

Submission Form

What aspects in the Statement of Proposals for the new draft water plan and water management protocol do you support?

We particularly welcome that the revised Water Plan will consult and take into account the requirements of Traditional Owners of the land. We expect that this will add to and reinforce many aspects that will assist in maintaining the health of the Burdekin.

We welcome the decision to expand the area of planning that will enable the new plan to take into account many key existing users and potential new users (industrial), as well as additional surface and groundwater supplies.

We also welcome the specific recognition of the impact of the Burdekin on the Great Barrier Reef World Heritage Area. At the same time, we believe that this should move further and examine land use resulting from water allocation and how this affects the Reef (detailed below).

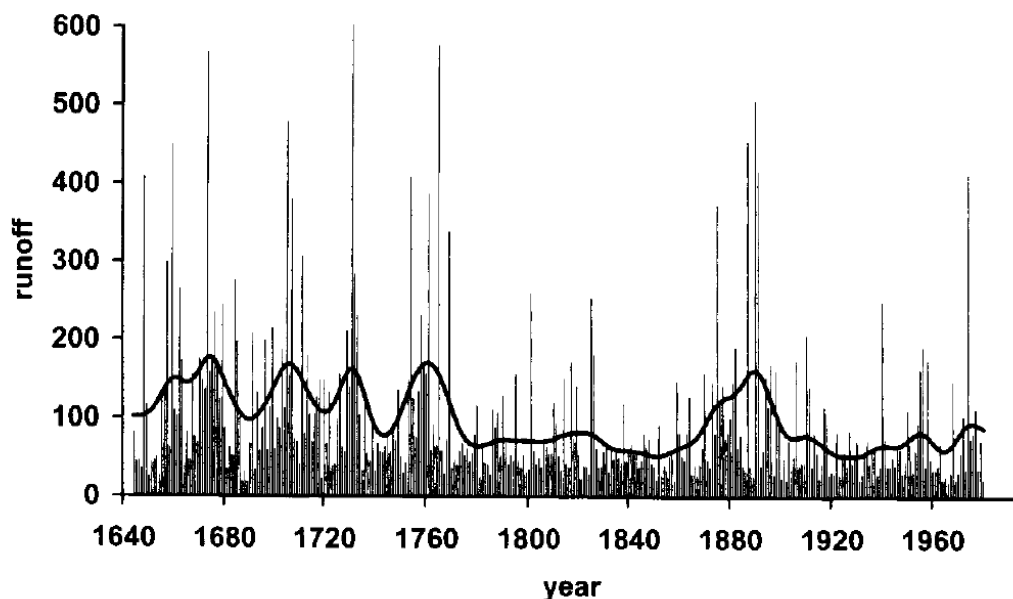
What issues concern you?

- RIVER HYDROLOGY, MORPHOLOGY AND COASTAL PROCESSES

Hydrology

The water yield from the Burdekin is highly variability and this variability can be expected to increase under the influence of climate change. It is noted that the modelling that informed the plan flow objectives in the 2007 plan was based on an assessment of historical flows from 1890 to 2004 and that the revised plan would be based on an updated hydrological model that includes additional information about flows in the Burdekin Basin since 2004 and that it will include the Ross River and Crystal Creek catchments.

This is a useful approach but our knowledge of water yield patterns in the Burdekin extends beyond the 1890–present – see Figure 1 and the attached 1998 Isdale et al paper¹.



¹ Isdale P.J., Stewart B.J., Tickle K.S and Lough J.M, 1998. Palaeohydrological variation in a tropical river catchment: a reconstruction using fluorescent bands in corals of the Great Barrier Reef, Australia. *The Holocene* 8(1), pp 1-8.

Figure 1. Annual reconstructed Burdekin River runoff 1644-1980 from Isdale et al 1998

The two outstanding features in Figure 1 are the extended wet and dry periods from the late 17th Century through to the mid 18th Century and from the late 18th Century through to mid 19th Century respectively. Clearly, the reappearance of such extended periods of either dry or wet conditions would have considerable implications for the environment, agriculture, industry and key urban areas. With this high existing variability and the further uncertainty associated with the impacts of climate change, a conservative approach to water allocation based on median rather than average water yield values and stress tested against both extended dry and extended wet scenarios would seem to be useful.

