

Pooles's Lagoon 2010 Post Fencing Wetland Condition Assessment

Produced by Christina Howley for the South Cape York Catchments

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Doughboy (Yuku Baja Muliku Rangers)

17 November 2010

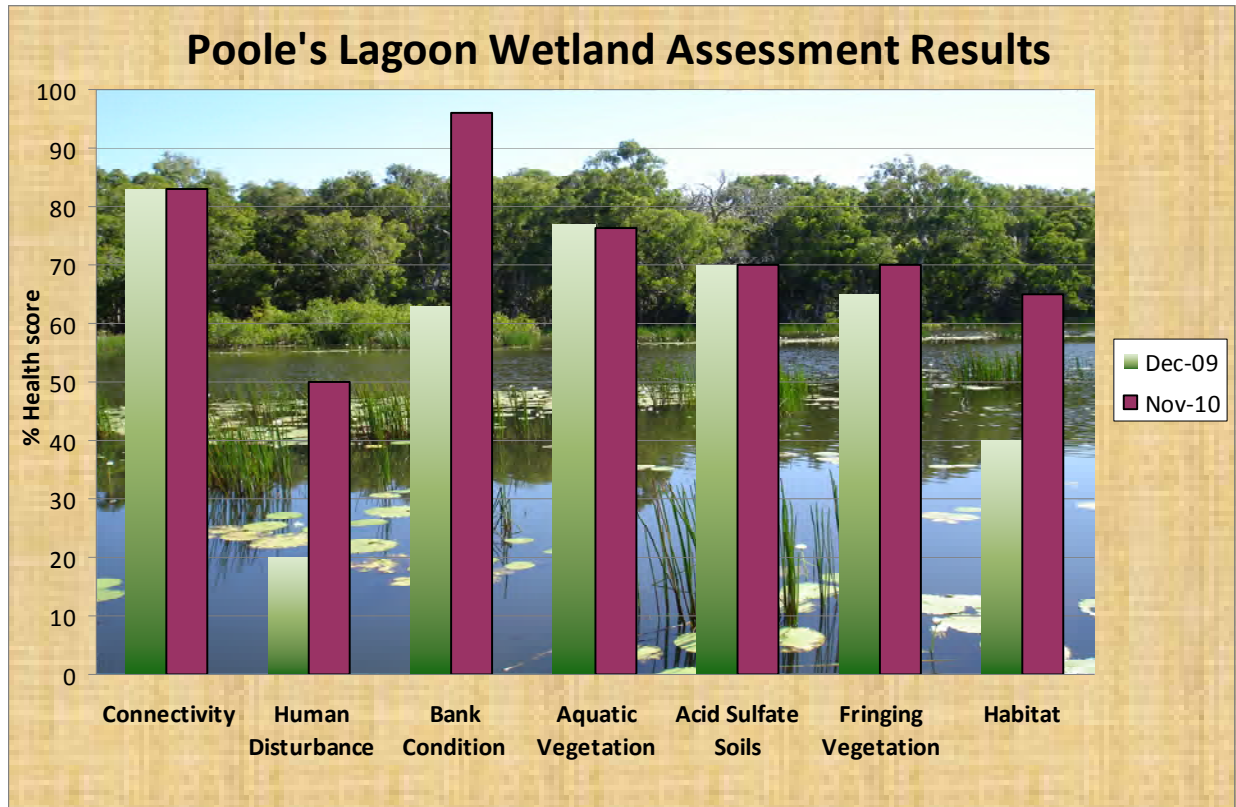
A wetland condition assessment was conducted at Pooles Lagoon on the 10th November 2010 in order to assess the health of the wetland since the construction of a feral pig and cattle exclusion fence around the wetland. Results from this survey will be compared with a similar survey conducted on the 22nd December 2009, and water quality monitoring conducted 14th November 2008, prior to construction of the fence. Both surveys were conducted in accordance with the Cape York Freshwater Wetland Assessment Methods (Howley & Stephan 2009).

