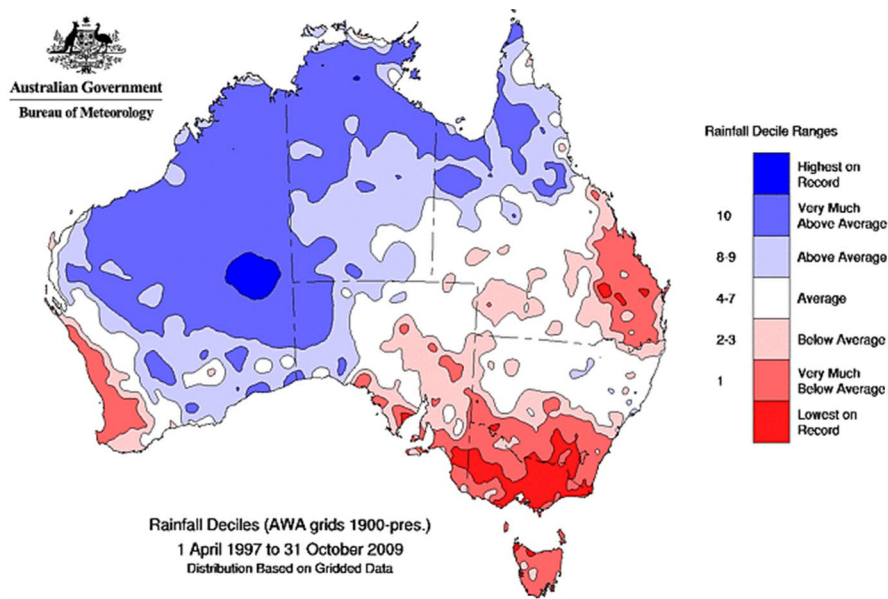
Drought hit Queensland again in 1951 and 1952.⁴⁸ Still, local flooding in the Callide and Dawson Valleys in January 1952 took the life of one man at Wowan.⁴⁹ One Callide Valley resident recalled a very wet year in 1956 and another told of lucerne crops being partially destroyed by one fall of heavy rain in 1957.⁵⁰

In Australia and around the world, the 1960s brought a significant increase in dam construction.⁵¹ The Callide Valley irrigation investigations coincided with the construction of the Callide Power Station.⁵² Both the Callide Dam and Callide A Power Station were completed in 1965, allowing the Banana Shire to further benefit from its rich coal reserves.⁵³

Drought affecting more than 10 percent of Queensland was experienced in 1965-66 and again in 1969-70.⁵⁴ Water drawn from the Callide Alluvium generally exceeded replenishment and groundwater resources declined.⁵⁵

From the 1980s, dams and weirs were used to artificially recharge aquifers.⁵⁶ As a result, the Callide Dam Stage II was completed in 1988 to enhance groundwater supply and to increase town water for Biloela.⁵⁷ The Callide B Power Station was commissioned in 1988 and the Awoonga-Callide Pipeline was built to meet increased demand for water from Callide Dam.⁵⁸

Kroombit Dam was built in 1989 to store water for aquifer recharge and was initially successful in replenishing groundwater.⁵⁹ Callide Creek flooded 10 houses above floor level in Goovigen in February 1997,⁶⁰ and one man lost his life in 2003 when flash flooding in the Dee River and tributaries inundated houses.⁶¹ Yet, drought saw Kroombit Dam empty by 2006,⁶² and the 'Millenium Drought' persisted until 2009.⁶³



Right: Rainfall decile ranges across Australia – 1 April 1997 to 31 October 2009.
Bureau of Meteorology

Shrinking groundwater resources

In 2008, an independent assessment of the Callide 'groundwater dependent ecosystems' was completed to inform the Fitzroy Basin Water Resource Plan.⁶⁴ The assessment found it was 'highly likely' that groundwater dependent ecosystems in the Callide Alluvium had been 'significantly affected by depletion of groundwater resources ... since the 1960s'.⁶⁵ While there had been some stabilisation of groundwater levels in many areas, the catchment north of Goovigen was still in decline.⁶⁶ The report cited overuse of the alluvial aquifer as the cause of four of nine Biloela bores failing, both Thangool bores running dry and the depletion of a number of irrigation, stock and domestic bores.⁶⁷

Wet years

One of the strongest La Niña episodes on record impacted Queensland with significant and widespread flooding in 2010 and 2011.⁶⁸

