

Australian Government

Department of the Environment and Heritage

Ecological Risk Assessment Australia's Tropical Rivers

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PROJECT AREA

51 catchments
3 "Focus" catchments: Fitzroy, Daly,
1,190,973 km²
Flinders





Objectives of the Ecological Risk Assessment

1. To identify and describe the key threats to the aquatic ecosystems of the tropical rivers

2. to identify, and where possible, quantify the risks of key threats to key ecological assets of the aquatic ecosystems of the selected focus catchments; and in doing so,

3. illustrate the application and utility of ecological risk assessment as a decision making tool for natural resource management.



HEIRARCHICAL APPROACH TO ERA



Northern Tropical Rivers Study Area

Basin/Catchment scale hazard assessment of threats to aquatic ecosystems. Semi-quantitative (Relative Risk Model)

Focus Catchment

•Semi-quantitative risk assessment of multiple threats to multiple assets





Bayesian Networks





Adapted from Walker et al. (2001) and Obery and Landis (2002)



Daly River Catchment Risk Regions





Daly River sub-catchments and Land Use



Conceptual Model Describing Ecological Risk



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THREAT: SEA LEVEL RISE

Based on GEODATA TOPO 250K Waterbodies Data- 'subject to inundation'



Risk Region most at risk is the Daly River Estuary



THREAT: LAND CLEARING

Based on NRETA Land Clearing Dataset 2005



Risk Region most at risk is the Green Ant Creek



THREAT: MINING

Based on MODAT 2005-'abandoned mines'



Risk Region most at risk is the Fergusson River



LAND USE: IRRIGATED AGRICULTURE

Based on Land Use Mapping Project at the Catchment Scale Project (2002)



Risk Region most at risk is the Katherine River



LAND USE: GRAZING NATURAL VEGETATION

Based on Land Use Mapping Project at the Catchment Scale Project (2002)



at risk is the King & Dry Rivers

Risk Region most at risk is the Limestone Creek



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HABITAT: DRAINAGE DENSITY

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Based on GEODATA TOPO 250K Drainage Data

Drainage Density= <u>total drainage length</u> risk region area

> Risk Region with the <u>highest</u> Drainage Density is the Fish River

Risk Region with the <u>lowest</u> Drainage Density is the King & Dry Rivers

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HABITAT: RIPARIAN

Based on Melaleuca Survey of the NT (1993)**# Hectares** % Cover Possibility to incorporate riparian 11 11 rainforest derived 12 12 from the 1:250 000 rainforest surveys J Russell-Smith Low (0.37-0.73) Low (104-2 149) (1992)(0.73 - 1.41)Med Med (2 149-8 087) High (1.41-3.68) High (8 087-18 282)

> Risk Region with the <u>most</u> Riparian Habitat is the Daly River Estuary Risk Region with the <u>least</u> Riparian Habitat is the Dead Horse Creek



HABITAT: WETLANDS

Based on GEODATA TOPO 250K Waterbodies Data

Hectares

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% Cover

Low (0.28-1.74) Med (1.74-5.7) High (5.7-30)

Low	(95-3 028)
Med	(3 028-11 606)
High	(11 606-149 159)

Risk Region with the <u>most</u> Wetland Habitat is the Daly River Estuary Risk Region with the <u>least</u> Wetland Habitat is the Dead Horse Creek

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Calculating Relative Risk for Risk Region 9 Katherine River

Sum of Threats in Risk Region = Σ Threats

Sum of potential Exposure= Σ (Threat * Habitat)

Total Risk to Endpoint = Σ (Threat * Habitat)







Relative Risk for Daly River 18 Risk Regions





Relative Risk for Daly River 18 Risk Regions

Assessment Endpoints:	Maintenance of perennial flow	Water quality	Maintenance of aquatic threatened species	Maintenance of riparian vegetation	Maintenance of biodiversity	Total Risk by Region
Risk Region						
1	120	240	240	152	160	912
2	28	52	52	44	72	248
3	96	136	136	144	240	752
4	80	152	152	112	184	680
5	80	128	128	96	84	516
6	96	192	192	108	80	668
7	56	144	144	80	124	548
8	20	44	44	44	148	300
9	88	216	216	112	196	828
10	24	48	48	36	80	236
11	132	216	216	148	92	804
12	96	180	180	112	88	656
13	84	168	168	96	72	588
14	72	144	144	96	108	564
15	72	144	144	84	64	508
16	72	144	144	112	152	624
17	64	120	120	112	276	692
18	40	88	88	56	92	364
Total Risk for Assessment Endpoint	1320	2556	2556	1744	2312	10488



Relative Risk for Daly River 18 Risk Regions



Risk Region with **highest risk** to specified endpoints is **Risk Region 1- Daly River** Risk Region with **lowest risk** to specified endpoints is **Risk Region 2- Hayward Creek**



SUMMARY

• The model presented here is a first pass.

• Need to incorporate other data such as weeds and feral animals.

• Further stakeholder feedback and input required.

 Model validation in the form of sensitivity (uncertainty) analysis:
 Quantitative (e.g. Monte Carlo analysis)

-Qualitative (e.g. Documentation of uncertainties related to datasets)

• The RRM approach is also been used in the TRIAP ERA for the project's 51 catchments at the scale of north Australia.

• Approach is useful in the NRM prioritisation and decisionmaking



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NTGS: MODAT 2005.