Poole's Lagoon Wetland Condition Assessment Results Before and After Pig Exclusion Fence

Category:	Scores (%):	
	22-12-09	10/11/2010
Connectivity	83	83
Human Disturbance	20	50
Bank Condition	63	96
Aquatic Vegetation	77	76.5
Acid Sulfate Soils	70	70
Fringing Vegetation	65	70
Habitat	40	65
Average	59.7 %	72.9 %
Health Rating	Medium	GOOD

Wetland Health Rating Table (Bolton 2001)

Health rating	Score
Excellent	>85%
Very good	>75% - 85%
Good	>65% - 75%
Medium	>55% - 65%
Poor to average	>45% - 55%
Poor	35% - 45%
Very poor	<35%



Discussion:

The connectivity index describes how well the wetland is associated with surrounding wetland areas and other ecosystems. The connectivity index has four components – proximity, area, roads, and adjacent landuse (Keith Bolton 2001). Connectivity was assessed during the initial 2009 survey but has not been re-assessed as the relevant conditions have not been altered; therefore the connectivity score has remained the same. The wetland area was assessed at 3.5 hectares, with its closest wetland 4.3km away. The wetland is surrounded by natural ecosystems, with no adjacent human landuse or modification of the wetland drainage. There is approximately 100m of dirt track within 50 metres of the wetland. Wetland Connectivity is rated as “Very Good”.

The **Human Disturbance** index measures how much human impact there has been on the Lagoon. Factors include grazing, fire, weeds, rubbish, clearing, drains, domestic and feral animals, plant and bank removal. Prior to fencing, Poole’s scored an index rating of “Very Poor” (20 out of 100%) due primarily to the high level of impact from feral pigs, cattle, weeds and fire. In the current study, the level of human impact has been improved to “Poor to Average” (50%) due to the exclusion of pigs and cattle from the lagoon. There has also been some treatment of weeds including lantana which has helped to reduce the level of weed infiltration; however a wide range of weeds still occur around the wetland (See Fringing Vegetation Index).

The **Fringing Vegetation (CYMAG 2009)** index includes an assessment of riparian vegetation diversity, the number of weed species and amount of infiltration of weeds and the extent of the riparian zone. Pooles Lagoon received a score of 65% (“Medium”) before the fence was constructed, and 70% (“Good”) during the post-fence survey. The riparian vegetation was considered to be in-tact, with only minor clearing for a dirt track and for the exclusion fence. Between 26 (2009) to 29 (2010) riparian plant species were identified at the lagoon. A number of weeds were recorded during both surveys, including Sickle Pod, Snakeweed, *Sida acuta* and Pink Chinese Burr. Some weed spraying and removal had occurred before the second survey, and the spread of weeds such as Lantana and Sicklepod appeared to have been under control. However the clearing of a path for fence construction also allowed for the increase in weeds around the area of the fence.

Weed Species Observed during 2009 and 2010 Surveys at Pooles Lagoon

Weed Species	Common Name	Level of Infiltration	Comments
<i>Senna obtusifolia</i>	Sickle pod	Low	Treated by rangers, some still observed around the fence
<i>Urena lobata</i>	Pink Chinese Burr	Low	
<i>Lantana camara</i>	Lantana	Low	Removed by hand-only dead lantana observed
<i>Stachytarpheta sp.</i>	Snakeweed	Medium	
<i>Solanum sp.</i>	Devils fig	Low	No observed during 2010 survey
<i>Mimosa pudica</i>	Sensitive Weed	Low	
<i>Gotu kola</i>		Low	
<i>Sida acuta</i>		Low	
<i>Hyptis suaveoleans</i>		Medium	
<i>Hymenachne amplexicaulis</i>		Very Low	Removed by hand after survey

The declared weed *Hymenachne* was the only aquatic weed that had infiltrated the wetland (See Aquatic Vegetation Index).

The **Aquatic Vegetation Index** measures the diversity of aquatic plants, the percentage of the wetland surface covered by plants, and the number and level of infiltration of aquatic weeds. Pooles Lagoon received a score of 76.5% (“Very Good”) for Aquatic Vegetation in both 2009 and 2010. During the 2010 survey, seven species of aquatic vegetation were identified at Pooles. The dominant species was the white water lily (*Nymphae* sp.), which together with other aquatic plants covered approximately 75% of the surface of the lagoon. The high level of plant cover shades the water, helping to reduce water temperature, increase oxygen levels and provide shelter for fish and other aquatic animals. During the December 2009 survey, aquatic plant cover was only 15%. This may be related to the increased pig impacts and water turbidity, or just an indication of the highly variable nature of these wetlands.

