



Final Report and Overview

North East Victoria: Adapting to a Low Water Future

Acknowledgements

This document has been prepared with the assistance of people from a range of organisations. Thanks go to the Executive Officer of the North East Greenhouse Alliance, the Technical Team and Steering Group for the project, staff of the Alpine Shire Council, Indigo Shire Council, Towong Shire Council, Rural City of Wangaratta, the City of Wodonga, North East Water, North East Catchment Management Authority, Goulburn-Murray Water and the Department of Sustainability and Environment.

The input of staff, councillors, community members and businesses through workshops, discussions and audits through the course of this project is gratefully acknowledged.

All errors, of course, remain the responsibility of the author.

Funding

The North East Greenhouse Alliance project “North East Victoria Adapting to a Low Water Future” is funded by the Australia Government through *Water for the Future*.

Disclaimer

While every attempt has been made to make this information as accurate as possible, the North East Greenhouse Alliance and its members and contributing organisations and the author assume no legal responsibility for decisions based on the contents of this document.

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Narelle Martin
On behalf of the Steering Group

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Introduction

This final report is to:

- Provide a wrap up report for the stakeholders and participants of the project “North East Victoria - Adapting to a low Water Future.”
- Provide a starting point for briefings for participating Councils and other interested bodies as the implications, recommendations and suggestions, as well as some of the lessons learnt, are considered.

Scope of the project

The title of the project was “North East Victoria – Adapting to a Low Water Future”. When the project was proposed, the region was in the grip of an on-going drought. During the project the drought broke and there was series of serious floods. The project focus then more clearly shifted to a *low water future* and *variability*. This change more clearly reflected the project proposal.

The project was limited to urban community impacts and local government interests and did not consider the reliability of supply to irrigators.

This project was focused on the institution and the partners. It was *not* a community-based project.

The geographical area of the project included the areas covered by the Alpine Shire, Indigo Shire, Towong Shire, Rural City of Wangaratta and the City of Wodonga. These areas largely cover the Victorian side of the upper Murray River catchment, the Kiewa catchment and the Ovens and King catchments.

Governance and funding arrangements

The project “North East Victoria adapting to a low water future” arose from discussions within the North East Greenhouse Alliance (NEGHA). Each of the participating organisations, councils and partners, signed letters of support for the project submission. The project was funded by the Federal Government, through the Australian Government’s *Strengthening Basin Communities Program*.

The funding of \$800,000 from the federal government was supported by in-kind contributions by the participating organisations.

Management of the project was undertaken initially by the Executive officer of the NEGHA, and latterly by a project manager, supported by a Steering Group. Appendix One provides an outline of the governance structure, and membership of the NEGHA and this project.

A clear basis of the funding agreement was that no money from the project could be spent on infrastructure.

Timing for the project was also tight. The project funding agreement was signed on 15 December 2009 for completion by 31 December 2011.

The Richness of the North East.

It could be argued that the biggest export from North East Victoria is water. Although the North East Victorian region it comprises only 2% of the geographic area of the Murray Darling Basin, the region's rivers contribute 38% to the total water in the Murray Darling Basin systems. Industry, agriculture and communities have been built on the availability of water.

Changes in the amount of rainfall in North East Victoria has impacts both within the North East community and downstream.

Outcomes of the project.

A full listing of the reports produced is included in Appendix Two.

The project comprised three related elements:

- Phase 1 – Project Context setting
- Phase 2 – Climate Change Risk Assessment and Adaptation Planning
- Phase 3 – Development and Delivery of Practical Solutions

The project has:

- Provided the context of the impacts of climate change on the stakeholder communities in the North East of Victoria;
- Undertaken a comprehensive risk analysis identifying the highest risks to the participating organisations;
- Developed an adaptation plan with recommendations for participating organisations and at the regional level;
- Reviewed existing plans and strategies of Councils to identify whether climate change has been incorporated into existing documents and approaches, identified gaps, and recommended methods of incorporating changes into operations;
- Consulted with stakeholders to identify behavior and communication barriers to change;
- Completed a review of training and development needs for the participating organisations and identified sources of training;
- Undertaken audits of seven small to medium businesses in the region to identify water use, potential water savings and recommendations for further action, as well as providing a basis for further savings for businesses across the North East;
- Developed a blueprint for future planning and design that incorporates sustainable water management guiding principles into land use planning and projects from inception;
- Identified innovative approaches for dealing with septic and sullage in small communities not served by water authorities; and
- Developed a Climate action plan for Alpine Shire Council and a template that other municipalities can use.