A flood risk study was commissioned by the Banana Shire Council (Council) in 2010.⁶⁹ This study recognised that the Callide Valley is subject to flash flooding and cautioned that it was possible for flooding to occur 'with no advance warning'.⁷⁰

Callide Valley flooding 2013

Tropical Cyclone Oswald developed from a tropical low in the Gulf of Carpentaria to a Category 1 cyclone on 21 January 2013.⁷¹ As a cyclone, Oswald made little impact, but the subsequent low of ex-Tropical Cyclone Oswald caused record flooding, the largest number of tornadoes in Australia in a single event,⁷² and over \$10 billion in damage⁷³ as it moved south through Queensland and into New South Wales.⁷⁴

The system affected the Callide Valley area between Thursday 24 and Saturday 26 January,⁷⁵ over the Australia Day long weekend. At one point, almost 700mm of rain fell in the area over a 48 hour period.⁷⁶ The Callide Dam filled and water was released. By the afternoon of 27 January 2013, the weather system had moved, dam levels had stabilised and the dam gates had closed.⁷⁷

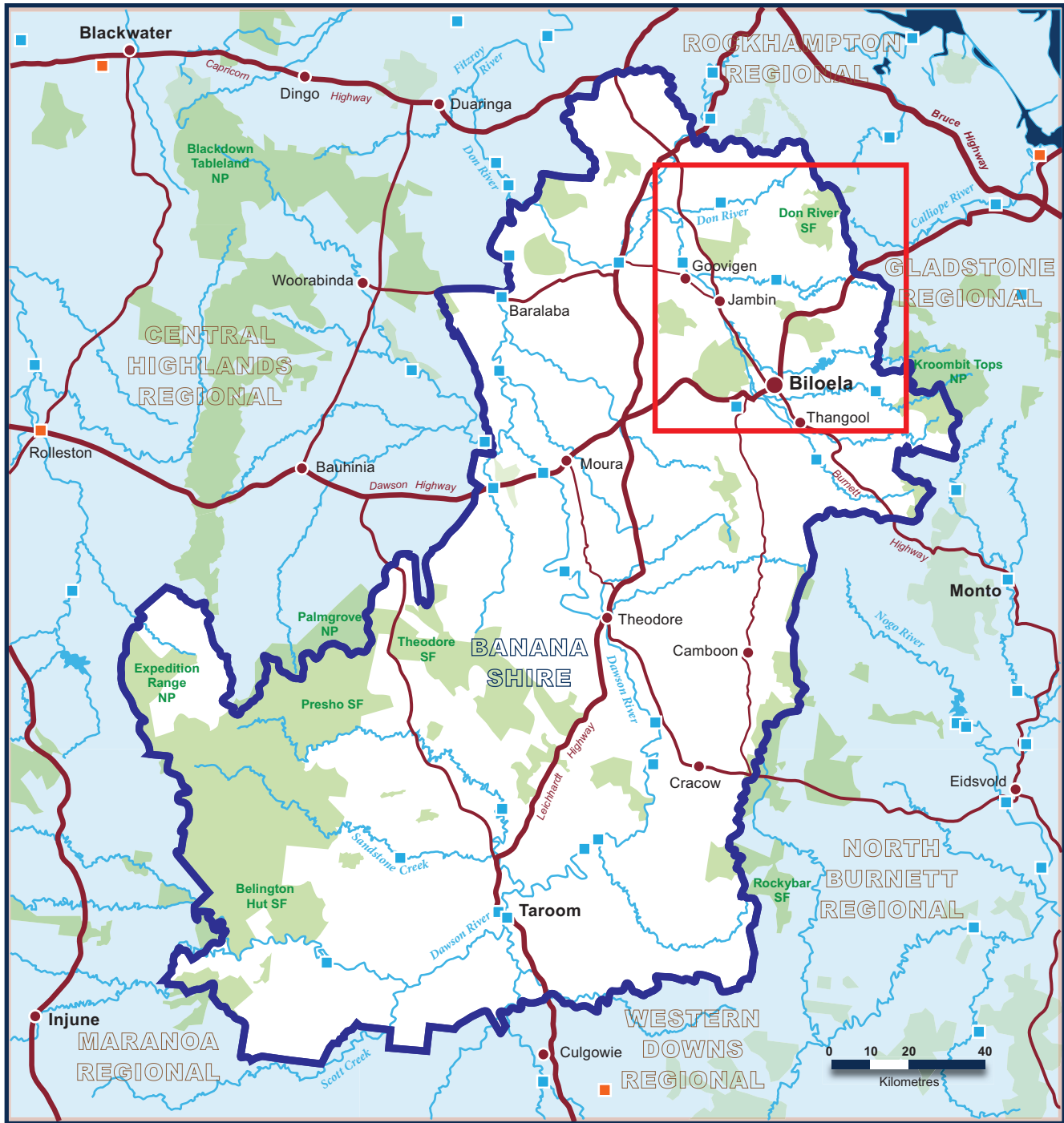
By 27 January 2013, many areas of the Banana Shire were isolated by flood water from a number of waterways, including Jambin, Goovigen, Thangool and Biloela.⁷⁸ Evacuees and some of their livestock were sheltering at the Jambin School.⁷⁹

