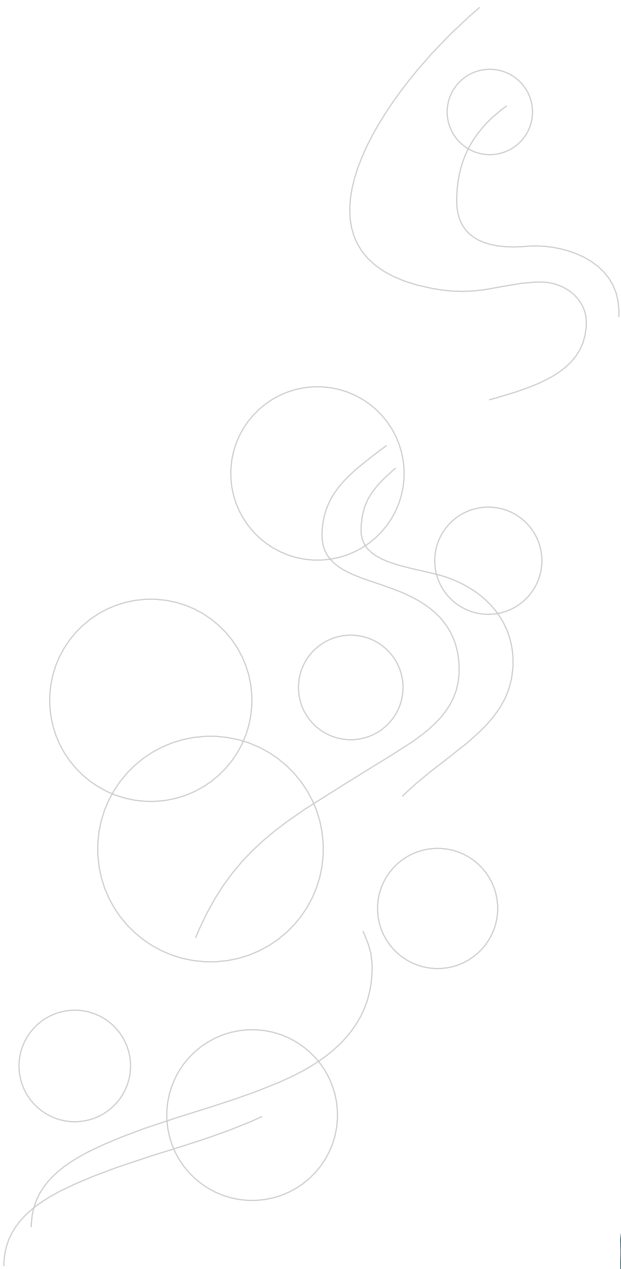


3. Central Queensland Regional Water Supply Strategy responses



3.1 Overview of strategy responses

Traditionally water supplies have been met through the development of new supply sources, however there are limitations on the water resource and more efficient use and management is needed.

Consequently, water efficiency improvements, water allocation trading and demand management will have a higher profile than in the past. Best management practices across all water user sectors, along with existing water use efficiency programs, are a key component of the strategy response. The adoption of practices such as water re-use and recycling will be one of the ways that Central Queensland will be able to ensure a cost effective water savings program.

Diversification of water supply sources, including potential for interaction between two or more supply sources, is also considered. This approach could offer considerable benefits for the region, improving the overall performance of linked supply schemes.

Greater flexibility in water trading should allow users to develop more appropriate mixes of water products for their needs. For example, a town water supply scheme could hold a combination of medium and high priority water allocations, which may enable an appropriate water supply for most years while ensuring essential requirements are met during extreme dry periods.

While the strategy offers avenues to access water supply in most situations, in some parts of the region options will be limited.

3.2 Regional strategy responses

3.2.1 Maximising the effectiveness of supplies through water trading

The first step in the government's three-tiered approach for addressing future water needs involves improved specification and security of existing entitlements and the introduction of water trading.

