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MURRAY-DARLING BASIN AUTHORITY



Agenda Item 7.5 of Meeting 30 – 5 April 2011

FOR DECISION

7.5. Treatment of Climate Change in the Basin Plan

Purpose of Paper:

1. To seek agreement to a revised policy on the treatment of climate change in the Basin Plan.

Recommendations:

2. It is recommended that the Murray-Darling Basin Authority (MDBA) adopt the following resolutions:
 - (a) **notes** that the environmentally sustainable level of take (ESLT) is being developed based on 114 years of historical climate data;
 - (b) **agrees** to attribute 0% to the climate change component of risk allocation as it is not possible to distinguish a long term climate change signal from climate variability.
 - (c) **agrees** that rather than specifying an allowance in the reduction required to meet an ESLT, any reduction that is due to climate change will occur through reduced access to water over time resulting from the standard procedures of the water resource plans, and as a result water users will bear the risks of reduced water availability due to climate change; and
 - (d) **notes** that allowing water users to bear the risk of reduced water availability due to climate change is consistent with the National Water Initiative and the *Water Act 2007*.

Background:

3. At Meeting 27, the Authority agreed to consider adjustment to the surface water sustainable diversion limit (SDL) policies, including the climate change policy, prior to the release of the proposed Basin Plan (refer Agenda item 7.1). At Meeting 29a, the Authority noted an update on the review of the climate change policy (refer Agenda item 3.2).
4. The reduction considered as necessary to achieve an environmentally sustainable level of take (in the Guide), included a 3% allowance to account for the impacts of climate change. This allowance was determined as part of the broad consideration of the range of reductions in current diversion limits. The uniform 3% allowance was based on a proportion of the estimated average 10% decline in water availability under a median 2030 climate scenario.
5. The Guide also proposed accreditation requirements for water resource plans to ensure that these plans are responsive to climate change. In particular, the Authority proposed accreditation requirements based on the 'principle of equitable sharing' of any reductions in water availability between consumptive and environmental uses. This approach was designed to address the situation where most water resource plans are biased towards allocation for consumptive use under drier future climate scenarios.

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6. Modelling of the predicted impact of climate change on groundwater under the median 2030 climate change scenario shows no strong deviation from historical median recharge. Accordingly, groundwater planning for the Guide did not include an allowance for climate change. No change is proposed to that approach and this matter is not discussed further in this paper.

Consideration of the Issues:

7. Climate change issues intersect with the following elements of the Basin Plan:
 - (a) the selection of a climate baseline for hydrological modelling;
 - (b) the use of this baseline to determine an environmentally sustainable level of take;
 - (c) the allocation of risks (payments) in relation to reduced water availability; and
 - (d) water resource plan accreditation requirements.

Feedback on the approach in the Guide

8. CSIRO was supportive of the Authority's use of 114 years of data (1895 – 2009) for the climate baseline. However, CSIRO criticised the use of a uniform application of a 3 % allowance in the overall reductions in current diversion limits because it oversimplifies climate change projections and is based on logic that is unclear.
9. The Victorian Government, CSIRO and others, suggested that more analyses should have been done on environmental water requirements under a range of possible future climate scenarios, particularly drier scenarios.
10. There was also criticism that the proposed approach means that entitlement holders are affected twice. Firstly, because climate change is included in the calculation of the sustainable diversion limits and again through reduced allocation announcement as a result of reduced water availability as the climate changes. Concerns were also raised about the additional impacts on the reliability of entitlements that would occur if the 'principle of equitable sharing' is applied.
11. The criticism of the treatment of climate change, particularly from the CSIRO which provided related advice in the development of the Guide, appears valid and there is evidence to support the development of a revised climate change policy.