RIVER MORPHOLOGY and COASTAL PROCESSES

A body of anecdotal information suggests the status of the riverbed has changed dramatically following the construction of the Burdekin Falls Dam. In some sections, local residents have photographic evidence that the riverbed has changed from a stony bed to a deep sand bed. The accumulation of sand in the river has been measured by surveying the riverbed elevation on four transects close to the Inkerman bridge in 2009 and 2021. From these it is estimated that sand accumulation is about 120,000t/yr resulting in raising the bed level by 1-6m according to the location. It has been suggested that this has increased flooding in the delta and may accelerate an avulsion event².

The export of sand to coastal areas has not been comprehensively measured. There are some short-term measurements made at the Inkerman bridge that suggests a sand flux of 300,000 t/yr. Recent reports from the Dept of Regional Development, Manufacturing and Water note that the sand accumulating in the Delta has increased. The thickness of the Cape Bowling Green sand spit is reducing. While there are several morphological processes in action, there are some indications the spit may be responding dynamically to flows of the Burdekin River and its delivery of sand in present time.

These issues could be resolved by modelling studies of the impact of existing and proposed dams on the incidence of high flow events under a range of climate scenarios and their influence on stream morphology and the transport of coarser sediments. These assessments should ideally include the compilation of a comprehensive sediment budget for the river below the Burdekin Falls Dam and provide a profile of sand movement in the lower Burdekin and along the coast. These assessments would aid evaluation of any responses that might require inclusion in the revised water plan and provide a more comprehensive baseline for future monitoring and research.

B ECOLOGY

The Queensland Water Act's definitions require water management that, amongst other things, "sustains the health of ecosystems, water quality, water dependent ecological processes and biological diversity associated with watercourses, lakes, springs, aquifers including, where practical reversing degradation where that has occurred" (Section 2(2)(c)).

Some of these issues have been addressed in the 2007 Water Plan, though both the summary of the Minister's performance assessment reports (page 9) and the review of existing management arrangements (pages 12-13) identify areas where improved outcomes are required. In the Minister's assessment reports, these included further targeted research to improve knowledge of critical flows enabling ecological connectivity, research to determine the scheme's impact on riverine morphology, the flow regime required to support fish passage to the mouth of the Haughton River, and observed die-back of riparian vegetation and overall freshening of water in Barratta Creek and other estuaries.

The review of existing management arrangements also identifies these areas but gives emphasis to supporting the habitats of native plants and animals and migratory birds in watercourses, floodplains, wetlands, lakes and springs and maintaining flood flows to both facilitate the movement of aquatic fauna within the basin and between the basin and the marine environment and deliver the water and nutrients needed to support river-forming processes.

² Wolanski, E., hopper, C (2022) Dams and climate change accelerated channel avulsion and coastal erosion and threaten Ramsar-listed wetlands in the largest great barrier reef watershed. *Ecohydrology and hydrobiology* 22 (2022) 197-212.

These issues will no doubt be given attention in the ecological modelling and other studies foreshadowed on page 18 of the Statement of proposals. However, these studies also need to consider that, at 6% formal conservation coverage, the Basin as a whole is not well conserved by international standards such as the 30/30 target adopted by the 15th Conference of the Parties of the Convention on Biological Diversity and endorsed by the Australian Government³. In addition, there has been little systematic protection of riparian, instream and inland lakes, springs and wetland ecosystems within the formal conservation network.

The previous plans have focussed on water flows. To complement this and give clarity and purpose, the Plan should identify key species at risk and the habitats upon which they are dependent and their relation to water flow and WATER QUALITY. It is preferable when developing conservation measures to species 'assemblages' rather than individual species, but for the purpose of illustration, examples of key species are listed below

