

1. Salinity and nutrient beneficial use objectives

a. California

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b. National

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EXAMPLE

b. International

Title: Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Author: Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand

Publication date: October 2000

Source:

http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

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Summary:

The government of Australia has established national guidelines for surface and groundwater as part of the National Water Quality Management Strategy. The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (WQG) were produced to provide guidelines for protecting water resources of a particular environmental value (use). The policies, strategies, and implementation of these guidelines are managed by the State, Territory or Commonwealth. The WQG is summarized below.

Water quality guidelines have established trigger values that guide whether a water resource is of sufficient quality for a particular use. The guidelines in WQG apply to both surface and groundwater. The environmental values established in the WQG are aquatic ecosystems, primary industries including irrigation, livestock drinking water and aquaculture, recreational water, and drinking water. Some values in WQG represent adequate quality while other values represent triggers for investigation resulting in remediation or an appropriate guideline for that use. In some situations numerical criteria have been established while for other situations flow charts to guide decisions have been developed to determine the criteria at a local level. In both situations the Australian government has approached guidelines from two perspectives either the trigger value may represent a loading rate or was established through a risk-based tolerance level for a species or ecosystem.

Table 1: Summary of Environmental Values (Uses) and Water Quality Guidelines for Australia and New Zealand

Beneficial Use	Subdivision	TDS	Nitrate	Nitrite	Boron	Sodium	Chloride
Aquatic Ecosystems	See table below ⁵	<3,000 mg/L ^a	17 µg/L; 1700 µg/L; 3400 µg/L; 17,000 µg/L ^{b,c}	No data	90 µg/L; 370 µg/L; 680 µg/L; 1300 µg/L ^b	No data	No data
Recreational and aesthetics¹		1,000,000 µg/L	10,000 µg/L (as N)	1,000 µg/L (as N)	1,000 µg/L	300,000 µg/L	400,000 µg/L
Drinking water²		500 mg/L (aesthetic)	50 (as nitrate)	3 (as nitrite)	4 mg/L (1 mg/L in uncontaminated source)	180 (aesthetic)	No data
Primary Industry	Livestock drinking water	Based on tolerance of individual species ^d	<400 mg/L avoid water >1500 mg/L ^e ; 30 mg/L ^f	No data	5 mg/L	No data	No data
Primary industry	Irrigation water ³	Based on tolerance of crops for TDS, chloride, and sodium ^g	5 mg/L ^h ; 25-125 mg/L ^{i,j}	No data	0.5 mg/L ^h ; based on crop sensitivity ⁱ	No data	No data
Primary industry	Aquaculture ⁴ and human consumption of aquatic foods	<3,000 mg/L ^a	<50,000 µg/L (as NO ₃)	<100 µg/L (as NO ₂)	No data	No data	No data
Industrial water	The current guidelines do not provide guidance as industry requirements vary widely and other environmental values tend to drive the management of the particular resource.						

Environmental Value footnotes relative to Beneficial Uses:

¹ Recreational waters containing chemicals that are either toxic or irritating to the skin or mucous membranes are unsuitable for recreation. Specific guidelines for these waters are given above. For primary and secondary contact.

² Guidelines refer to levels at point of use ([National Water Quality Management Strategy Australian Drinking Water Guidelines 6, 2004](#)).

³ Nutrient levels are established to maintain crop yield, prevent bioclogging of irrigation equipment and minimize off-site impacts. Concentrations should be less than recommended trigger values.

⁴ Aquaculture includes food (fish and shellfish) for humans, fry for recreational and natural fishing, ornamental fish or plants, raw material for energy and biochemicals, and items for fashion industry.

Footnote 4 Table:

Ecosystem	Location	Salinity uS/cm	TN ug/L	NO_x ug/L
Upland River	SE Australia	30-350	250	15
	SW Australia	120-300	450	200
	Tropical Australia	20-250	150	30
	South central Australia (low rain)	No data	No data	No data
	New Zealand	No data	295	167
Lowland River	SE Australia	125-2200	500	40
	SW Australia	120-300	1200	150
	Tropical Australia	20-250	200-300	10 (north 5 ug/L)
	South central Australia (low rain)	100-5000 (depends on flow)	1000	1000
	New Zealand	No data	614	444
Freshwater lake and reservoirs	SE Australia	20-30	350	10
	SW Australia	300-1500	350	10
	Tropical Australia	90-900	350	10 (north 5 ug/L)
	South central Australia (low rain)	300-1000	1000	100
	New Zealand	No data	No data	No data
Wetlands	SE Australia	No data	ND	ND
	SW Australia	No data	1500	100
	Tropical Australia	No data	350-1200	10
	South central Australia (low rain)	No data	No data	No data
	New Zealand	No data	No data	No data
Estuaries	SE Australia	No data	300	15
	SW Australia	No data	750	45
	Tropical Australia	No data	250	30
	South central Australia	No data	1000	100

	(low rain)			
	New Zealand	No data	No data	No data
Marine	SE Australia	No data	120	5
	SW Australia	No data	230	5
	Tropical Australia	No data	100	2-8 (lower value for Great Barrier Reef)
	South central Australia (low rain)	No data	1000	50
	New Zealand	No data	No data	No data

⁵ Salinity, Total Nitrogen and NO_x Guidelines for Ecosystems in Australia

Water Quality Guideline footnotes relative water quality objectives:

^aFreshwater production

Tolerances of livestock to total dissolved solids (salinity) in drinking water^a

Livestock	Total dissolved solids (mg/L)		
	No adverse effects on animals expected	Animals may have initial loss of production and a decline in animal condition and health be some scouring, but stock would be expected to tolerate these levels for short production periods if introduced gradually	
Beef cattle	0–4000	4000–5000	5000–10 000
Dairy cattle	0–2500	2500–4000	4000–7000
Sheep	0–5000	5000–10 000	10 000–13 000 ^b
Horses	0–4000	4000–6000	6000–7000
Pigs	0–4000	4000–6000	6000–8000
Poultry	0–2000	2000–3000	3000–4000

^a From ANZECC (1992), adapted to incorporate more recent information

^b Sheep on lush green feed may tolerate up to 13 000 mg/L TDS without loss of condition or production

^b The trigger values for freshwater represent the percent of species protected when the respective boron or nitrate level is applied. The levels of protection are 99%, 95%, 90% and 80%, respectively. Application of the trigger values and protection level is described in the WQG and guidance using a decision tree is used for application of this guidance level for a particular location.

^cTable provides additional guidance as to the salinity, total nitrogen (TN), and oxides of nitrogen (NO_x) for specific ecosystems and their locations within Australia or New Zealand.

^d Table from National Water Quality Management Strategy

^eNitrate

^f Nitrite

^gWater quality trigger values are considered inappropriate for general application. Evaluation of the criteria for a particular crop must consider crop type, salt tolerance level, soil characteristics, soil and water management practices, climate, and rainfall.

^hLong term trigger value is the maximum amount of contaminant that can be tolerated with 100 years of irrigation based on a specified loading rate.

ⁱShort term trigger value is the maximum amount of contaminant that can be tolerated with 20 years of irrigation based on a specified loading rate.

^jShort term trigger value with a specific site-assessment protocol.

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