Appendix 3 shows the reports and linkages to partners.

Contents of Reports

The following information provides a snapshot of the work undertaken in the reports, but does not reflect the conclusions of the work. All of the reports are included on the disc: [Adapting to a Low Water Future – Final reports.](#)

It should be noted that the titles of reports listed here are slightly different to the titles of the final reports, for ease of reading. Appendix 3 reflects the full titles.

Phase 1 Context. What is happening and what is predicted?

This suite of reports was overseen by Dr Lin Crase of La Trobe University and is produced as a single document.

Historical Climate, Climate change and Water Availability. Written by Craig Beverly (Department of Primary Industry) and Mark Hocking (Hocking et al Pty Ltd).

This report provides a review of water resources. The study reviewed and analysed historical climate, climate change and water availability within the North- East Catchment Management Authority Region. The report used an approach developed by Department of Primary Industry (DPI). The computer modeling included climate scenarios developed by CSIRO, and used existing surface water and groundwater models to assess the major impacts of climate change on water availability projections to 2030 and 2070.

The estimates that arose from the modeling are shown in a large number of maps, graphs and tables. Outcomes of the modeling, for example predicted changes in rainfall, are also provided by municipality.

The report notes that previous studies typically addressed key river basins such as the Ovens and Kiewa river systems. This was the first time that the climate change study addressed the whole of the North East CMA region at a smaller spatial scale.

The key findings from the study broadly aligned to previous modeling, but identified large uncertainties. It was also noted that there were significant variations in this report and other reports. For example, it points out that there are differences in views in the long term ability to extract groundwater. Conclusions are included on pages 59-60, with recommendations particularly on groundwater dynamics and sustainable extraction limits.

User Groups, Access to Water and Current Water Usage Statistics. Written by Jayanath Ananda (La Trobe University)

This report provides a snapshot of the region including the population and economy, water rights and entitlements, water user groups and consumption trends, water sources and water supply reliability.

Again information is broken down by municipalities. This report looks at both urban and rural water use. It notes that rural water use is the dominant water use in the region. The report also includes a description of water rights and entitlements including security in water entitlements.

Water Demand, Drives, Trends and Related Behaviours. Written by Alistair Watson (Freelance economist and Adjunct Professor, La Trobe University)

This paper provides a discussion on the relative powers on irrigation versus urban water provision. It provides considerable background on the development of water policy, particularly the role of irrigation. The paper also includes some discussion on different approaches to water pricing and the implications for different urban water strategies.

Preliminary Vulnerability Assessment. Written by Lin Crase and Harry Clarke (La Trobe University)

This report focuses on vulnerability assessment on a council by council basis. The approach focuses on reduced water availability while recognizing that increased variability is also an issue.

Potential vulnerable economic activities and assets in each municipality are identified: “hot spots”. For each shire economic drivers, the level of water dependency of the economy and substitution opportunities are addressed.

Policy responses that may lower vulnerability are also discussed: investments in long-term infrastructure; providing information to those affected by changed water supply availability; providing an expanded range of technology; and putting into place a water supply policy regime that encourages rather than discourages adaptation.

The assessment of vulnerability is provided in table form for each municipality. The report also considers the social and economic consequences of vulnerability.

Summary and Synthesis North East Victoria Adapting to a Low Water Future. Written by Lin Crase (La Trobe University)

This report provides a brief summary of the major findings of the above reports.

Phase 2: Climate Change risk assessment and adaptation, and governance

Adapting to a Low Water Future: Climate Change Risk Assessment and Adaptation Plan.

