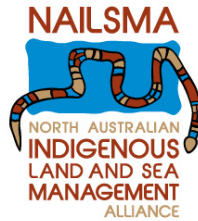


Nyul Nyul Freshwater Research and Monitoring project



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National Environmental
Research Program

NORTHERN AUSTRALIA HUB

NERP Northern Hub Theme 5.1 Case Study: Nyul Nyul Freshwater Research and Monitoring

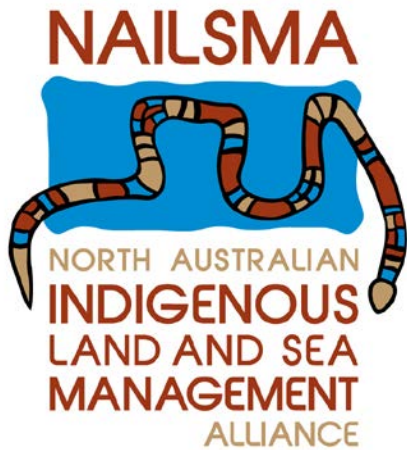
- 1 of 3 NAILSMA lead case studies
 - Timeframe – 2012 - 2014
 - Who is involved?

Griffith University and University of Western
Australia: scientific research

Nyul Nyul Rangers: on country field work, local
knowledge of habitats

NAILSMA: project coordination, I-Tracker Tools
The Nyul Nyul community





North Australian Indigenous Land and Sea Management Alliance Ltd (NAILSMA)

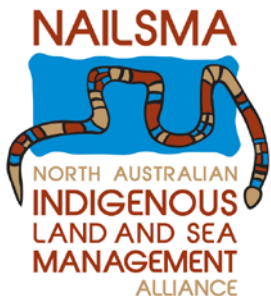
NAILSMA is an Indigenous-led not-for-profit company with a decade of experience delivering large-scale initiatives across north Australia.



Looking after Our Country... Our Way

Looking after our country... our way

- Culturally appropriate programs focusing on Indigenous knowledge and contemporary science.
- Supporting Traditional Owners to contribute to healthy country and healthy people on traditional lands.



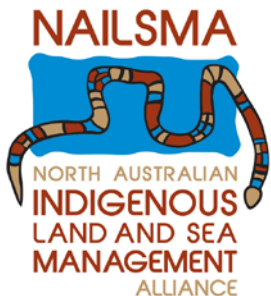
Programs

- Saltwater People Network
- Youth Leadership
- Carbon Abatement
- Water Resource Management
- Indigenous Knowledge
- Livelihoods
- I-Tracker

Looking after Our Country... Our Way

Collaborative Research Projects

- Supporting community-based management
- Community-friendly data collection and mapping tools
- Scientific research on important national issues
- Development of new methods that can be used across north Australia



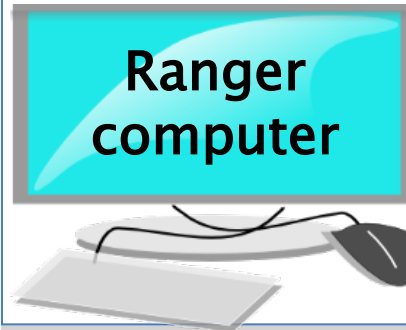
Looking after Our Country... Our Way

Using I-Tracker



NAILSMA I-Tracker Applications are custom built using CyberTracker software.

Application customised and installed on PDA



Data Analysis / Reporting

Date	Time	Event
2013	11:41	START
2013	11:53	Boat
2013	11:54	Boat



Rangers collect data using the PDA while on patrol.