- Small-headed grunter, *Scortum parviceps* – endemic to the freshwater sections of the Burdekin River (i.e., it occurs in no other catchment anywhere) and is therefore of great importance.
- Irwin's turtle (*Elseya irwini*) – is a rare species, probably endemic to the Burdekin River, and of great importance. It is impacted by poor water quality (fine suspended sediments) discharged from the Burdekin Dam and is one of several species in the Burdekin River whose nests probably suffer from drowning as a result of variable flow releases from the dam.
- Longfin eel, *Anguilla reinhardtii* – is now prevented from reaching much of the upper catchment by the Burdekin Falls Dam. Prior to the construction of the dam, it was one of, and probably the only, fish species that could negotiate the Burdekin Falls. It is a somewhat iconic species as adults migrate from fresh waters (including small headwater streams) to the Coral Sea close to New Caledonia to breed. Its juveniles return to fresh waters and migrate upstream, where they are major predators. Its loss from much of the Burdekin River is very unfortunate and should be addressed.
- Barramundi, *Lates calcarifer*, is a well-known and prized species for fishers and diners. It typically uses fresh waters for much of its development and relies on good environmental quality in rivers, creeks and wetlands. It is a species worth focusing on because it indicates good conditions, including connectivity within catchments.
- Platypus, *Ornithorhynchus anatinus*, another iconic Australian species. It represents a small group of primitive mammals, the monotremes, which are only found in Australasia. It occurs in upland streams in wetter parts of the Burdekin catchment – especially to the north in the southern Wet Tropics, and to the south in the Clarke Range, west of Mackay. Although it may not be threatened currently, it is uncertain how climate change will affect its habitat and food chain.
- Eastern curlew (*Numenius madagascariensis*), Brolga (*Antigone rubicunda*) and Magpie goose (*Anseranas semipalmata*) are three of many bird species inhabiting one of the most extensive, and therefore important, areas of wetland on the Australian east coast, including the Ramsar-listed tidal wetlands. The curlew, a shorebird, is of special interest because of its threatened status due to development and loss of habitat, both in Australia and elsewhere on its migratory pathway.

³ Richard G. Pearson, Aaron M Davis and R. Alastair Birtles, 2022. The Burdekin River: a review of its ecology, conservation and management. Tropwater Publication 22/06. James Cook University, Townsville. 32pp.

This could be managed by assignment of conservation rating based on habitat, biodiversity and connectivity characteristics via hydrogeomorphic typology and conservation values for all sections of the river. This would tend to accommodate conservation of assemblages and not only specific species.

As part of the additional assessment, options for enhanced protection of water dependent ecosystems and biodiversity should be identified. These should aim to identify key water dependent areas or features that need additional protection through either formal preservation or specific attention in the revised water plan itself – Pearson et al outline approaches that may be taken for such assessments⁴. This should include areas outside of the main river flow which are dependent on Burdekin flow, such as the Kinrara wetlands.

C. Demand and use of applied water

C1 Overall use of Burdekin Water

The BBWP was drafted in 2007 some years after the completion of the Burdekin Falls Dam. At that point there was an evident excess of water over the expected demand, mainly for irrigated agriculture. There is almost an implicit objective to use 'all water available' once environmental flows etc. are met. Using water to its 'maximum' encourages new applications which, with climate change, may result in those applications and associated investments to be threatened, and indeed also threaten existing established users.

C2 Consideration of associated land use resulting from water allocations

The current BBWP focuses on 'in-river' issues and does not explicitly consider the impact of those water allocations and subsequent use on associated domains. While the management of these associated domains may be outside of the jurisdiction of DRDMW or the Plan itself, there is implicit recognition within the "Statement of Proposal" that such issues should be considered. This is so for; (a) groundwater (p9); (b) consideration to the "type, location, purpose and volumes of water to be given to future demands" (p16), and (c) the Great Barrier Reef (p20). Even so, the Statement where it does refer to these issues, tends to do so in terms of the 'flows' of water, whereas it is the land use, agriculture and associated application of nutrients, that is damaging to both the Ramsar Bowling Green Bay Wetlands, and the GBR lagoon. New infrastructure proposed on the basis of expanded agriculture, would add tens of thousands of ha of cultivated land generating additional nutrient discharge to the GBR. While approvals of such proposals are not the role of DRDMW or the Plan, the plan should require explicit description of land use derived from water allocations to be made, along with reference to the appropriate regulation and jurisdiction that administer these.

C3 Water efficiency

As noted above (C1) water use for agriculture has been used liberally, emerging from an era when demand was relatively small compared to that stored by the BFD. The demand scenario is changing rapidly, which, along with climate change, is leading to predicted reduced surface flows to supply the dam. The National Productivity commission's "National Water Reform 2020" highlighted the need to move towards water efficiency ahead of construction of water storage infrastructure.