Written by Marsden Jacob Associates and The Regional Development Company.

There were two elements of this work. This included a risk assessment, and then developing an adaptation plan based on the outcome of that assessment

The risk assessment was to identify the full range of potential risks of both low water vulnerability and increased rainfall variability. The work involved staff from municipalities and agencies working together to identify how well they could perform their roles and responsibilities. This was assessed for current conditions, for the medium term (2030) and the long term (2070). These last periods took into account the likely changed conditions due to climate change.

The workshop discussions were followed by interviews and further discussions to refine the risk assessment. Following this process, a series of potential adaptation actions were identified.

The final report incorporates both processes. The formal report includes tables summarizing risks and actions. In addition, there are a series of excel reports included as part of the material on the disc that shows the spreadsheets and outcomes by both municipality and agency. There are also some recommendations for the region. These extensive spreadsheets identify risks, quantify risks and identify recommended actions.

Workshop: Changing Behaviours. Provided by Dr Douglas McKenzie-Mohr February 2010.

A workshop with participants across the region was held in February 2010. Dr McKenzie Mohr is a psychologist specializing in working with community change. He has been at the forefront of developing “Community-Based Social Marketing” (CBSM). The work of Dr McKenzie Mohr, including his free downloadable book, is available at <http://www.cbsm.com/public/world.lasso>

The workshop, over two days, provided participants with practical skills to assist in changing behaviours both in the workplace and in the community.

Water Security for the North East. Written by Bonacci Water.

This report includes the outcomes of re-analysis of significant amount of data from sources across the region, based on individual sites. It has a focus on urban water supply, and examines ways that new developments in particular may benefit from different approaches.

This report challenges municipalities and partners to consider alternative approaches to water supply and management. It includes outcomes of modeling of different scenarios, including the current “business as usual”. Scenarios include aspects of integrated water cycle management, including reducing water use, increasing efficiencies, and stormwater management. It identifies that alternative water management strategies have the potential to supplement demands for potable water supplies.

The report divides the North East region into 45 zones. Analysis show rainfall levels, as well as rainfall intensity and distribution.

The report includes case studies for a range of communities across the North East.

Review of Municipal documents. Written by Two Hemispheres Environmental Consulting.

This work built on the risk assessment and adaptation planning phase of the project. The report uses the priority groupings identified through the risk assessment process: surface water supply and quality; groundwater supply and quality; stormwater and flood management; policy and planning; economic development; recreation and amenity; and emergency services and environment. For each area, this report looks at the work already been undertaken by the five municipalities.

Council documents were reviewed to identify whether climate change had been identified and examined as part of the assumptions, and make recommendations.

Existing plans and strategies examined for each council (where available) have included: Planning scheme; Council Plan; Community Vision; Healthy Communities Plan; Heatwave Plan; Stormwater plan, Recreation Plan; Economic Development Plan and Tourism Plan. In addition plans unique to individual councils were also examined.

The report reviews constraints that municipalities operate under. There is an extensive review of existing plans and strategies (Section B) as well as detailed examination of reports, by Council. (Section C). The report also includes a substantial number of recommendations.

3. Phase 3: Practical Solutions

Alternative methods to manage sullage and septic in small rural towns. Written by Bonacci Water.

This report has been able to leverage from the work undertaken in Phase 2 by Bonacci, “Water Security”. Significant analysis and modeling already developed for the water security project has been able to be used and expanded to address the septic and sullage issues across 17 communities. The report has identified a range of barriers to addressing issues. These included institutional arrangements.

Case studies for options for sullage and sewage management at a number of locations are included in the report. Additional case studies are also being prepared for the municipalities outside of the formal report timetable. These case studies will be made available through councils.

Report for Water Efficiency Site Assessments and Action Plans. Written by the Water Group.

The Water Conservation Group¹ undertook audits of seven businesses in the North East to identify water savings in their operations. The businesses were: Bright Chalet; Burder Industries; Wangaratta Livestock Exchange; Myrtleford Butter Factory; Victoria Alps Winery; Wodonga Caravan and Cabin Park; and La Trobe University Campus.

