Wetland Importance and Values

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Civilization and Wetlands
6,000 Years of History

Sinister Image of Wetlands

Wetland Values

http://ramsar.org/index.html#top

Biological Values
- Wetland-dependent Wildlife Habitat
- Aquatic and Terrestrial Fish and Wildlife Habitat
- Reserves of Biodiversity

Environmental Values
- Flood Control
- Groundwater Replenishment
- Shoreline Stabilization
- Sediment and Nutrient Retention & Export

Societal Values
- Fur & Timber Harvest
- Aesthetics
- Recreation/Tourism
- Economic Value
  (consumptive & non-consumptive uses)
Biological Values
Wetland Dependent Wildlife

Waterbirds:
- 80% Breeding Birds in NA
- 50% of Migratory Birds
Shorebirds, Wading birds, Waterfowl

- Use all Wetland Types
- $8 Million in MS Flyway—Waterfowl Hunting
- ½ of Pop winters in MAV

Notice Correlation with Wetland Abundance

Fish and Shellfish:
- 95% of Shellfish
- Use for spawning (FW) and nurseries (FW, SE)

- $5 Billion Annually for Commercial Fisheries
- Shrimp and Fish Harvests are positively correlated with nation wetland area.

Reptiles/Amphibians:
- $16 Million in LA

Mammals:
- 10 Million Pelts Annually
- 700K Pelts Annually
- $118/day in AK

Recreation
- $18 vs. $3.50
- 60%

Table 204
Selected commercial and recreational fish and shellfish associated with wetlands

- Wildlife: 50
- Fish: 30
- Shellfish: 20

- Declines, Indicators

- Notice Correlation with Wetland Abundance
Biological Values

Aquatic and Terrestrial Wildlife

Aquatic Wildlife

Many Species Use Wetlands Facultatively and Opportunistically

Interactions

Terrestrial Wildlife

Many Species Use Wetlands Facultatively and Opportunistically

NOTE: 50% of Listed Animals Occur in Wetlands

Species Richness & NPP in Tidal Estuarine Wetlands Rivals Tropical Rainforests

Biodiversity of Wetlands

3.5% of Land in United States

40% of World’s Species Depend on Freshwater Wetlands

Environmental Values

Flood Control

1 ha Wetland can store 5,500 m³ of floodwater

Charles River Basin 3,400 ha

=> $17 million/year

2 Functions:

- Slow Velocity
- Store Water

Buffer Discharge
Environmental Values
Shoreline Stabilization
Reduce Erosion
Buffer Ocean Storms
2004 Hurricanes
-Charley (22)
-Frances (15)
-Ivan (40)
-Jeanne (6)
$25 Billion in Damage in U.S.

Environmental Values
Shoreline Stabilization
26 Dec 2004 Tsunami
Indonesia, Banda Arch
Mangroves
169,752 Dead
127,294 Missing
297,046 Total

Environmental Values
Groundwater Replenishment
Soil Type
Area of Wetland
Hydrologic Inputs
Depth of Aquifer
Human Uses:
Irrigation
Daily Life Needs
65% in High Plains
95% of Pumping from Ogallala Aquifer

$20 Billion in Damage in 11 Countries
Environmental Values

Groundwater Replenishment

- Recharge at 0.5–3.24 inches/ac/yr (0.85 ft/yr)
- Recharge at 0.5–3.24 inches/ac/yr (0.35 ft/yr)
- 174,000 mi²
- 400 million a.f.
- 3.3 Billion ac-ft
- 3.62 m (TX)
- 25% in Peatlands
- Release CO₂
- 40% of Global C

Environmental Values

Sediment & Nutrient Retention & Export

- Chemical & Nutrient Update by Plants
  - 98% N, 97% P
  - Bind with Soil Particles & Become Buried
  - Eutrophication
- Waste Water Treatment
  - Treatment, Collected
  - Pesticides, Heavy Metals, Grease, Oil (100,000X)
  - Water Quality
  - Carbon, Sulfur, Nitrogen Sinks

Societal Values

Trapping and Timber Harvesting

- 12 Million Pelts Annually
- 40 million ($1 Billion
- Florida
  - $16 Million for Alligators
- 22 Million ha total in US
- 13 Million ha of Hardwood Bottomlands in SE
- $620/ha or $8 Billion Total
- Cherrybark, willow, water, Nutall, pin oaks
### Societal Values

#### Recreation & Tourism

- **Recreation & Tourism**
  - 98 Million Americans
  - $6 Billion Annually

#### Estimation of Economic Value

- **Wetland Ecosystems**
  - Reflects the multiple values!

#### Estimated Economic Value

- **Nature 387:263–260**

<table>
<thead>
<tr>
<th>Total value (US$ per hectare per year)</th>
<th>Total global flow value (US$ per year)</th>
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</thead>
<tbody>
<tr>
<td>Estuaries</td>
<td>22,382</td>
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<td>mangrove/algae beds</td>
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<td>Coral reefs</td>
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<tr>
<td>Total marshes</td>
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<td>Swamps/floodplains</td>
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<td>Lakes/rivers</td>
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<tr>
<td>mangrove/algae beds</td>
<td>1,700,000,000,000</td>
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</tbody>
</table>

**Wetland Ecosystems** = $14.9 Trillion

**All Natural Ecosystems** = $33.0 Trillion

Thus, wetland systems account for approximately 45% of the realized value of natural ecosystems!