I-Tracker



Technical support
via email, phone
and site visits



Network of Indigenous ranger groups
across northern Australia



Training, workshops
and skills development



Looking after Our Country... Our Way



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Freshwater Research

Tropical Rivers and Coastal Knowledge (TRaCK) Program

Waterways Education Program (WEP) (UWA and DoW)





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Rangers



Kimberley Land Council



A Field Guide to Assessing Australia's Tropical Riparian Zones

Ian Dixon
Michael Douglas

Tropical Rapid Appraisal of Riparian Condition (TRARC), Version 1: August 2006



<http://savanna.cdu.edu.au>

Note: Read the User guide before using these score sheets.
Circle most appropriate score.

CANOPY COVER 1			
% cover of trees and tall shrubs >5 m in height. Look directly above you (approx. 5 m radius). Include weeds	Point		
	A	B	C
<5%	1	1	1
5-25%	2	2	2
25-50%	3	3	3
50-75%	4	4	4
75-100%	5	5	5

CANOPY HEALTH 2			
Canopy health of surrounding NATIVE trees and tall shrubs >5 m in height. Look around area (approx. 20 m up and down the transect). Do not include weeds	Point		
	A	B	C
Canopy very sparse/non-existent; shrubs and/or grasses common due to lack of canopy; dead trees may occur	1	1	1
Tree canopy sparse; individuals exhibit crown dieback; dead trees common	2	2	2
Canopy +/- sparse or lacking vigour; dead trees may be evident; minor crown dieback	3	3	3
Canopy slightly irregular and/or with some gaps; no/few dead trees	4	4	4
Tree canopy appears intact; no/few standing dead trees	5	5	5

Score sheets — page 1 of 6



www.rivers.gov.au

Note: This number refers to the numbered items in the User guide

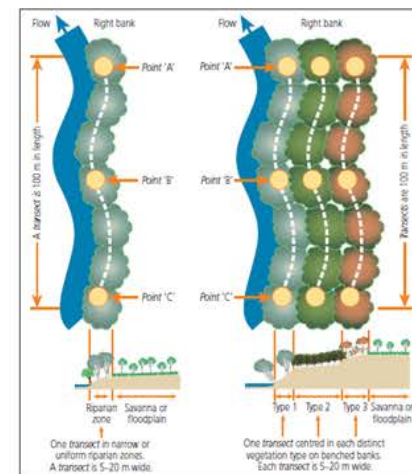
TREE SIZE CLASSES 3			
Variation in trunk width/height of dominant native trees >3 m tall. Look around area (approx. 20 m up and down the transect). Do not include weeds. Size groups: <10 cm, 10-20 cm, 20-30 cm, 30-40 cm, >40 cm	Point		
	A	B	C
No canopy, few trees or all same size group	1	1	1
2 distinct size groups	3	3	3
3+ distinct size groups	5	5	5

Choose a maximum of three species as co-dominants OR in tall closed forest with diverse species assess entire tree community

DOMINANT TREE REGENERATION 4			
Number of juveniles 0.3-3 m tall of dominant tree species. Must be same species as measured in "Tree size classes". (Look within approx. 5 m radius)	Point		
	A	B	C
0	1	1	1
1-3	3	3	3
4+	5	5	5

OTHER TREE REGENERATION 5			
Number of juveniles present that are common riparian species, even though adult individuals of these species are not dominant within the transect. (Look within approx. 5 m radius)	Point		
	A	B	C
0	1	1	1
1-3	3	3	3
4+	5	5	5

Date	
Stream name	
Site number	
Transect number	
Left / Right bank (when facing downstream)	Left Right
Assessors name/s	
GPS (start of transect)	
GPS (end of transect)	
Average channel width (m) near points A, B, C	A B C Ave
Average riparian width (m) or width of distinct veg. type	A B C Ave
Photo numbers	



August 2012



3 major field sampling trips to date

June 2013



October 2013





Field Sampling

Water quality

Biodiversity Sampling

- Freshwater fish communities
- Aquatic macroinvertebrates

Stable isotope analysis

- Food webs
- Water source

Riparian condition (incl. feral animal impacts)