Selection of the climate baseline

12. In 2009, the Authority sought advice from the CSIRO on the issue of climate scenarios for Basin Plan hydrologic modelling. A key finding of the report was:

"The central question to defining climate scenarios for the Basin Plan is how much of the current prolonged drought in south-eastern Australia can be attributed to global warming, and therefore can be treated as the start of a persistent change from historical conditions. Several research studies have suggested that at least part of the current drought is associated with global warming, but it is difficult to separate a global warming signal from the high natural climate variability." Chiew FHS, Cai W and Smith IN, 2009. Advice on defining climate scenarios for use in Murray-Darling Basin Authority Basin Plan modelling, CSIRO report for the Murray-Darling Basin Authority.
13. The CSIRO report also noted that given the difficulties associated with separating a global warming signal from the high natural climate variability, the South Eastern Australian Climate Initiative (SEACI) recommended that the climate baseline is better defined using either
 - (a) The longest possible climatic record including drier periods; or
 - (b) a running baseline based on the past 30 years data.

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14. The Authority's decision in 2009 to select the period 1895-2009 as the climate baseline was considered the most scientifically credible option. This long climatic sequence takes into account the extremes of climate experienced in the past, including three prolonged drought periods (the 'Federation' drought around 1900, the "World War Two' drought around 1940, and the recent dry conditions) and has similar mean annual rainfall and mean annual runoff as the past 30 years.

Intersection of the environmental sustainable level of take (ESLT) and climate change

15. It should be noted that the level of reduction in current diversion limits required to ensure an ESLT is being developed based on the historical climate sequence from 1895 -2009.
16. The advice from the CSIRO suggests considering a range of possible scenarios to assess robustness and resilience of planning arrangements and environmental outcomes under various future climate projections. While undertaking this analysis is desirable, it is not considered necessary or feasible (due to timing constraints) for the proposed Basin Plan. Furthermore, the focus of the first Basin Plan is on restoring the overall balance between consumptive and environmental uses. More detailed exploration of climate change effects can be considered for future amendments to the Basin Plan as the science around climate change and ecological responses to climate change continues to improve.

Intersection of risk allocation and climate change

17. Clauses 48 – 50 of the National Water Initiative (NWI) provide a risk assignment framework to apply in any future reductions in the availability of water for consumptive use (**Attachment A**). Clause 48 of the NWI deals specifically with the risks associated with climate change. The clause states that water access entitlement holders are to bear the risks of any reduction or less reliable water allocation, under their water access entitlements, arising from reductions to the consumptive pool as a result of seasonal or long-term changes in climate.
18. The NWI risk assignment framework is reflected in the *Water Act 2007* (refer section 74A and Schedule 3A).
19. For the first Basin Plan many of the potential impacts of climate change (e.g. changes in volume and timing of water availability) can be dealt with through existing planning procedures (e.g. allocation announcements). Using this approach is consistent with the risk assignment framework in the NWI and the *Water Act 2007*.
20. Section 75 of the *Water Act 2007* requires the Basin Plan to specify the Commonwealth's share of any reduction in current diversion limits that is attributable to changes in Commonwealth policy and improvements in knowledge. The Act does not require the Basin Plan to specify a reduction that is attributable to climate change, rather it is a consequence of determining the Commonwealth's share of the risk.
21. Consequently, it is considered appropriate to specify a figure of 0% to the reduction that it is attributable to climate change, albeit not formally in the Basin Plan as it is not required under the Act. The attribution of 0% reflects climate change considerations do not influence the scale of change under consideration by the Authority. It will be important to emphasise that it should not be interpreted as not dealing with this issue.

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Intersection of water resource plan requirements and climate change

22. The approach proposed in this paper is consistent with the policy that accreditation requirements should be established to remove or minimise impacts on reliability of entitlements. In discussing this policy, the Authority agreed that accreditation requirements should be established to remove or minimise impacts on reliability of entitlements, except in regard to climate change (refer to draft minutes of Meeting 29a, Agenda item 3.1). Further discussion of this issue is in agenda paper 7.8.

