World Wetland Day

2003: Tropical wetlands

Presentations on tropical wetlands: 31 January, Townsville, and 8 February, Darwin, 2003

CM Finlayson

June 2003
World Wetland Day 2003: Tropical wetlands

Presentations on tropical wetlands: 31 January, Townsville, and 8 February, Darwin, 2003

CM Finlayson

Environmental Research Institute of the Supervising Scientist
GPO Box 461, Darwin NT 0801

June 2003
Contents

Tropical wetlands: Presentation made at the Wetlands Forum, a part of the North Queensland Wetlands Festival, Townsville, 31 January 2003 1

Tropical wetlands – habitats and biota: Presentation made at ‘Wetlands in Litchfield Shire’ public forum and field trip, Darwin, 8 February 2003 20

Tropical wetlands – services and pressures: Presentation made at ‘Wetlands in Litchfield Shire’ public forum and field trip, Darwin, 8 February 2003 27
Tropical wetlands: Presentation made at the Wetlands Forum, a part of the North Queensland Wetlands Festival, Townsville, 31 January 2003

Tropical Wetlands

Max Finlayson
National Centre for Tropical Wetland Research
Darwin, NT

Tropical Wetlands

• Distribution and extent
• Wetland services
• Major pressures
• Integrated framework
Inventory incomplete, inaccurate, inadequate, outdated
### Global wetland area (km²)

<table>
<thead>
<tr>
<th>Region</th>
<th>Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S America</td>
<td>4,150,000</td>
</tr>
<tr>
<td>N America</td>
<td>2,420,000</td>
</tr>
<tr>
<td>E Europe</td>
<td>2,290,000</td>
</tr>
<tr>
<td>Asia</td>
<td>2,040,000</td>
</tr>
<tr>
<td>Africa</td>
<td>1,220,000</td>
</tr>
<tr>
<td>Oceania</td>
<td>36,000</td>
</tr>
<tr>
<td>W Europe</td>
<td>29,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,770,000</strong></td>
</tr>
</tbody>
</table>

### Wetland types - area (km²)

<table>
<thead>
<tr>
<th>Type</th>
<th>Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater – global</td>
<td>550,000</td>
</tr>
<tr>
<td>Freshwater – S Amer</td>
<td>1,520,000</td>
</tr>
<tr>
<td>Freshwater – Africa</td>
<td>350,000</td>
</tr>
<tr>
<td>Swamps – global</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Swamps – Okavango</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Swamps – Zambia</td>
<td>750,000</td>
</tr>
<tr>
<td>Swamps – Amazon</td>
<td>700,000</td>
</tr>
</tbody>
</table>
Wetland area ($km^2$) - Australia

- Qld 11 453 560
- SA 4 100 290
- NT 2 912 790
- NSW 2 171 740
- WA 2 056 250
- Ext Terr 1 090 580
- Vic 395 100
- Tas 20 830
- ACT 670

Total 24 201 210

Mangrove / coastal salt flats
Freshwater grasslands

Freshwater flooded forests
Lakes – shallow /deep

Inland salt lakes
Wetland biodiversity

Wetland biodiversity
Wetland biodiversity
Wetland biodiversity

Wetland services

Provisioning
Goods produced or provided by wetlands
- Food
- Freshwater
- Fuel wood
- Fibre
- Biochemical
- Genetic materials

Regulating
Benefits derived from regulation of wetland processes
- Climate regulation
- Disease control
- Flood control
- Detoxification

Cultural
Non-material benefits obtained from wetlands
- Spiritual
- Recreational
- Aesthetic
- Inspirational
- Educational
- Communal

Supporting
Services that maintain the conditions for life on earth
- Soil formation, Nutrient cycling, Pollination
Wetland services - provisioning

[Images of various wetland services, including fishing and farming activities.]
Wetland services - regulating

Wetland services - cultural
Wetland services - cultural

Managing Mimosa pigra
U Minh Thuong National Park Vietnam

Major pressures

Invasive species
Physical modifications
Hydrological modification
Over harvesting
Pollution
Invasive species