The 24 June 2014 version of the BBWP in Part #7 "Implementing and amending this plan", section #89, (a) / (i) parts B and C, included requirements that the Minister consider "water efficiency of existing and future allocations" and "water savings that may be made from improvements in efficiency of water use". This provision has been repealed and is absent from the current version (18 September 2020). These provisions were made mainly with a concern for the volumes of water being used. New practices for managing irrigation now make this both technically and economically attractive. This is outlined in a chapter⁵ in a forthcoming book "Oceanographic Processes of Coral Reefs – physical and biological links in the Great Barrier Reef", (included with this submission). If water efficiency were enabled in the Lower Burdekin, it would; save over 100,000 ML (about 20% of the current use); reduce the rise in water table at its source; and reduce nutrient flows through Bowling Green Bay Wetlands and into the GBR lagoon. Similar consideration should be made towards use of town water in the residential centre of Townsville, which currently is more than double the per capita use of southeast

⁴ Pearson, R.G., Davis, A.M. and Birtles, R.A., 2022. Enhancing whole-of-river conservation. *Marine and Freshwater Research* 73, 729-741.

⁵ Pathways to improved water quality in the GBR lagoon – exploring opportunities for broadscale application of low-risk practices in the Lower Burdekin irrigated agriculture areas, Attarde, S., Connell, .G., Chaiech, T.

How do you think the draft new water plan can be improved to address these or other issues?

(Please note the scope of the new water plan is limited to the management and allocation of water. Any issues or comments relating to the assessment or approval of infrastructure proposals should be referred to the Office of the Coordinator-General. For more information please visit: www.statedevelopment.qld.gov.au/coordinator-general)

In relation to A

- Ensure that the Plan takes into account both the Basin's high natural variability and the likely changes in rainfall patterns due to climate change. The revised plan should include water allocation strategies that cope with extreme and longer periods of drought. The plan should ensure that all users are aware of these patterns, and includes triggers that will govern allocations and protect environmental values.

In relation to B.

- Develop a map the ecological significance of all important species and habitats along the Burdekin, rating them in terms of significance and their vulnerability to a range of weather scenarios, including short-term variability and longer-term cycles
- Develop criteria for water quality requirements, aligned with the ecological maps above, required for those species assemblages and their habitats to thrive.

In relation to "C. Demand and use of applied water"

Consideration of 'water efficiency' is thus highly relevant to the BBWP in terms of (a) building resilience to drought and climate change, (b) setting terms for a national trend towards water efficiency paradigm, (c) determining the volume of water for competing interests, and (d) indicate how this would align with the GBR 2050 Plan.

- The new BBWP should be framed by the intention to achieve water efficiency by the users of all its water allocations, with approvals to be dependent of agreed efficiency standards, to be implemented over a defined period of years. [such requirements would be similar to standards for community standards for noise pollution etc.]
 - Proposals for water allocation should be required to specify the intended land use and expected impacts on downstream water quality, and the regulations and jurisdiction that apply.
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A water consultation group may be formed by DRDMW to assist in identifying water management issues, reviewing information, reporting on community perception or to provide advice on behalf of the community/representative groups in relation to the draft new plan.

Do you wish to nominate to participate in a water consultation group?

☒ Yes ☐ No

If yes, please provide any additional details about the stakeholders/area you would best represent.

NQCC represents over 1500 supporters throughout the North Queensland region, who are interested in the long-term health of the natural environment.

Do you have comments on the proposed consultation arrangements?

There is a very great need for some degree of public education on basic characteristics of Burdekin flows, opportunities and constraints. There are increasing demand on water, both legitimate expanded agricultural and new industrial uses. In addition, there have been a series of vexatious proposals for new infrastructure (Urannah Dam and Hells Gates Dam). In the vacuum of public understanding of the limitations of the Burdekin system, these gain popular support. To avoid confrontation, these proposals are entertained, and very substantial public funds are spent on feasibility studies and detailed business cases. This amounts to approximately \$100M for the current crop (see attached document). Furthermore, despite the excellent performance of Queensland Government's relevant entities in managing and assessing these proposals, there is a real chance they could be funded for political reasons, with consequent irreparable damage to the Burdekin Basin.

Thus, we urge that the review process include a mix of the following initiatives:

- Development of 'info brochures' with easily accessible info (pictorial) on Burdekin hydrology and issues to general public and specific stakeholder groups
- Deliberate campaign to disseminate these to specific stakeholder groups and general public in popular media
- Public fora and seminars with both invited and open access to allow views to be expressed and tested

Altogether these will also provide a resource that can be employed in the future as required. NQCC would be well-placed to help facilitate the distribution of such information to the community.

☐ Please tick this box and attach a detailed submission if more space is required.

Checklist