The report identifies the process used, identifies and costs to the water savings initiatives and includes the detailed reports of the audits of a number of the businesses.

Water savings and financial costs have been identified and extrapolated for across the North East region. These will be used as case studies for other businesses and industry across the North East.

A number of the company audit reports are also included.

Stakeholder Behavioural Study and Analysis. Written by The Regional Development Company.

This report analysed drivers and barriers for key stakeholders (municipalities and partners) to implementing actions for adapting to climate change. It outlines the consultation as part of the review. This included briefings and communications strategies to senior executives of Councils and partner organisations. The report also outlines the outcomes of facilitated workshops held with a number of councils.

An appendix outlines the result of a literature review undertaken to provide an understanding of potential drivers and barriers to embedding sustainability into organizations. It identifies that the drivers, challenges and barriers to sustainability are comparatively well understood. Both the report and the literature review incorporates recommendations.

Social Response Skills Gap and Training Needs Analysis Final report. Written by Wodonga Institute of TAFE.

This report consulted with councils and partners to identify challenges and trends for skills, recruitment and training. The focus is to identify what is needed for the partners to address the changing capability requirements of climate change on water resources.

The report includes a discussion of the environmental factors that will have an impact on knowledge and skills requirements as well as industry factors.

An overview of training and barriers to training are identified. Workforce training needs are also identified, along with current and emerging labour shortages and skills gaps.

The report also includes an extensive listing of existing courses and training available. These include training packages, related degrees across Australia (including distance education); and courses and workshops offered by agencies, including Municipal Association of Victoria, and the Victorian Employers Chamber of Commerce and Industry.

Alpine Shire Council Climate Change Action Plan 2012-2016. Written by Tribal Frog.

¹ The Water Conservation Group changed their business name during the contractual period to WaterGroup Pty Ltd.

This report was developed with an intense effort from the Councillors and staff of the Alpine Shire Council. The approach was to take the outcomes of the work developed as part of “North East Victoria Adapting to a Low Water Future” and previous work instigated by the Alpine Shire related to Climate Change and develop a consolidated, user friendly and short action plan.

The Plan is recognized as a work in progress and a “first cut” and is designed to be the basis of ongoing action by Alpine Shire Council, for example it may be included or referred to in future Council Plans. It includes an Action Table clustered into three common themes that emerged from previous documents. These are: education and awareness; council business; and advocacy. Priority actions, responsible units and priorities have been identified.

An associated data base included in this disc lists all of the reports developed by the Alpine Shire Council that have addressed some aspects of climate change and sustainability, and the relationship with the Alpine Shire Council Climate Change Action Plan.

Developing a Climate Action Plan. Written by Tribal Frog.

This report provides a template for other municipalities in the project to assist them in developing a Climate Change Action Plan. It documents the process used by Alpine Shire Council and identifies the key steps that contributed to the success of developing the Climate Change Action Plan.

Surprising outcomes

Much more important than the reports is what we have learnt from them, and what can be done in the future.

There are a number of surprises that emerged from the work.

Current risks are not being met.

The risk assessment showed that there are four significant risks that are not being met². Nearly 60 water related risks were identified and rated through workshops and follow up consultations.

Of these risks identified, 7% of the risks are **extreme**, and with current water variability are not being met. This means that we are not currently able to manage some significant risks, never mind risks likely to increase by 2030 or 2070. These are:

- Reduced reliability of unregulated surface water supplies
- Uncertainty of data relating to sustainable yield of groundwater under climate change scenarios
- Degradation of parks, gardens and streetscapes
- Decreased water reliability in unregulated systems for aquatic ecosystems.

The risk assessment showed that the number of high and extreme risks increases significantly over time.

² Marsden Jacob Associates, The Regional Development Company, Adapting to a Low Water Future: Climate Change Risk Assessment and Adaptation Plan. A Report prepared for North East Greenhouse Alliance

Councils are already managing water variability

It was clear as the project progressed that Councils in particular are already dealing with climate change and variability, but often don't recognize it³.