Aquatic vegetation



Remote sensing workshop

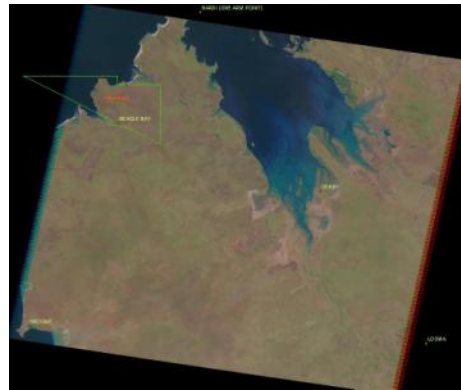
Australian Rivers Institute

- Use satellite imagery of waterholes to explore community knowledge of how the Nyul Nyul freshwater systems work and identify threats
- 25yr satellite record and a 2 years of field sampling but the Nyul Nyul community has a longer historical knowledge, to build a greater understanding of freshwater places

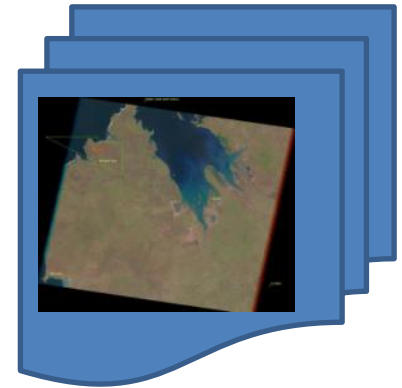


How we use satellite data to map water

- Satellites circle the earth and capture imagery
- Landsat imagery is available from 1989 to 2014 (25 yrs) so we can use it to look back into the past