On release of the Fitzroy Basin ROP, many water entitlements were converted to tradable allocations. In addition to permanent trading, the arrangements allow for allocations to be leased, or seasonally assigned (temporary trading). These allocations are located in the Lower Mackenzie–Fitzroy River, the Dawson River and the Nogo–Upper Mackenzie River.

It is expected that trading will continue to promote higher value and best use of water, bringing broad economic benefits to landholders and improved outcomes for the natural environment. The flexibility possible through trading will become increasingly important in sub-regions where additional water supplies are not available, thereby promoting innovation and new efficiencies.

The strategy has identified a need to allow for conversion of medium priority allocations to high priority allocations to meet urban, mining or industrial needs in the Nogo–Mackenzie Water Supply Scheme. Implementation of this conversion process is outlined in Section 5.

3.2.2 Maximising the effectiveness of supplies through demand management and more efficient use of water

The second tier in the government's approach for addressing future water needs is through improved management of supply systems and usage efficiencies achieved through reduced use and recycling.

Improved management of systems

Given that there are multiple storage systems in the region, which for the major part are operated independently, there may be, for example, opportunities for linking supply systems to optimise storage management. The implementation schedule highlights some elements that are considered important for further investigation in the short term. One critical element of these investigations will be to consider possible linkages between the Lower Fitzroy and Awoonga Dam in the Boyne River Basin. Another aspect will be to assess the potential of Nathan Dam to secure high priority needs in the Lower Fitzroy.

The options to meet supply shortfalls include:

- Firstly, making better use of existing supplies, then
- Considering options for developing new supplies.

Water trading is available in some parts of the catchment. Not all areas will have this option available.

Demand management and water use efficiency will have a high priority. Existing demand management and water use efficiency initiatives in the region will continue.

Legislative provisions

Restricting water supply

Under the Water Act, water service providers may restrict water supply if necessary because of climatic conditions or water conservation needs. Such restriction may apply to the volume of water taken, the period that water may be taken, and the way that water may be used.

Systems leakage management plans

Under the Water Act, water service providers must, except where exemptions apply, prepare and implement system leakage management plans to minimise water losses. These plans:

- detail system leakage and how the leakage was calculated
- identify measures to reduce leakage, which may include, for example, pressure reduction, system maintenance and overflow reduction
- outline cost-benefit analyses of the implementation of these measures
- for those measures where implementation is cost effective, detail a plan to implement such measures.

Large and medium water service providers are required to prepare system leakage management plans by October 2007, whilst small water service providers are required to prepare system leakage management plans by October 2008.

Drought management plans

The Water Act provides for water service providers to have drought management plans in place to minimise the impact on communities of water shortages caused by drought.

Large water service providers are required to prepare drought management plans by October 2006, while medium and small water service providers are required to prepare drought management plans by October 2007. Exemptions may apply.

More efficient use of water

Although demand management has been a priority for most water service providers in recent years, and gains have been significant, additional gains could be made over the long term.

For the rural sector: further reductions in water distribution losses and irrigation improvements are expected to yield significant water use savings, allowing for production gains, maintenance of production in drier years, or trading.

For the urban sector: significant savings could be made, particularly in new developments.

Potential savings were considered to be achievable. For example, savings of up to 19 per cent, or 6000 ML/a were considered achievable for communities in the Lower Fitzroy.

While acknowledging that significant progress has been made in the region, further cost-effective savings could potentially be made in many areas, including:

- measures aimed at improving the water use efficiency of residential outdoor water use such as:
 - appropriate pricing
 - permanent low level water restrictions (set times on alternating days for irrigating gardens)
 - landscaping and irrigation advice
 - rebate programs
 - audit and retrofit programs.
- implementing mandatory internal water use efficiency measures in new residential and non-residential developments. Improvements to outdoor water use efficiency will be achieved through local landscape and site coverage planning controls and irrigation advisory services in partnership with developers.
- potable water loss reduction programs implemented by water service providers, including active leak detection and pressure management. Funding for these programs is available through the Reduction of Potable Water Consumption and Loss component of the Water and Sewerage Program (WASP), which is administered by the Department of Local Government, Planning, Sport and Recreation (LGPSR).
- use of recycled water as a resource rather than its disposal to land.