All Council Plans and strategies were reviewed to see if climate change had been considered. The report by Two Hemispheres Environmental Consulting provides a detailed assessment of Council plans and strategies, and identifies gaps and recommendations. It makes clear that Council and their staff are already grappling with climate change related issues.

For example, there are currently big issues in flooding and implications for management for Councils in the areas of stormwater, planning, emergency management and upgrading of Infrastructure that Councils are struggling to deal with.

Different assumptions provide different outcomes.

While this is not really a surprise, it was interesting to see how different approaches by consultants, reviewing base information, could provide different outcomes. The groundwater modeling by Beverly and Hocking point to less water security than has been identified by other consultants. This is in part a reflection that there is not enough data. This was picked up by the risk assessment, where there are a number of recommendations to try and get a better handle on the risks associated with lack of information, particularly for groundwater.

The work by Bonacci, both in relation to water security (phase 2) and in addressing septic and sillage issues (phase 3), has provided challenges for models of business as usual. Their work combines both modeling and discussions with locals. The outcomes of that work has stimulated considerable discussion and may lead to quite different approaches. That is particularly valuable when dealing with intractable issues such as providing water for small communities, and managing septic and sillage (or sewage) in small communities.

Infrastructure costs may vary

Different approaches in thinking about water security⁴ and sillage and sewage⁵ may lead to reduced infrastructure costs.

The two reports by Bonacci addressing both water security and septic and sillage are meant to challenge long held beliefs and approaches to both issues.

One of the premises for the water security brief was to try to incorporate water security into the development process. This work allows councils and partners to consider how they have traditionally approached water provision through large infrastructure, with opportunities to reduce mains water demands, sewerage discharges and impacts on waterways from urban development.

This can also be particularly important in small communities where there is no reticulated water supply.

Alternative approaches to provision of water services may reduce infrastructure and energy costs in some instances.

³ Two Hemispheres Environmental Consulting, [North East Victoria – Adapting to a Low Water Future: Review of Municipal Documents](#)

⁴ Bonacci Water, [Development of Practical Solutions for the North East of Victoria – Adapting to a low water future. Water Security for the North East Greenhouse Alliance.](#)

⁵ Bonacci Water, [Development of Practical Solutions for the North East of Victoria – Adapting to a low water future. Alternative Options to Manage Sillage and Sewage in small community towns](#)

As part of the development of the report on septic and sullage, a workshop was held. The workshop discussion on managing sullage included participation from Environmental Health Officers across the region. This is an example of an ongoing issue where municipalities and water authorities across Victoria have tended to place management of this issue in the too hard, too costly basket. Having an opportunity through this project to more clearly identify both the scale of the challenge, challenge assumptions and look to practical ways of managing hot spots has been welcomed.

There is considerable opportunity to reduce water costs in businesses

One of the projects was to undertake free water audits for seven businesses⁶. This led to a couple of surprises. One was how difficult it was to get businesses to undertake a free service. The second was that the audits clearly showed how much could be saved –water and money - through fairly simple changes. Of the sites audited, water savings of approximately 20% with a pay back period of 5.3 years was identified. These figures have been extrapolated across the North East.

Less surprising was the recognition that communications were critical, and there was more work needed to be done in this area⁷.

Discussion

Lessons learnt

There have been some lessons from this project that can be applied elsewhere. With hindsight, some changes would have been helpful. These include trying to expand the timeline, having a dedicated project manager; and having more time in the front stage of the project development to consult and discuss with participating organisations.

A different title (such as dealing with water variability) would have allowed a clearer focus earlier in the life of the project.

There would also have been benefits in having discussions with other local government applicants and organisations that had funding from the same sources about their experiences and to learn from each other.

All of these are issues that arise in part because this was the first round of funding. Some recommendations along these lines will be included in the final report to the Federal Government.

Benefits of the project

There are not many opportunities where staff and organisations can take time to think about the future. More often, the focus is reacting to pressures, events (including drought, fire and flood), and working within funding constraints. A clear benefit of this funding and the project has been the opportunity it has provided to step out of the daily routine and be proactive.