Aquatic Plants Present at Pooles Lagoon Nov 2010

Aquatic Species	Common Name/ Description	Abundance
<i>Nymphaea sp.</i>	White Water Lily, most likely <i>Nymphaea Gigantea</i>	Dominant
<i>Nardoo sp.</i>		Abundant
<i>Eleocharis sp.</i>		Abundant
<i>Nymphiodes indica</i>	Water snowflake	Rare
<i>Myriophyllum sp.</i>	Submerged aquatic- species not confirmed	Abundant
<i>Azola sp.</i>		Rare
<i>Persicaria sp.</i>		Occasional

The only aquatic weed identified at the Lagoon was *Hymenachne amplexicaulis*. *Hymenachne* is a Weed of National Significance. It invades and chokes out wetlands. *Hymenachne* was not present at Pooles Lagoon prior to 2010 and seeds may have been transported to the Lagoon from the near-by Keatings Lagoon. Only a small patch (approximately 3x3 m) was observed during the 2010 survey. All *Hymenachne* present was removed by hand, however on-going monitoring and further treatment may be required as rhizomes or seeds may remain.

The **Habitat** index determines how effective this wetland is at providing habitat for native animals. The provision of habitat is a very important ecological role of paperbark wetlands, which can be great buffers and maintainers of biodiversity (Keith Bolton 2001). The index records evidence of fauna species and indicators such as fallen branches, leaf litter and holes in trees. In 2009, Pooles Lagoon achieved a “Poor” (40%) rating which may have been a function of the brief nature of the survey, the time of year and the level of human disturbance. In 2010, the Habitat Score had been improved to 65% (“Medium”). A thick layer of leaf litter, high number of fallen trees, large number of birds visiting flowering trees and numerous animal burrows and diggings not observed in 2009 contributed to the improvement in habitat value.

The Bank Condition index assessed during the 2009 and 2010 surveys includes the amount of feral pig or cattle impacts around the edge of the wetland, ground cover and signs of bank erosion. The Bank Condition Score increased from 63% (“Medium”) to 96% (“Excellent”). Prior to the exclusion of pigs and cattle from the wetland, an average of 97% of the wetland edge had been dug up by pigs, and 1.8 cattle hooves were observed per 0.5m² quadrat. During the 2010 survey, no pig diggings or cattle hooves were observed at any location. Ground cover (percent vegetative cover) increased from an average of 38.4% to 53.5%. There were no signs of erosion and the bank slope was shallow to moderate.

Cattle & Feral Pig Impact Survey*

	2009 (Before Fence)	2010 (After Fence)
Average Number of Cattle Hooves	1.8 per 0.5m ²	0
Percent of Ground Dug up by Pigs	97%	0
Vegetative Ground Cover (%)	38.4%	53.5%.

*Measured at 4 sites around the wetland, with 3 readings from each site, using a 0.5 m² quadrat



Pig Diggings at Pooles Lagoon – December 2009

Acid Sulphate Soils: During the 2009 survey, soil samples were collected from 3 locations around the edge of the wetland at depths from 0.5m to 1.5 m. Field tests were conducted for acid sulphate soils (ASS) using a 1:5 soil to DI water and potential acid sulphate soils (PASS) using 1:5 soil to peroxide test. The results from ASS tests ranged from pH 4.8 to 6.7 (slightly acidic to acidic) and the results from PASS peroxide tests ranged from pH 3.1 to 4.0, indicating that acid sulphate soils may be present at all sites between 0.5 m to 1.5 m bgs. Soil tests were not repeated during the 2010 survey.

Water Quality: Only minimal water quality monitoring has been conducted at Poole's lagoon. However, the improvement in bank condition is likely to have an impact on water quality. Acid sulphate soils may be disturbed by feral pig diggings, releasing acids into adjacent waters. Water pH was moderately acidic (5.05 to 6.01) in November 2011. No further analysis of water pH has been conducted.

Turbidity levels measured during November 2008 (pre-fence) ranged from 40.9 to 41.2 NTU. This indicates a medium to high level of sediment suspended in the water. Turbidity samples collected from the same locations in November 2010 ranged from 3.79 to 10.2 NTU. The decrease in turbidity is likely to be a direct result of the lack of pig and cattle digging up the edges of the wetland.

References:

Bolton, K.G.E. (2001) **North Coast Wetland Assessment Guide Manual. Paperbark Wetlands.** Department of Land and Water Conservation and Southern Cross University. ISBN 0 7347 5232 6

Howley, C. and Stephan, K. (2009) Cape York Freshwater Wetland Assessment Field Data Sheets. CYMAG Environmental, Cooktown, Qld. (www.cymag.com.au/publications)

APPENDIX A- PHOTO POINTS

Site 1 – December 2009



November 2010



Site 2 –

December 2009



November 2010



Site 3 –

December 2009



November 2010



**Site 4 –
December 2009**



November 2010



Waters Edge Site 4
Dec 2009



November 2010