The body responsible for regulating Queensland dams, the DEWS, commissioned an independent hydrologic review of the Callide Dam gate operations in the January 2013 flood event.⁸⁰ After consulting with SunWater and the Council, a report was completed in May 2013.⁸¹ The report was not publicly released.

The Callide Valley in 2015

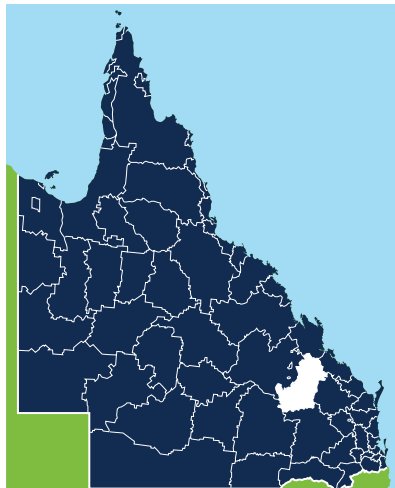
The Callide Valley is spread over 28,546km² and is home to approximately 15,200 people.⁸² Several townships are located in and around the valley, including Biloela, which is the main service and administration hub and is where the Banana Shire Council Chambers is located. Other smaller towns in the valley include Jambin, Goovigen, Taroom, Theodore, Moura, Wowan, Dululu, Baralaba, Rannes and Thangool.

The Callide Valley is rich in natural resources.⁸⁵ Banana Shire residents are primarily employed in the coal mining industry, beef production, dairy and agriculture, including dry crops (mung beans) and irrigated crops (cotton).⁸⁵ Moura, just west of Biloela, hosts one of the Queensland Cotton ginning facilities, which is part of one of the world's largest cotton companies.⁸⁶ The Leichhardt and Burnett Highways cross through the Banana Shire, and the Dawson Highway provides passage to the Port of Gladstone.⁸⁷