To further facilitate effective demand management, appropriate per capita usage targets for urban communities across the region are to be determined.

For industry and power generation sectors: further water savings to those already planned are potentially achievable. The following actions could be taken to encourage demand management in the non-residential sector:

- encouraging demand management through appropriate pricing structures, such as volumetric wastewater charging
- further encouraging high-volume non-residential users to undertake water efficiency audits and implement water efficiency measures to assist in a reduction of potable water demand. Incentive programs for investing in water efficiency measures should be considered by water service providers
- continue to maintain a 'watching brief' on alternative technologies for reducing cooling tower water use, including the assessment of costs, efficiency improvements and environmental performance.

For the mining sector: there is general industry recognition that water supply is becoming scarce, and this growing awareness is leading to increased action for improved water management. There is considerable investment in water planning and implementation of works.

There is significant variation in the way water is managed across coal mines. Accordingly, it is inadvisable to attempt extrapolation from the water use of an 'average' site. However, the coal association research program (ACARP) is funding the development of a formal process of sharing information about water management practices as a basis for planning and implementing change. An online tool called WaterMiner is now available (<http://selkie.smi.uq.edu.au/waterminer/>) which provides access to a range of site-specific information on coal mine water use, a water practices catalogue and a capability for examining scenarios for demand management.

The first phase of this research is now complete and the following conclusions can be drawn:

- Leading practice water production ratios (ML/Mtpa) have been compiled for a range of tasks carried out on seven mine sites. Estimates of the implication of applying these ratios across all sites indicate considerable potential for reduction in total water use and in the importation of fresh water to sites.
- Application of the leading production ratios results in increases in on-site salinity which must be managed. Estimation of the value of water in production terms and the relative costs of purchasing water and desalination to make more fresh water available indicate that potential value far exceeds costs. Therefore, if water is in short supply, desalination is economically attractive irrespective of variations in the cost. Acceptable management of the resulting brine remains a challenge.
- There is clear evidence that barriers associated with the use of worked water (recycled water) in the coal preparation plant and for dust suppression are being overcome by experience (currently these practices use the majority of water on site).
- Demand management through the introduction of evaporation control could be an important part of a mix of practices which would help sites achieve leading practice. There is little evidence of demand management being applied to evaporation control currently.
- To achieve leading practice and manage risks associated with ensuring water security and acceptable discharge, sites must consider improved management of overland flow and water storage capacity. Consideration needs to be given to the implications of ongoing significant importation of fresh water from off-site compared to more effective incorporation of on-site run-off, taking into account ecosystem requirements, environmental flows and implications for downstream storages.
- The supply of water under a full 'take-or-pay' arrangement is unlikely to facilitate a water saving ethos at mine sites.

- Underground mines provide a potential target for improved demand management.
- A more integrated approach to water management across on-site teams is likely to deliver improved outcomes.

3.2.3 Increasing water supplies through release of unallocated water

Consistent with the government's policy, unallocated water will only be released where alternatives such as water trading, unused parts of current water entitlements, or increasing water use efficiency have been fully explored.

However, water should be reserved for specific future infrastructure projects, which the government has identified, through a water planning process such as this strategy. These projects would be expected to be of high value to the community at some time in the future. Similarly, in certain areas, water could be reserved to meet the future needs of nominated urban communities.

The need to reserve water for future infrastructure projects has been based on assessment of projected water supply shortfalls, using best information currently available. Projected water requirements will be reviewed and updated as part of the implementation process for the strategy.