Landsat image of
Dampier Peninsular



25 year Historic
record

How we use satellite data to map water

Landsat

Google Earth

Landsat infrared index

0m

Landsat

50m

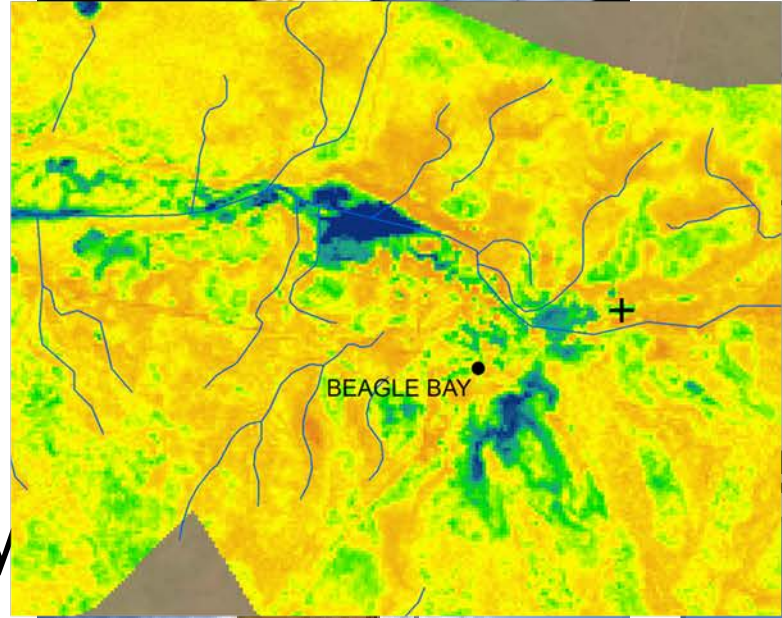
MODIS

MO

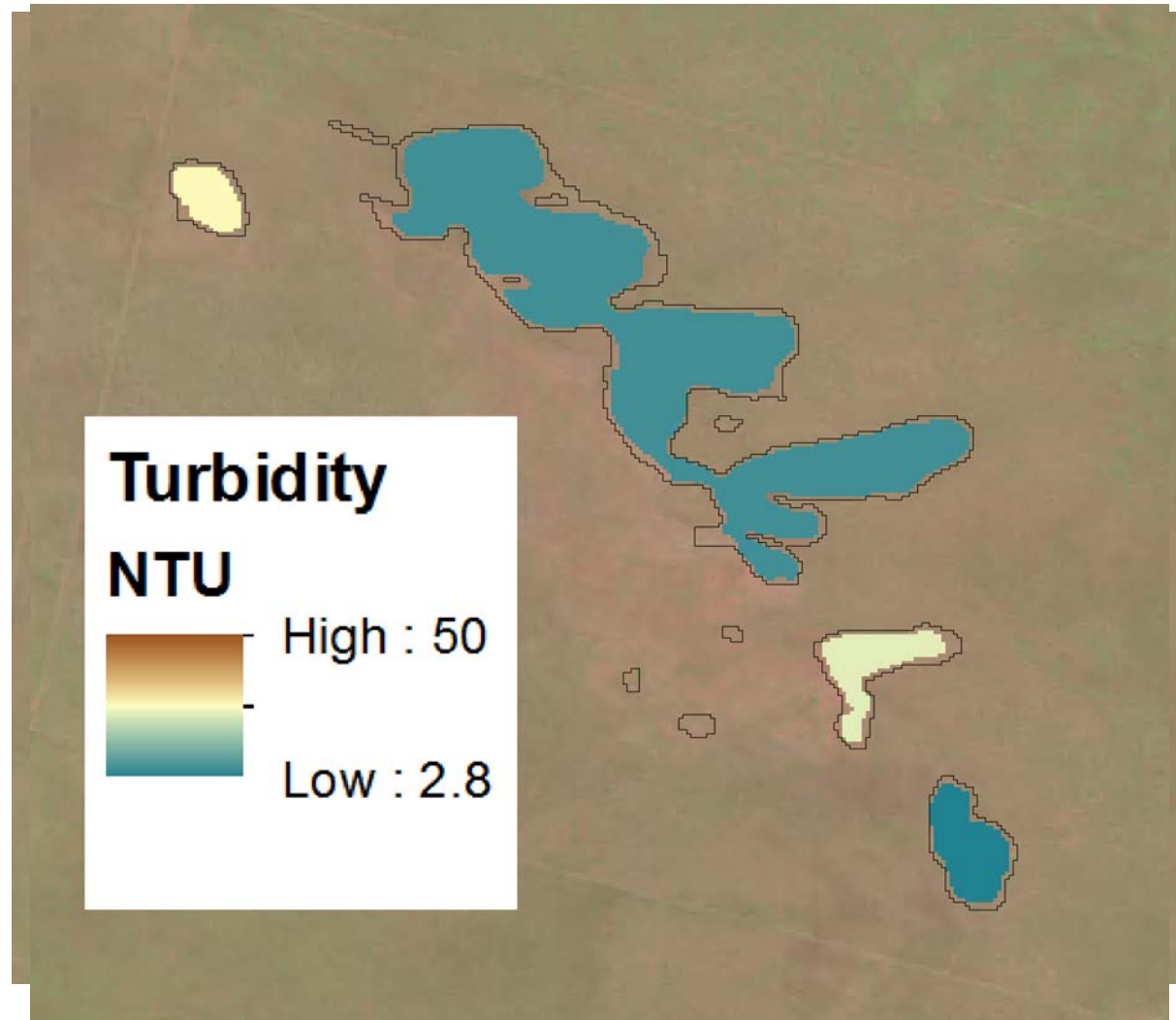
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- good for floods

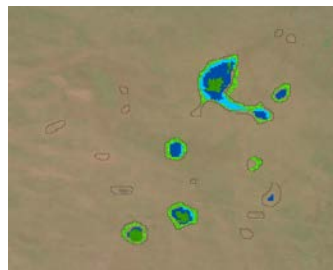
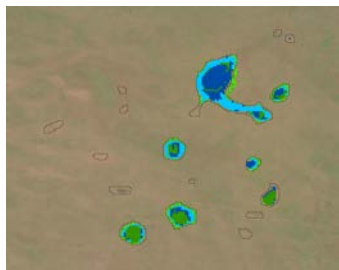
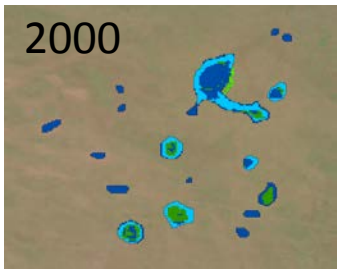
Can detect water, and other features using infrared part of spectrum



