

Mangrove Monitoring

MANGROVES IN THE NORTHERN TERRITORY



Extensive stands of mangroves in the Northern Territory (NT) are located along the northern coasts of Arnhem Land, Darwin Harbour and on the Tiwi Islands. Isolated pockets can occur within any number of small embayments or surrounding small coastal estuaries. Mangroves are found 50km inland along some river systems.

MANGROVES IN DARWIN HARBOUR

- Highly diverse forming one of the largest contiguous blocks in the NT.
- Approximately 20,400 ha representing 5% of NT mangroves and 2% of Australia's mangroves.
- 36 species occur in Darwin Harbour, 51 in the NT. For comparison 80 mangrove species are typical of mangrove environments found worldwide.
- Six species are common: *Rhizophora stylosa*, *Ceriops tagal*, *Sonneratia alba*, *Bruguiera exaristata*, *Avicennia marina* and *Campostemon schultzei*.
- Approximately 2% of mangroves has been cleared, most recently 8.4 ha cleared for the LNG Plant at Wickham Point.
- East Arm Port was the single largest development resulting in the loss of 21ha of mangroves.
- NT Government proposed future conservation protection to over 90% of mangroves in Darwin Harbour.

MANGROVE MONITORING PROGRAMS

- Darwin Harbour Mangrove Monitoring Program.
- Community Mangrove Monitoring Program.
- Darwin Liquid Natural Gas (DLNG) Mangrove Monitoring Program (Wickham Point).

Darwin Harbour Mangrove Monitoring Program



The mangrove monitoring program was initiated following the Mangrove Survey of Darwin Harbour. It consists of a network of 27 monitoring sites along seven transects from seaward to landward edge in Darwin Harbour mangrove communities to represent eight of the 10 dominant mangrove communities. The main purpose was to increase knowledge and

understanding of mangrove ecology.

4 Primary Objectives:

1. Determine natural status and condition of mangroves in Darwin Harbour.
2. Monitor seasonal and annual changes in productivity of mangroves communities in Darwin Harbour.
3. Determine impact of coastal development on Darwin Harbour Mangroves.
4. Establish a monitoring framework and standard method for present and future research.

Attributes Collected:

- Vegetation stand structure: stem density, crown density, basal area, height, health and condition status.
- Phenology.
- Primary Productivity (leaf litter productivity & biomass productivity).
- Regeneration (natural recruitment counts).
- Soil (salinity, pH, moisture, temperature, acid sulfate potential, field description & classification).
- Debris.
- Crab holes (crab density – direct relationship with soil drainage & oxidation).
- Photo documentation.
- Site information and description.

Community Mangrove Monitoring Program

The community mangrove monitoring program was a two year monitoring program to continue scientific mangrove monitoring in Darwin Harbour. The focus was on community awareness and participation. Eight sites were located in potentially disturbed hinterland mangrove communities in the Darwin and Palmerston region in four catchments.

3 Primary Objectives:

1. Determine impacts of coastal development on hinterland mangrove environments in Darwin Harbour.
2. Facilitate community education and participation.
3. Survey mangrove environments in partnership with community groups.

Attributes Collected:

Attributes collected were as per the Darwin Mangrove Monitoring Program. A number of attributes including biomass productivity and crab holes weren't collected for the purpose of this program.

DLNG Mangrove Monitoring Program

The monitoring program was part of the Conoco Phillips mangrove monitoring program. Twenty four monitoring sites along six transects representing four mangrove communities were established. Twelve were set up at Wickham Point and 12 in Darwin Harbour as control sites. The Darwin Harbour Mangrove Monitoring Program was modified to gain efficiency, increase accuracy and improve statistical integrity.

2 Primary Objectives:

1. Determine if construction of LNG Plant at Wickham Point would impact on adjacent mangroves by monitoring parameters related to community structure/composition, soil condition and mangrove productivity.
2. Collate and analyse data collected from Darwin Harbour Mangrove Monitoring Program 1999-2000 in order to provide a baseline for comparison with DLNG and place Wickham Point sites into a regional context.

Attributes Collected:

- Vegetation: canopy density, seedling/sapling counts, basal area, leaf litter productivity.
- Soils: conductivity, pH, moisture content, sedimentation.

The monitoring forms an important base for future activities that work towards protecting health of mangrove communities in Darwin Harbour. Continued monitoring was recommended during and after the construction phase:

- Annually monitor canopy density, regeneration and soils.
- Monitor basal area, height, health and condition status every three to five years due to slower rate of change in stand structure.

MANGROVE RESEARCH

A number of research projects have been undertaken by post graduate students, and some still ongoing in Darwin Harbour pertaining to: links between mangroves and fish; links between mangroves and insects; biological diversity of mangroves; mangrove rehabilitation; recovery from disturbance; mangrove productivity and management.

FOR MORE INFORMATION REFER TO:

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Lewis, D. (2002). Community Mangrove Monitoring Program: Impact Assessment of Coastal Development on Estuarine Mangrove Environments in Darwin Harbour – Technical Manual and Final Report. Report No. 26/2002. Department of Infrastructure Planning and Environment, Darwin, Northern Territory.

Moritz-Zimmerman, A., Comley, B and Lewis, D. (2002). Darwin Harbour Mangrove Monitoring Methodology Technical Manual. Land Monitoring Series No. 3, Report No. 25/2002. Department of Infrastructure Planning and Environment, Darwin, Northern Territory.

McHugh, P. (2004). Report to ConocoPhillips, DLNG Mangrove Monitoring Program: Monitoring of Mangrove Community Structure/Composition, Soil Conditions and Mangrove Productivity in Darwin Harbour. Report No. 35/2004D. Department of Infrastructure Planning and Environment, Darwin, Northern Territory.