A series of steps is likely to be required before any water reserved in association with potential infrastructure identified in this section would be released to development proponents and/or other competing water users. The mix of medium and high priority water associated with the infrastructure will be determined closer to the time of development. This mix would be based on market considerations.

The infrastructure options will only proceed to development after full project evaluation and impact assessment studies have been satisfactorily completed and all necessary regulatory approvals obtained and a proponent identified. Included in the environmental assessments will be consideration of matters associated with implementation of the Reef Plan.

It is expected that the potential infrastructure options identified would be progressed at the appropriate time on a commercial basis as is provided for by the Queensland Government *Guidelines for Financial and Economic Evaluation of New Water Infrastructure in Queensland* and the *Water and Sewerage Program*.

For each of the sub-regions in the study area, Section 3.3 indicates the government's intended position over the strategy period regarding the release or reservation of unallocated water in the Fitzroy Basin.

The government's state-wide principles for the release of water will apply to the unallocated water referred to in Section 3.3. Releases would be made as water allocations or water licences using market based mechanisms to establish prices.

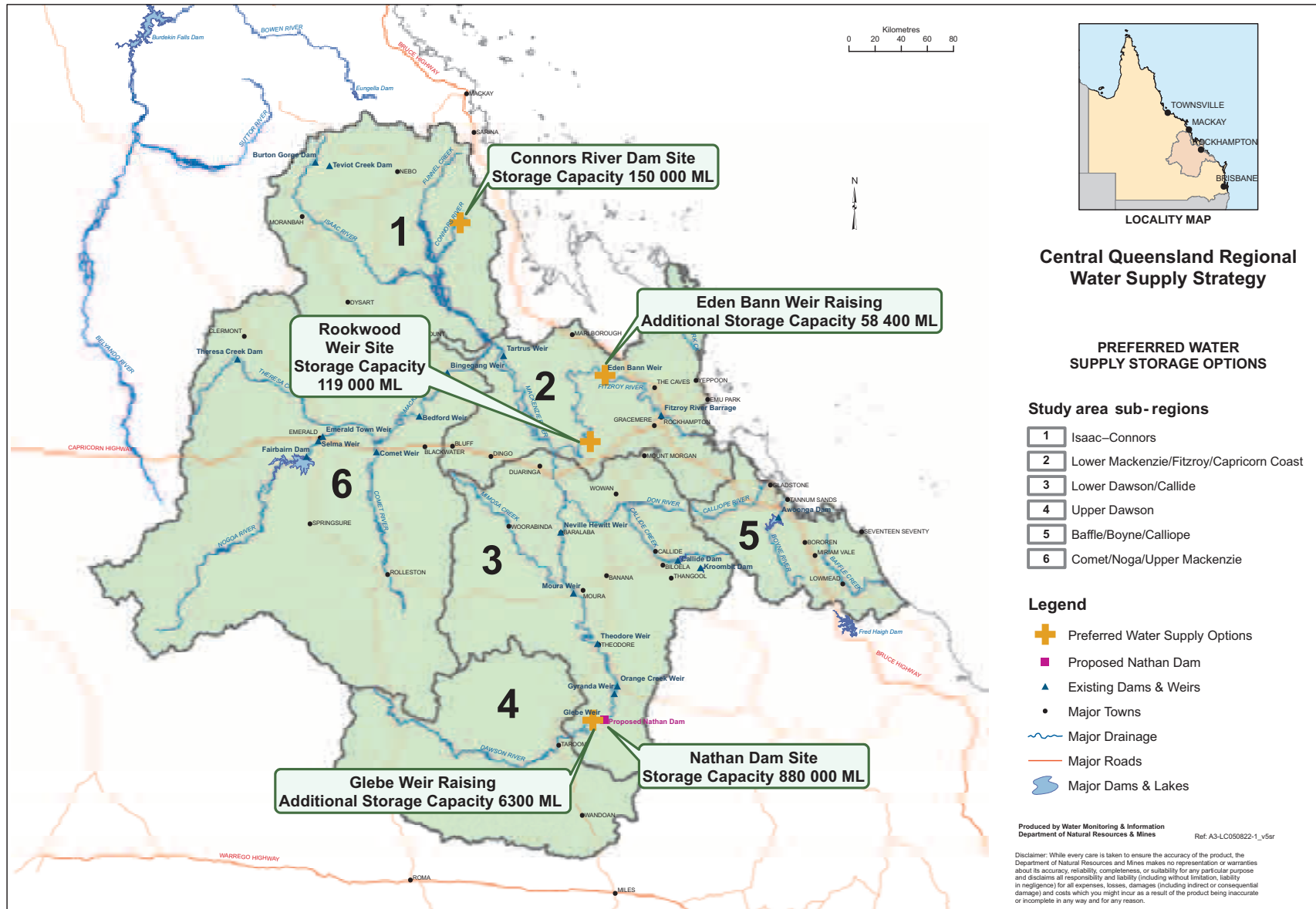


Figure 7: Preferred water supply storage options

In the Isaac–Connors sub-region construction of a pipeline from downstream of the Burdekin Falls Dam to Moranbah has started.

This pipeline is expected to meet short to medium term demands.

In the medium term if additional demand cannot be met by efficiency gains or trading, a new dam on the Connors River is proposed.

3.3 Sub-regional strategies

3.3.1 Isaac–Connors

As a sizeable additional supply is required for mining and urban needs in this sub-region, it is not expected that demand management savings alone will be sufficient.

Short term

It is expected that the area's additional coal mining demands will be met by the Burdekin–Moranbah pipeline being developed by SunWater, for which SunWater already holds allocations in the Burdekin River catchment.

It is expected that this additional supply of some 23 000 ML/a, will be adequate to meet short to medium term needs for coal mining.