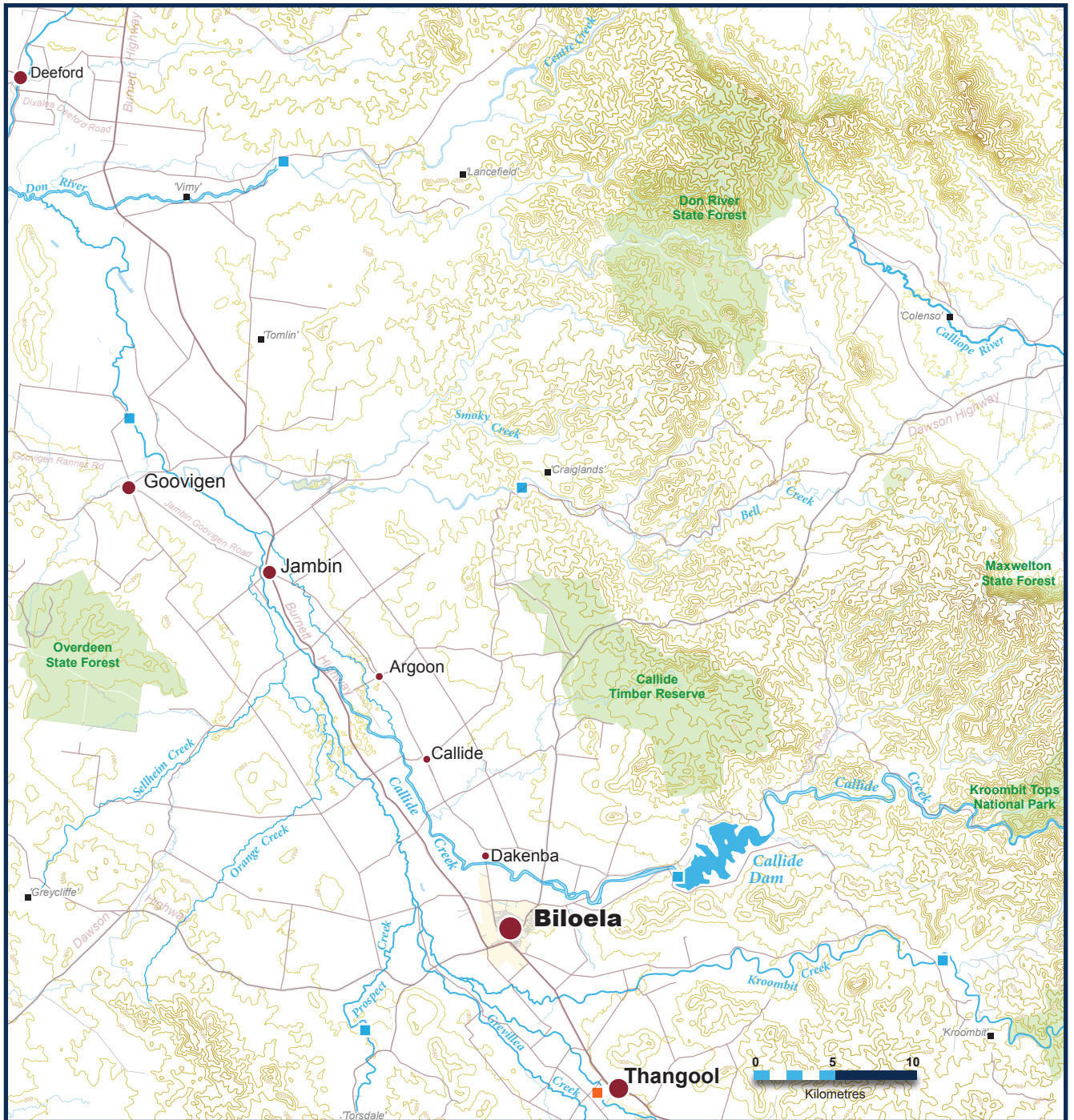
Right: Queensland map showing boundaries of Local Government Areas with Banana Shire Council highlighted in white.

Local Government Association of Queensland



Above: Map showing the Banana Shire in greater detail; the Study Area of the Callide Creek catchment in this Report is outlined in red.

Queensland Government



Maps orientated to North		Legend	All distances in kilometres	
	Highway or major road			Severe Rapid Damage Assessment (RDA)
	Street or local road			Moderate RDA
	River			Minor RDA
	Creek or waterway			Emergency Alert (EA) successfully received
	State Forest National Park			EA unsuccessful or not received
	Elevations (50m contours)			Emergency Alert initial polygon
				Extent of flooding as modelled
				Flood modelling area

Above: Enlargement of the Study Area box on the previous page, showing details of the Callide Creek Valley from Thangool to Deeford.

This map forms the basis of many subsequent maps with different overlaid data in this Report.