Long-term future climate scenarios

23. Modelling carried out by the Authority for the Basin Plan shows that Basin-wide water availability decreases by 10% under a median 2030 climate scenario, 27% under a dry scenario, and increases by 9% under a wet scenario. The assessment also shows a clear trend when moving from the northern end of the Basin to the south – generally the southern regions experience a larger proportional decrease in water availability under a median climate and a smaller range in future climate values. The northern regions display a smaller increase under a 2030 median climate scenario. However, the range of future climate values (and the uncertainty) is greater in the northern regions. A region-by-region summary of the 2030 climate results is at **Attachment B**.
24. With respect to long-term future climate scenarios three key issues should be noted:
- (a) while rainfall is generally not adequately simulated in current Global Climate Models (GCMs), in the southern Basin GCMs are reasonably consistent in predicting reduced rainfall in the future. Nonetheless, regional climate projections remain highly uncertain and hydrologic projections based on the range of possible climate futures are even more uncertain.
 - (b) given the various elements of climate change analysis (multiples of future scenarios emissions trajectories (or warming), climate models, scaling methods and catchment models) very high estimates of cumulative uncertainty do accumulate and this may preclude reaching effective conclusions about future water management; and
 - (c) defining defensible probabilities for different future climate scenarios is currently not possible and it is preferable for scenarios to be simply considered as descriptions of plausible futures.
25. Notwithstanding the issues noted above, climate change scenarios can provide water users with information that they can use to assess the potential for climate change to impact on their own water availability.

Key communications messages

26. External communication on this matter should make it clear that:
- (a) the 1895 -2009 period that was used to develop sustainable diversion limits offers a long sequence for modelling, and takes into account the extremes of climate experienced in the past, including three prolonged drought periods;
 - (b) the approach is consistent with the National Water Initiative (i.e. that water users will bear the risk of reduced water availability due to climate change);
 - (c) The Authority will continue to work cooperatively with organisations, such as the CSIRO and SEACI, to improve our understanding of climate change impacts on water availability and the environment;

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- (d) Given the scale of change being considered for the first Basin Plan relative to the predicted impact of climate change and the associated uncertainty, the extent to which existing water sharing arrangements can deal with climate change is considered adequate;
- (e) The absence of ascribing a particular reduction that is due to climate change in the Basin Plan is not a reflection of a view that climate change is not occurring, rather it is an acknowledgement that any climate change impacts for the Basin Plan are more appropriately dealt with through existing planning arrangements (e.g. allocation announcements).

Proposed Engagement (including BCC):

- 27. The Authority will continue to consult with the Basin States to develop the climate change policy and will also consult with the CSIRO and the BCC.

Development Working Group Comments:

- 28. The Development Working Group agrees with the essence of the recommendation; however it emphasised the need to be upfront about communicating this issue and its treatment under the proposed Basin Plan.

Chief Executive's Comments:

- 29. The recommendations are supported.

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Attachments:	
A: Clauses 48 – 50 of the National Water Initiative.	1 pp.
B: Table - Summary of average annual water availability results by region and for the Basin under median, dry extreme and wet extreme 2030 climate scenarios.	1 pp.

Clauses 48 to 50 of the National Water Initiative

48. *Water access entitlement* holders are to bear the risks of any reduction or less reliable water allocation, under their *water access entitlements*, arising from reductions to the consumptive pool as a result of:
- (i) seasonal or long-term changes in climate; and
 - (ii) periodic natural events such as bushfires and drought.
49. The risks of any reduction or less reliable water allocation under a *water access entitlement*, arising as a result of bona fide improvements in the knowledge of water systems' capacity to sustain particular extraction levels are to be borne by users up to 2014. Risks arising under comprehensive *water plans* commencing or renewed after 2014 are to be shared over each ten year period in the following way:
- i) *water access entitlement* holders to bear the first 3% reduction in water allocation under a *water access entitlement*;
 - ii) State/Territory governments and the Commonwealth Government to share one-third and two-thirds respectively reductions in water allocation under *water access entitlements* of between 3% and 6%; and
 - iii) State/Territory and Commonwealth governments to equally share reductions in water allocation under *water access entitlements* greater than 6%.
50. Governments are to bear the risks of any reduction or less reliable water allocation that is not previously provided for, arising from changes in government policy (for example, new environmental objectives). In such cases, governments may recover this water in accordance with the principles for assessing the most efficient and cost effective measures for water recovery.