Additional urban demand in Moranbah being generated by the coal industry expansion is expected to be serviced under arrangements with the relevant mining companies that provide water in these areas. Availability of water from the Burdekin–Moranbah pipeline for mining needs is expected to allow the mining companies to provide improved urban supply.

Additional agricultural demands may be met by release of unsupplemented unallocated water by grant of water licence. Details of volumes and triggers for such releases are provided in the implementation schedule.

Medium to longer term

It is anticipated that the medium term urban and industrial water demands may exceed the supplies that can be provided by the above strategies. These additional demands could be met by the development of a dam on the Connors River at the Mt Bridget site (Figure 7), and associated distribution pipeline.

The development process for a Connors River Dam needs to commence in the immediate future given the time required to prepare impact assessment studies, secure approvals and construct the dam, and the time required for it to fill.

To confirm the suitability of the Mt Bridget site for possible future development of a dam, it is intended that more detailed studies of the site and potential storage area be undertaken during 2006–07. This includes assessment of a number of environmental matters associated with the proposed dam site. Further details are provided in Section 5.

Unallocated water will be reserved in association with this proposal. The approximate volume to be reserved will be identified following the investigations identified in Section 5. Based on the preliminary assessments conducted for the strategy, a Connors River Dam is expected to provide in the order of 30 000 ML/a high priority supply.

Subject to satisfactory water pricing arrangements, part of the supply available from a Connors River Dam could be made available to meet agricultural demands in the area downstream of the dam.

3.3.2 Lower Mackenzie–Fitzroy

Some of the projected demands detailed in Section 2 are expected to be met by demand management measures. For example, substantial volumes of treated effluent are currently produced in the area and this will increase proportionately with population growth. This water is currently under-utilised and is a resource warranting consideration as a potential source of supply.

The Lower Fitzroy river system will be the next main source of supply for the urban and industrial needs of the Rockhampton, Fitzroy and Livingstone council areas and the Gladstone Area Water Board.

To reliably meet the needs of these areas, which are mainly for high priority water, further infrastructure will be required on the Lower Fitzroy River. Appropriate pipeline infrastructure would also be required to deliver water to the desired locations.