Queensland Government

Endnotes Chapter 02

1. Water Solutions, *Review of Callide Dam Gate Operations in the January 2013 Flood Event*, Water Solutions, Kenmore, 2013.
2. Back to Biloela Committee, 'Rideout's Land by the late Lex McLennan' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
3. Department of Environment and Resource Management, *Fitzroy Basin Water Resource Plan: 1999 draft amendment to Include Groundwater in the Callide Subcatchment—Socioeconomic Assessment Report*, Department of Natural Resources and Water, Queensland, 2008, p. 19, http://mackay.qld.gov.au/_data/assets/pdf_file/0015/101742/633783_Fitzroy-WRP-1999-DA-Callide-Socio-Assess-Report-CD.pdf, accessed April 2015;
National Native Title Tribunal, Southern and Western Queensland Region, *Native Title Applications and Determinations Areas*, 31 March 2015.
4. Centre for the Government of Queensland, Biloela, *Queensland Places*, 2015, <http://www.queenslandplaces.com.au/biloela>, accessed April 2015.
5. State Library of Queensland, 'Queensland legislation', State Library of Queensland, 2014, <https://www.slg.qld.gov.au/resources/atsi/community-history/qld-legislation>, accessed April 2015;
Back to Biloela Committee, 'B.J. Birchley Story' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
6. Back to Biloela Committee, 'Descendants of the First Inhabitants' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
7. Centre for the Government of Queensland, Biloela, *Queensland Places*, 2015, <http://www.queenslandplaces.com.au/biloela>, accessed April 2015.
8. *ibid.*
9. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005.
10. The Central Queensland Herald, 'Story of the Callide Valley', *The Central Queensland Herald*, <http://biloela-timeline.info>, accessed April 2015.
11. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005.
12. *ibid.*
13. *ibid.*
Royal Geographical Society of Queensland, Braving the Bull of Heaven Continued: Droughts in Space and Time, *Royal Geographical Society of Queensland*, <http://www.rqsq.org.au>, accessed April 2015.
14. Back to Biloela Committee, 'Nott's of Greycliffe' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974;
Royal Geographical Society of Queensland, Braving the Bull of Heaven Continued: Droughts in Space and Time, *Royal Geographical Society of Queensland*, <http://www.rqsq.org.au>, accessed April 2015.
15. Back to Biloela Committee, 'Early Recollections' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
16. Back to Biloela Committee, 'The Big Floods' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
17. *ibid.*
18. D. Garden, 'The Federation Drought of 1985-1903, El Nino and Society in Australia', in G. Massard-Guilbaud and S. Mosley ed., *Common Ground: Integrating the Social and Environmental in History*, Cambridge Scholars Publishing, 2010, p. 284.
19. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005.
20. *ibid.*
21. Centre for the Government of Queensland, Theodore, *Queensland Places*, 2015, <http://www.queenslandplaces.com.au/theodore>, accessed April 2015.
22. Banana Shire Council, Theodore Community Snapshot, <http://www.banana.qld.gov.au/documents/4771350/7425107/Theodore%20snapshot.pdf>, accessed April 2015.
23. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005.
24. Department of Science, Information Technology, Innovation and the Arts, Upper Burnett Callide Valley Land Settlement Files, *Queensland State Archives*, 1923-1933, <http://www.archivesearch.qld.gov.au>, accessed April 2015.
25. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005.
26. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005;
Royal Geographical Society of Queensland, 'Braving the Bull of Heaven Continued: Droughts in Space and Time', *Royal Geographical Society of Queensland*, <http://www.rqsq.org.au>, accessed April 2015.
27. Bureau of Meteorology, Queensland Flood Summary 1920-1929, http://www.bom.gov.au/qld/flood/flid_history/floodsum_1920.shtml, accessed April 2015.
28. J. Callaghan, 'Tropical Cyclone Impacts along the Australian East Coast from November to April 1858 to 2000', *Australia Severe Weather*, <http://www.australiasevereweather.com>, accessed April 2015.
29. *ibid.*
Back to Biloela Committee, 'The Big Floods' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.