Physical modification
Climate change

Combined causes?
### Extent of loss & degradation

<table>
<thead>
<tr>
<th>Location</th>
<th>Loss Percentage</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>54%</td>
<td>80% drainage</td>
</tr>
<tr>
<td>Mexico</td>
<td>35%</td>
<td>agriculture</td>
</tr>
<tr>
<td>Finland</td>
<td>30%</td>
<td>peat/forestry</td>
</tr>
<tr>
<td>New Zealand</td>
<td>90%</td>
<td>agriculture</td>
</tr>
<tr>
<td>Europe</td>
<td>60%</td>
<td>agriculture/drainage</td>
</tr>
<tr>
<td>Asia</td>
<td>27%</td>
<td>agriculture</td>
</tr>
<tr>
<td>Victoria</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>South Australia</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>NSW</td>
<td>60%</td>
<td>coastal</td>
</tr>
</tbody>
</table>

Extent of degradation - unknown
Integrated model – inventory, assessment & monitoring

Inventory

Assessment

Monitoring

Hierarchical approach to wetland inventory

Level 1
River basin or island

Scale (nominal)
1:1 000 000

Geology; climate; landcover

Level 2
Wetland region

Location; altitude; area; land systems; climate; hydrology; vegetation

Level 3
Wetland complex

Location; physico-chemical and biological features; classification; jurisdiction; ecosystem services

Level 4
Wetland habitat

Location; physico-chemical and biological features (ecological character); land tenure; land use; management issues and threats.

Basic (“Core”) dataset stored in Database with GIS Interface
The Risk Assessment Framework (modified from van Dam et al. 1999; Ramsar 2000)

Identification of the problem (eg site assessment: site-specific information on stressor & environment)

Identification of the effects (field assessment: eg bioassays, monitoring, surveys etc.)

Identification of the extent of the problem (eg chemical concs, spatial & temporal distribution)

Identification of the risk (comparison of effects with the extent using a GIS framework)

Risk management/ Risk reduction (manage inputs/ alter practices)

Monitoring (use of early warning and rapid assessment indicators/ GIS-based approach)

The Risk Assessment Framework

Analysis

Thank you
Tropical Wetlands in Northern Australia: their value and future

Max Finlayson, Peter Bayliss, Maria Grazia Bellio & John Lowry

National Centre for Tropical Wetland Research
Darwin, NT

Distribution and extent

• Inventory incomplete, inaccurate, outdated

• Effective inventory data collation and analysis still needed

• Standard procedures available for data collation and storage
Escarpment

Freshwater flooded forests
Wetland biodiversity
Thank you
Tropical wetlands – services and pressures: Presentation made at ‘Wetlands in Litchfield Shire’ public forum and field trip, Darwin, 8 February 2003

Tropical Wetlands: services & pressures

Max Finlayson

National Centre for Tropical Wetland Research, Darwin, NT

Environmental Research Institute of the Supervising Scientist
James Cook University
Northern Territory University
University of Western Australia

Wetland services

Provisioning
Goods produced or provided by wetlands
- Food
- Freshwater
- Fuel wood
- Fibre
- Biochemical
- Genetic materials

Regulating
Benefits derived from regulation of wetland processes
- Climate regulation
- Disease control
- Flood control
- Detoxification

Cultural
Non-material benefits obtained from wetlands
- Spiritual
- Recreational
- Aesthetic
- Inspirational
- Educational
- Communal

Supporting
Services that maintain the conditions for life on earth
- Soil formation, Nutrient cycling, Pollination
Wetland services - provisioning

Wetland services - provisioning
Wetland services - provisioning

Wetland services - provisioning

[Images of wetland scenes]
Major pressures

- Invasive species
- Physical modifications
- Hydrological modification
- Over harvesting
- Pollution

Invasive species
Physical modification – agriculture, drainage, canalisation, irrigation

Urban development
Hydrological modification

Overharvesting
Pollution

Climate change - salinisation
Combined causes?

Thank you