Demands that cannot be met by trading and demand management savings alone are expected to be able to be met by obtaining access to supplies from the infrastructure identified in this section.

The timing of the onset of the demands from these different areas may vary considerably, and are likely to have an effect on the preferred staging of the developments.

A volume of unallocated water will be reserved for the future storage developments as detailed below.

Short to medium term

Building on the preliminary investigations that were previously undertaken, further investigations into the raising of Eden Bann Weir and constructing Rookwood Weir will be undertaken.

Pending satisfactory completion of the investigations, it is expected that Eden Bann Weir will be raised and Rookwood Weir constructed by the end of 2011.

The investigations will include environmental, social, cultural, and economic evaluations, and will provide data necessary for environmental impact assessments. The outcomes of these investigations will assist the selection of the most appropriate arrangements of this infrastructure to meet the short, medium and long term water demands, including the size, and any staging of the infrastructure.

In the Lower Mackenzie–Fitzroy sub-region short to medium term urban and industrial needs that cannot be met by trading or efficiency measures are expected to be met by the raising of Eden Bann Weir and construction of a weir at Rookwood.

Further investigations are underway to assist in selecting the most appropriate arrangements to meet the short, medium and long term water demands, including the size and any staging of the infrastructure. Longer term demands, are expected to be supported by infrastructure developments as well as linking other supply schemes with the Lower Fitzroy schemes (for example, Awoonga Dam or the proposed Nathan Dam).

As part of these investigations, potential synergies across the Fitzroy and Boyne catchments will be examined to increase the supply available through the interconnection of the supply systems. This includes the potential for Awoonga Dam to operate in conjunction with the Lower Fitzroy supply schemes by linking the supply systems, and for Nathan Dam to provide supplies to the Lower Fitzroy, particularly in critical water supply periods.

More detailed consultation is proposed with landholders potentially affected by the proposed infrastructure.

Provision of a higher level river crossing at Riverslea to accommodate the inundation of the existing crossing by the Rookwood Weir pond would provide increased access opportunities for the local community.

Some agricultural demand is expected to be met by take-up of currently unutilised, or under-utilised water allocations. There is in the order of 30 000 ML/a of unsupplemented water allocations (with waterharvesting conditions) in the Fitzroy River area not presently being fully used. Trading is provided for along the Lower Mackenzie and Fitzroy River upstream of the Fitzroy Barrage that should facilitate uptake of these allocations.

However this unsupplemented water is not considered suitable for proposed developments associated with the proposed Fitzroy Agricultural Corridor which would require both medium and high priority supplemented water sourced from infrastructure on the Fitzroy River.

For areas above the Fitzroy Barrage, without access to tradable water allocations, an opportunity to obtain additional supply will be provided through the release of unsupplemented water licences during 2006.

For areas below the Barrage, a future amendment to the Fitzroy Basin ROP is expected to provide opportunity for access to some overland flow development.

In addition, the release of up to 8000 ML/a of unsupplemented water allocation (with waterharvesting conditions) in the Lower Mackenzie River, as provided for in the Fitzroy Basin ROP, will occur if water trading is not sufficient to meet agricultural demands.

Longer Term

Along with water trading and water efficiency gains, it is expected that the area's longer term urban, industrial and agricultural demands will be met by the raising of Eden Bann Weir and development of Rookwood Weir, operated in conjunction with the Fitzroy Barrage, Awoonga Dam and potentially Nathan Dam. It is anticipated that the conjunctive operation of the lower Fitzroy and Awoonga Dam systems will improve the overall performance of the water supplies, and potentially enable additional water to be made available.

Longer term agricultural irrigation demands will need to be met by water trading, and if available, further small releases of unsupplemented unallocated water.

Capricorn Coast

It is expected that demands of the Capricorn Coast area that cannot be met through demand management, water reuse and water use efficiency gains would be met by a pipeline to the Lower Fitzroy, in conjunction with the proposed infrastructure identified above. This option would be progressed by the Livingstone Shire Council. The pipeline will be funded jointly by the state and federal governments and Livingstone Shire Council.