30. *ibid.*
31. *ibid.*
32. Back to Biloela Committee, 'Netley' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
33. D. Cameron, 'Closer Settlement in Queensland: The Rise and Decline of the Agrarian Dream, 1860s-1960s', in G Davison and M. Brodie ed., *Struggle Country: The Rural Ideal in Twentieth Century Australia*, Monash University Publishing, Clayton, Victoria, 2005.
34. Bureau of Meteorology, Queensland Flood Summary 1930-1939, http://www.bom.gov.au/qld/flood/flid_history/floodsum_1930.shtml, accessed April 2015.
35. Back to Biloela Committee, 'Jack Edward's Story' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
36. Back to Biloela Committee, 'Scotty McKenzie's Daughter (Shirley McCann Recalls)...' and 'A Flash Flood' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
37. Centre for the Government of Queensland, 'Biloela', Queensland Places, 2015, <http://www.queenslandplaces.com.au/biloela>, accessed April 2015.
38. Bureau of Meteorology, Queensland Flood Summary 1930-1940, http://www.bom.gov.au/qld/flood/flid_history/floodsum_1930.shtml, accessed April 2015.
39. Bureau of Meteorology, *Tropical Cyclone Information for the Northern Region*, <http://www.bom.gov.au/cgi-bin/silo/cyclones.cgi?region=aus&year=1941&year=1941&loc=0>, accessed May 2015.
40. J. Callaghan, Bureau of Meteorology, Tropical Cyclone Impacts Along the Australian East Coast from November to April 1858 To 2000, <http://www.austaliasevereweather.com/cyclones/impacts-eastcoast.pdf>, accessed May 2015.
41. Fitful February, *The Morning Bulletin (Rockhampton)*, 28 February 1942, <http://trove.nla.gov.au/ndp/del/article/56111571>, accessed May 2015;
Back to Biloela Committee, 'Donald Matheson Recalls' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
42. Back to Biloela Committee, 'Jim Flemming writes...' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
43. Back to Biloela Committee, 'C.W. Clarke' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
44. AngloAmerican, Callide, AngloAmerican, 2013, <http://angloamerican.com.au/~media/Files/A/Anglo-American-Australia-V3/document/factsheets/ang-2291-fs-callide-fa-sr.pdf>, accessed April 2015.
45. Back to Biloela Committee, 'Bert Boon Remembers' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974;
Bureau of Meteorology, *Queensland Flood Summary 1940-1949*, http://www.bom.gov.au/qld/flood/flid_history/floodsum_1940.shtml, accessed April 2015.
46. Bureau of Meteorology, *Historical impacts along the east coast*, <http://www.bom.gov.au/cyclone/history/eastern.shtml>, accessed April 2015.
47. *The Morning Bulletin (Rockhampton)*, *Country Notes: Jambin and Goovigen*, 21 March 1949, <http://trove.nla.gov.au/ndp/del/article/56898016>, accessed May 2015;
Back to Biloela Committee, 'Charles Stanley of Craig Anthol Writes' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974;
Sunshine Coast Heritage Library, *Tropical Cyclone and Flood Summary 1800-2006*, <http://static.placestories.com/pool/story/0008/0021998/lo/doc.pdf>, accessed May 2015.
48. Royal Geographical Society of Queensland, 'Braving the Bull of Heaven Continued: Droughts in Space and Time', *Royal Geographical Society of Queensland*, <http://www.rqsq.org.au>, accessed April 2015.
49. Bureau of Meteorology, *Queensland Flood Summary 1950-1959*, http://www.bom.gov.au/qld/flood/flid_history/floodsum_1950.shtml, accessed April 2015.
50. Back to Biloela Committee, 'Charles Stanley of Craig Anthol Writes' and 'The Cavanagh Story' in *The Big Valley Story: Golden Jubilee Biloela 1924-1974*, Banana Shire Council, 1974.
51. J. Larsen, B. Gibbes, and J. Quiggan, 'Dam hard: water storage is a historic headache for Australia', *The Conversation*, 27 October 2014, <http://theconversation.com/dam-hard-water-storage-is-a-historic-headache-for-australia-33397>, accessed April 2015.
52. *Moir v The Commissioner of Water Resources* (A91-82) Land Court, Brisbane, p. 5.
53. CS Energy, *Callide Power Station*, CS Energy, [http://www.csenergy.com.au/content-\(19\)-callide.htm](http://www.csenergy.com.au/content-(19)-callide.htm), accessed April 2015.
54. Royal Geographical Society of Queensland, 'Braving the Bull of Heaven Continued: Droughts in Space and Time', *Royal Geographical Society of Queensland*, <http://www.rqsq.org.au>, accessed April 2015.
55. Department of Natural Resources and Water, *Fitzroy Basin Water Resource Plan Amendment – Callide Catchment Groundwater Project*, Queensland, 2008, p. ii, http://mackay.qld.gov.au/__data/assets/pdf_file/0019/101746/Callide-Catch-GWater-Project.pdf, accessed April 2015.
56. *ibid.*, p. iii.
57. *ibid.*, p. 46.
58. SunWater Limited, Awoonga Callide Pipeline, *SunWater*, <http://www.SunWater.com.au/future-developments/all-projects/awoonga-callide-pipeline>, accessed April 2015.
59. Department of Natural Resources and Water, *Fitzroy Basin Water Resource Plan Amendment – Callide Catchment Groundwater Project*, Queensland, 2008, p. 46, http://mackay.qld.gov.au/__data/assets/pdf_file/0019/101746/Callide-Catch-GWater-Project.pdf, accessed April 2015.
60. Bureau of Meteorology, *Queensland Flood Summary 1990-1999*, http://www.bom.gov.au/qld/flood/flid_history/floodsum_1990.shtml, accessed April 2015.
61. *ibid.*
62. Department of Natural Resources and Water, *Fitzroy Basin Water Resource Plan Amendment – Callide Catchment Groundwater Project*, Queensland, 2008, p. 46, http://mackay.qld.gov.au/__data/assets/pdf_file/0019/101746/Callide-Catch-GWater-Project.pdf, accessed April 2015.