Turbidity (water cloudiness)



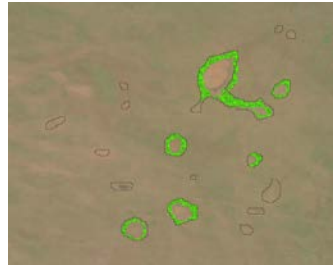
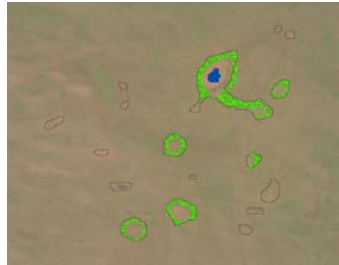
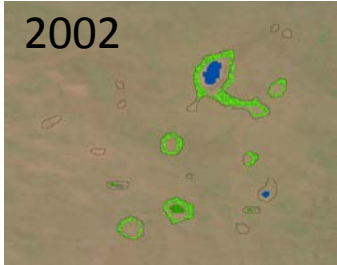
2000



Lake Louisa

(Rubabunan)

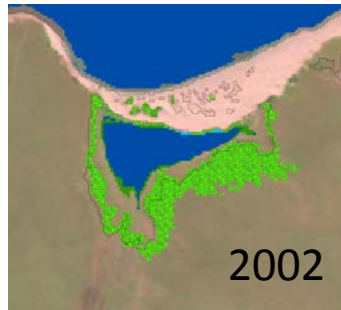
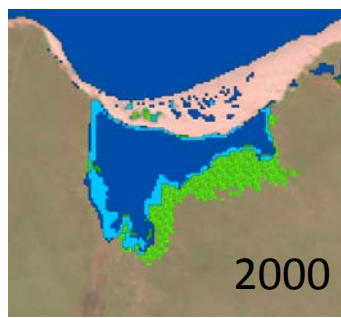
2002



- Large water body collects rainwater runoff, very little influence of GW
- Except for the wettest years (e.g. 2000) Lake Louisa dries up by the end of the dry
- Low connectivity
- Low fish diversity- Gambusia, Ox-Eye Herring (observed but not common)
- Site for hunting cattle, not used for fishing
- Main impacts; cattle and fire



Weedong



- In the last 15+ yrs has held water all year round except for the driest years, but it didn't exist in the 60's, how/why did it form?
- Low coverage of aquatic vegetation
- High diversity of macroinvertebrates
- No fish collected during sampling
- Maintains a relatively low turbidity all year

- Driven by groundwater
- High impact from donkeys and fire
- Invasive Mosquito fish (*Gambusia holbrooki*)
- High connectivity for short periods some wet seasons



Springs



Summary of outcomes

- Suite of baseline data and Indigenous Ecological Knowledge increasing our understanding of these systems
- Identification of threats and cultural values to assist in monitoring
- Refining monitoring techniques for Rangers and developing customised I-Tracker tool
- Procedure for rangers to acquire and use Landsat imagery
- Improved capacity for Rangers and community to manage freshwater habitats
- Share knowledge and tools with other Indigenous Ranger groups in the region for their use in future

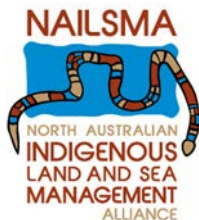
Acknowledgements

- The KLC supported Nyul Nyul Rangers
- Beagle Bay community members
 - Workshop participation
 - Field sampling



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