This has pragmatic implications. Councils are already delivering on managing risks and emergencies that are consistent with climate change but there is a challenge to change thinking about reduced water and water variability from a reaction to events e.g. drought or as an emergency, to preparing

⁶ Water Group, [Report for Water Efficiency Site Assessments and Action Plans, Phase 3 Part 5 of North East Victoria Adapting to a Low Water Future](#)

⁷ Regional Development Company, [North East Victoria Adapting to a Low Water Future Phase 3 Stakeholders Behavioural Study and Analysis](#)

proactively for change. For example, there is an opportunity to work with the community *in advance* to identify which recreation reserves ones should not get watered during dry periods, or which activities get supported with water and which ones don't.

The project has identified approaches that can reduce duplication and allow communities to leverage from each other. For example, Alpine Shire has been developing a proactive recreational strategy as discussed above. The project has provided an opportunity for different groups and organisations to work together.

Research carried out through this project helps to position the partners for additional funding, for example for infrastructure. The project has identified where Councils and partners can work together to change policy settings, or address gaps. Many of these activities do not need additional funding.

The reports and project outcomes have helped to identify gaps, risks and opportunities. They provide a solid foundation for future work in the region.

Finally, this project adds value to other work within the region. A second project of NEGHA, also funded through the federal government, looking at Socio-economic adaptation will be drawing and leveraging off the work completed as part of the North East Victoria – Adapting to a Low Water Future.

Next stages

This report and accompanying material will be provided to the participating organisations for their consideration.

With some additions to meet their requirements, these reports will also be provided to the federal government. That will complete the formal development stage of the project: "North East Victoria – Adapting to a Low Water Future".

Discussions have been held with staff of Regional Development Victoria and various State Government departments about the work.

Additional copies of the reports will be available through NEGHA, and the participating organisations.

Conclusion

NEGHA and its partners with the assistance of the federal government have undertaken a significant piece of work to proactively address issues of climate change and the impacts of water variability. The challenges and opportunities identified through this work position the partners, and the communities they represent, to better meet the current and emerging challenges.

Councils are managing risk as part of their core business. This project has helped identify and quantify current and future risks. A major challenge is to shift from reacting to "one off" events, to considering variability more clearly in long term planning and strategies.

This project provides a solid foundation for future action.

Appendix One: Governance Arrangements

Project auspicing

This project has been delivered by the North East Greenhouse Alliance on behalf of Alpine, Indigo and Towong Shires, Rural City of Wangaratta, City of Wodonga, and in partnership with the North East Catchment Management Authority, North East Water, and Goulburn-Murray Water. Department of Sustainability and Environment also provided support and was a partner for the project.

The City of Wodonga provided auspicing for the North East Greenhouse Alliance. This included providing an office and administrative support for the Executive Officer of NEGHA. Nikki Scott as Executive Officer of NEGHA provided project management until September 2011. That role was provided by Narelle Martin who acted on a contract basis to provide project management until the completion of the project (including final reports) in February 2012.

The City of Wodonga also signed agreements with the Federal Government on behalf of the NEGHA. The City of Wodonga provided contractual and financial oversight for the project, including auditing of funds.

Steering Group

A Steering group was established and met regularly. Members of the Steering Group included:

Cameron Alexander (Alpine Shire);

Mark Verbaken; Anne Visser (City of Wodonga);

Bronwyn Chapman (Rural City of Wangaratta);

Charles Knight, (Towong Shire);

Mark Florence, Helen Jones (Indigo Shire);

Tim Clune (North East Water);

Matthew O'Connell (North East Catchment Management Authority);

Matthew Pethybridge (Goulburn-Murray Water);

Tony Long (DSE)

Executive support: Nikki Scott (to September 2011)/ Narelle Martin

Appendix Two: List of reports and products.