63. Bureau of Meteorology, *Recent rainfall, drought and southern Australia's long-term rainfall decline*, <http://www.bom.gov.au/climate/updates/articles/a010-southern-rainfall-decline.shtml>, accessed April 2015.
64. Department of Natural Resources and Water, *Fitzroy Basin Water Resource Plan Amendment – Callide Catchment Groundwater Project*, Queensland, 2008, http://mackay.qld.gov.au/_data/assets/pdf_file/0019/101746/Callide-Catch-GWater-Project.pdf, accessed April 2015.
65. *ibid.*, p. 1.
66. *ibid.*
67. *ibid.*
68. Commonwealth Scientific and Industrial Research Organisation (CSIRO), *The Millenium Drought and 2010/11 Floods*, South Eastern Australian Climate Initiative, July 2011, http://www.seaci.org/publications/documents/SEACI-2Reports/SEACI2_Factsheet2of4_WEB_110714.pdf, accessed April 2015.
69. AECOM Australia Pty Ltd, *Banana Shire Council, Callide Valley Flood Risk Study (Phase 1 – Flood Study)*, Banana Shire Council, 2010, <http://www.banana.qld.gov.au/documents/4771350/40887810/2014-03%20Confirmed%20Ordinary%20Meeting%20Minutes%20Attachment%20-%20Callide%20Valley%20Flood%20Risk%20Study%20-%202026%20March%202014>, accessed April 2015.
70. *ibid.*, p. 51.
71. Australian Emergency Management Institute, *Cyclone Oswald, Queensland and New South Wales 2013*, <https://www.emknowledge.gov.au/resource/3487/2013/cyclone-oswald-queensland-new-south-wales-2013>, accessed May 2015.
72. Bureau of Meteorology, *Tropical Cyclone Oswald*, Queensland Regional Office, <http://www.bom.gov.au/announcements/sevwx/qld/qldtc20130117.shtml>, accessed May 2015.
73. Insurance Council of Australia, *Historical Disaster Statistics*, <http://www.insurancecouncil.com.au/industry-statistics-data/disaster-statistics/historical-disaster-statistics>, accessed May 2015.
74. Bureau of Meteorology, *Ex-TC Oswald Floods*, http://www.bom.gov.au/qld/flood/flid_reports/EXTC_Oswald.pdf, accessed May 2015.
75. Water Solutions, *Review of Callide Dam Gate Operations in the January 2013 Flood Event*, Water Solutions, Kenmore, 2013, p. 13.
76. Bureau of Meteorology, *Ex-TC Oswald Floods*, http://www.bom.gov.au/qld/flood/flid_reports/EXTC_Oswald.pdf, accessed May 2015, p. 5.
77. Water Solutions, *Review of Callide Dam Gate Operations in the January 2013 Flood Event*, Water Solutions, Kenmore, 2013, p. 15.
78. Gladstone Observer, *Residents evacuated as dam water swamps towns*, 26 January 2013, <http://www.gladstoneobserver.com.au/news/residents-evacuated-dam-water-swamps-towns/1732769/>, accessed May 2015.
79. *ibid.*
80. Water Solutions, *Review of Callide Dam Gate Operations in the January 2013 Flood Event*, Water Solutions, Kenmore, 2013.
81. *ibid.*
82. Queensland Government Statistician's Office (Queensland Treasury), *Queensland Regional Profiles: Banana Shire Local Government Area*, the Queensland Government, Brisbane, 2015, p. 5.
83. Banana Shire Council, *Banana Shire Information*, <http://www.banana.qld.gov.au/shire-information>, accessed May 2015.
84. *ibid.*
85. *ibid.*
86. Queensland Cotton, <http://www.qcotton.com.au/cotton-marketing.html>, accessed May 2015.
87. Banana Shire Council, *Banana Shire Information*, <http://www.banana.qld.gov.au/shire-information>, accessed May 2015.