3.3.3 Dawson–Callide Valley

Short to medium term

An allocation has already been reserved for the Nathan Dam development, within the Fitzroy Basin Water Resource Plan. It is envisaged that urban and industrial high priority demands and medium priority agricultural demands could be met by development of Nathan Dam.

Utilising the proposed Nathan Dam to provide supplies to the Lower Fitzroy, particularly in critical water supply periods, is also a potential option as discussed in the previous section.

If the Nathan Dam development were to represent a feasible solution to meeting water supply needs for the Lower Fitzroy, it could influence the timing of Nathan Dam development.

It is expected that development of the dam would commence when impact assessment studies are completed, outstanding approvals have been obtained and the project is considered to be commercially viable, either as a stand alone solution for the Dawson–Callide sub-region, or as a combination solution for the Lower Fitzroy and Dawson–Callide sub-regions.

The options for meeting needs for high priority water in the Dawson prior to the completion of Nathan Dam are trading and more efficient use of water. Trading would most likely involve the purchase of medium priority water allocations, in conjunction with the development of off-stream storages. It is considered that these options should be adequate to meet the pressing needs in this sub-region, prior to the development of Nathan Dam.

For the Callide Valley, performance issues associated with the scheme will be addressed as part of an amendment to the Fitzroy Basin Water Resource Plan commencing in 2006 to include Callide groundwater.

In the Dawson–Callide sub-region short to medium term needs that cannot be met by trading or efficiency measures are expected to be met by construction of Nathan Dam on the Dawson River.

Apart from adoption of more stringent water use efficiencies or alternate technologies, such as desalination or air cooling for power stations, a potential additional source of high priority supply to the Callide area would be water piped from a future Nathan Dam.

3.3.4 Upper Dawson

In the Upper Dawson future high priority demands are expected to be met from Nathan Dam.

There is also a proposal to release unsupplemented water, following finalisation of the Nathan Dam project.

Short to medium term

It is expected that the projected mining demands identified in Section 2 of the strategy could be met by the Nathan Dam development.

If Nathan Dam has not been constructed before these mines plan to commence operation, there are a number of alternative options that could be considered. For example, supply from groundwater including the Great Artesian Basin, or water associated with coal seam gas extraction would be a possibility, in conjunction with water efficient processes.

The taking of water from the Great Artesian Basin is regulated through the Great Artesian Basin Water Resource Plan. The plan divides the Great Artesian Basin geographically into management areas and makes provision for the granting of unallocated water, subject to conditions limiting access to the water.

If groundwater or water from coal seam gas sources were insufficient, another option would be to raise the Glebe Weir which could provide a high priority water supply of up to 2000 ML/a (Figure 7). However, Glebe Weir would be flooded by the construction and filling of Nathan Dam, and hence this would be considered a temporary supply to be replaced by supply from Nathan Dam. It is expected that the weir raising would be a relatively high cost solution due to technical aspects associated with the raising. As such it would only be suitable for very high value uses such as coal mining.

It is expected that the area's agricultural demands will be met by release of unsupplemented unallocated water when the details of the Nathan Dam project have been finalised.

3.3.5 Gladstone and Discovery Coast

It is expected that the Gladstone area longer term future urban and industrial demands will be met primarily via a pipeline from the Lower Fitzroy system.

The area's projected growth in urban and industrial demands which are not met by demand management savings will require access to high priority supplies which can only be provided from new water sources.

It is expected that the majority of the area's additional urban and industrial demands in the longer term will be met from the Lower Mackenzie–Fitzroy River system via a pump station pipeline system linking the Fitzroy Barrage storage to the Gladstone Area Water Board's reticulation system. The possible timing of these developments would be a matter for the board to consider.

