

# Shoal Bay and Buffalo Creek

## Summary

Water quality in outer Shoal Bay was in excellent condition. Water quality at Shoal Bay upper estuary monitoring sites was in moderate condition. Water quality at freshwater sites was in very good condition for the 2011 reporting year. The water-bug community at the biological monitoring sites was assessed as similar to reference condition at two sites and significantly impaired at two sites. Water quality at the estuary monitoring site in Buffalo Creek was in very poor condition. For some water quality indicators in Buffalo Creek, water quality objectives were greatly exceeded.



## Nature of system

- Shallow embayment with series of sandbars changing with tides
- Possible light limitation of upper reaches of the estuary/marine waters during the wet season
- Perennial freshwater inflows from Howard River







































## Potential sources of pollution

- Wet season diffuse source loads from the Howard and Shoal Bay sub-catchments
- Sediment and nutrient loads are high with runoff during the wet season
- Sewage treatment plant wastewater discharges to upper Buffalo Creek. Of note, in October 2011, the Territory Government improved and modernised the licensing regime for sewage treatment plant discharges into Darwin Harbour, including by increasing the monitoring and reporting requirements and focussing on improvements in wastewater discharge quality over time.











*Aerial view across part of southern Shoal Bay region towards Buffalo Creek and Darwin Hospital.  
Photo: Barry Ledwidge*

Shoal Bay freshwater and marine water quality

Indicator and units	Freshwater		Outer Marine		Upper Estuary Marine	
	Water quality objective	Compliance	Water quality objective	Compliance	Water quality objective	Compliance
 <b>Electrical conductivity</b> (µS/cm)	<200	23 	NA		NA	
 <b>Turbidity</b> (NTU)	<20	3.9 	NA		NA	
 <b>pH</b>	6.0–7.5	6.8-7.3 	7.0–8.5	7.8-8.2 	6–8.5	7.7-8.1 
 <b>Dissolved oxygen</b> (%)	50–100	79-88 	80–100	*	80–100	*
 <b>Total suspended solids</b> (mg/L)	<5	3 	<10	*	<10	*
 <b>Chlorophyll a</b> (µg/L)	<2	0.25 	<2	1 	<4	3 
 <b>NOx</b> (µg N/L)	<8	4 	<20	2 	<20	2 
 <b>Ammonia</b> (µg N/L)	NA		<20	5 	<20	25 
 <b>Total nitrogen</b> (µg N/L)	<230	165 	<270	150 	<300	310 
 <b>Total phosphorus</b> (µg P/L)	<10	10 	<20	5 	<30	45 
 <b>Filterable reactive phosphorus</b> (µg P/L)	<5	6.5 	<5	2 	<10	6 
<b>Number of samples</b>		4		8		8
<b>2011 rating</b>						
<b>2010 rating</b> (2009 data)		B		A		C
<b>2009 rating</b> (2001–2008 data)		C		A		C

Note<sup>1</sup>: (nd). Limited or no data available Note<sup>2</sup>: (NA). Not applicable, no WQO developed \* WQO currently under revision.  
 Note that many of the median nutrient concentrations for the Shoal Bay upper estuary marine sites at Mickett Creek and Howard River estuary only exceeded the water quality objectives by a small amount. For example, the median total nitrogen concentration for the Shoal Bay upper estuary marine sites exceeded the water quality objective by only 3%.

## Buffalo Creek marine water quality

Indicator and units	Water quality objective	Compliance
 pH	6–8.5	7.3–7.8 ✓
 Chlorophyll a (µg/L)	<4	45 ✗
 NO <sub>x</sub> (µg N/L)	<20	40 ✗
 Ammonia (µg N/L)	<20	1775 ✗
 Total nitrogen (µg N/L)	<300	2735 ✗
 Total phosphorus (µg P/L)	<30	548 ✗
 Filterable reactive phosphorus (µg P/L)	<10	326 ✗
<b>Number of samples</b>		4
<b>2011 rating</b>		
<b>2010 rating</b> (2009 data)		E
<b>2009 rating</b> (2001–2008 data)		E
<p>* WQO currently under revision.                      The Buffalo Creek monitoring site in the estuary is influenced by the treated wastewater discharged from the Leanyer-Sanderson sewage treatment plant outfall. The treatment plant is subject to a Waste Discharge Licence. The licensed mixing zone is yet to be fully determined. It is possible that the Buffalo Creek monitoring sites are located within the discharge mixing zone, and that the water quality objectives may not apply to this site. The Leanyer-Sanderson wastewater is treated by waste stabilisation lagoons utilising a combination of sunlight, micro-organisms and algae to break down the raw wastewater. The presence of elevated concentrations of chlorophyll in Buffalo Creek may be largely due to the algae present in the treated wastewater discharge.</p>		

## Biological health using the AUSRIVAS score

Site	2009	2010	Change
DW42	A	B	Change
DW43	B	B	No change
DW45	A	A	No change
DW70	A	A	No change



*Mangroves are a feature of Shoal Bay*