1. Overview of project and final report

- *Final report: North East Victoria. Adapting to a Low Water Future.* Written by Narelle Martin

2. Phase 1 Context. What is happening and what is predicted?

- *Historical Climate, climate change and water availability. North East Victoria Adapting to a Low Water Future: Deliverable 1.* Written by Craig Beverly, and Mark Hocking.
- *User Groups, Access to Water and Current Water Usage Statistics. North East Victoria Adapting to a Low Water Future: Deliverable 2,* Written by Jayanath Ananda.
- *Water Demand, Drivers, Trends and Related Behaviours. North East Victoria Adapting to a Low Water Future: Deliverable 3* Written by Alistair Watson.
- *Preliminary Vulnerability Assessment. North East Victoria Adapting to a Low Water Future: Deliverable 4* Written by Lin Crase, and Harry Clarke.
- *Summary and Synthesis North East Victoria Adapting to a Low Water Future Deliverable 5* Written by Lin Crase.

3. Phase 2: Climate Change risk assessment and adaptation, and governance

- *Adapting to a Low Water Future: Climate Change Risk Assessment and Adaptation Plan. A Report prepared for the North East Greenhouse Alliance.* Written by Marsden Jacob Associates and The Regional Development Company.
 - This project also provides separately extensive spreadsheets for each organization and the region, identifying risks, quantifying risks and identifying recommended actions.
- *Workshop: Changing Behaviours.* Provided by Dr Douglas McKenzie-Mohr February 2010.
- *Development of Practical Solutions for the North East of Victoria – Adapting to a Low Water Future. Water Security for the North East.* Written by Bonacci Water.
 - This report includes options for water security for locations across the region. Additional case studies are also being developed for participating municipalities.
- *North East Victoria – Adapting to a Low Water Future: Review of Municipal documents.* Written by Two Hemispheres Environmental Consulting.

4. Phase 3: Practical Solutions

- *Development of Practical Solutions for the North East of Victoria – Adapting to a Low Water Future. Alternative Options to Manage Sullage and Sewage in Small Rural Towns.* Written by Bonacci Water.

- This report includes options for sullage and sewage management at a number of locations across the region. Additional case studies are also being developed for participating municipalities
- *Report for Water Efficiency Site Assessments and Action Plans, Phase 3 Part 5 of North East Victoria Adapting to a Low Water Future* Written by the Water Group.
- *North East Victoria Adapting to a Low Water Future Phase 3 Stakeholder Behavioural Study and Analysis* written by Regional Development Company.
- *North East Victoria Adapting to a Low Water Future Phase 3: Social Response Skills gap and Training needs analysis Final report.* Written by Wodonga Institute of TAFE.
- *Alpine Shire Council Climate Change Action Plan 2012-2016 Produced for the North East Greenhouse Alliance.* Written by Tribal Frog.
 - An associated data base lists all of the reports developed by the Alpine Shire that have addressed some aspects of climate change and sustainability, and the relationship with the Alpine Shire Council Climate Change Action Plan.
- *Developing a Climate Action Plan.* Written by Tribal Frog.

Appendix Three: Report relevance to organisations

Report	A	I	T	Wa	Wo	NEW	NE CM A	G- MW	Region
Context setting reports	✓	✓	✓	✓	✓	✓	✓	✓	✓
Risk assessment and adaptation plan	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Security	✓	✓	✓	✓	✓	✓	✓	✓	
Review of Council documents	✓	✓	✓	✓	✓				✓
Water efficiency for business	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stakeholders Behavioural Study and Analysis	✓	✓	✓	✓	✓				✓
Skills gap and training needs analysis	✓	✓	✓	✓	✓	✓	✓	✓	
Septic and Sullage	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alpine Shire Council Climate Change Action Plan	✓	✓	✓	✓	✓				
Developing a Climate Change Action Plan	✓	✓	✓	✓	✓				✓

Code:

A: Alpine Shire

I: Indigo Shire

T: Towong Shire

WA: Rural City of Wangaratta

Wo: City of Wodonga

NEW: North East Water

NECMA: North East Catchment Authority

G-M W: Goulburn-Murray Water

Region: Hume region