In these circumstances, part of the high priority allocation reserved for the Lower Fitzroy weir developments would be used to meet the Gladstone area demands. This strategy outcome is reflected in Section 3.3.2.

Discovery Coast

There would be potential for Miriam Vale Shire to access water, via a pipeline, to Gladstone. However, the Miriam Vale Shire Council’s preferred water supply strategy for the Discovery Coast is desalination and efficient use of water resources. The council has developed an integrated water strategy that comprised of a non-asset strategy (which incorporates pricing policy and regulation), a water supply strategy (based on the current supply plus desalination), a wastewater strategy and a water recycling strategy.

3.3.6 Comet–Nogoa–Upper Mackenzie

The area’s future water needs will have to be met by trading and demand management savings, as there is no unallocated water available in this area. Small volumes, for stock and domestic use and council road maintenance, can continue to be made available in accordance with the Fitzroy Basin ROP.

Some potential savings have been identified through reduction in system losses by lining distribution channels in parts of the Nogoa Mackenzie Water Supply Scheme. It is expected the water service provider, SunWater, in consultation with water users, will seek to have these savings converted to tradable water allocations.

Water trading is likely to provide the relatively small volumes required to meet coal mining demands in this sub-region without creating undue economic or social impacts. However, provision will be made for the conversion of medium priority water allocations to high priority water allocations in the Fitzroy Basin ROP, to facilitate such trading occurring.

Timing of the process to amend the Fitzroy Basin ROP rules relating to the conversion of water allocation priority groups is provided in Section 5.

In the Comet–Nogoa–Upper Mackenzie sub-region needs will have to be met by trading or efficiency measures as no further unallocated water is currently available.

3.4 Urban communities strategy

3.4.1 Supporting solutions for urban community water supplies

In areas with identified unallocated water, a reservation will be established for urban community needs.

Policy and program development is needed to address the challenge of balancing affordable water supplies and demand. This is of particular relevance in areas where there is strong competition for the scarce resource, such as there is in parts of Central Queensland.

While local governments appreciate that mines have often provided water for local governments' urban needs at limited cost, in the longer term, local governments are seeking a greater level of entitlement security and a more direct role in planning for their towns' future water requirements. The potential for improvements in allocation security and supply regimes will be explored, with a particular focus on towns supplied by mines, in the Isaac–Connors and Upper Mackenzie catchments.

3.4.2 Supporting solutions for small communities

The previous sections have outlined a water supply strategy at a regional and sub-regional scale that provides a framework within which water supplies for small communities can be considered.

To address the needs for smaller communities it is proposed that the Central Queensland Local Government Association coordinate a regional assessment of water demands in smaller communities and alternatives for meeting the demands. This study would investigate both specific solutions for individual small communities, and generic solutions that may be appropriate for a number of small communities within the study area.

The study would consider solutions involving new infrastructure or new water allocations as well as options for increasing the efficiencies of water use or accessing existing water allocations through trading. Consideration of the most appropriate water priority mix would also be included. Undertaking the study on a regional basis should provide significant efficiencies and cost reductions allowing a full range of options to be considered on a consistent basis.

The study would provide an initial assessment of opportunities for local governments to work collaboratively on:

- joint water supply options (such as pipelines)
- implementing consistent regulations (for example regulations relating to rainwater tanks)
- encouraging voluntary community adoption of best practice water conservation.

Undertaking a study on a regional basis would allow for funding under one of the State Government's financial assistance programs to be considered. These programs are designed to support councils working together to provide joint services.

The proposed study would require strong support from the local governments involved. Commitment by the local governments would need to include willingness to progress the study and the studies findings on a collaborative basis, and to provide partial financial support for the study.

The Queensland Water Directorate is a professional association, established as an initiative of local government water industry professionals. The directorate has indicated that they are prepared to provide some financial and in-kind support to the project if it has the support and commitment of the local governments. The Department of Natural Resources and Water has also indicated a willingness to provide in-kind support to the project.