Dipterocarp endemism in the Heart Of Borneo
• Overview of the Sabah Plant Red List project
• Focus in on Dipterocarps & the role of HoB in their conservation
• Current gaps in plant conservation
Sabah Plant Red List project

- Aims to assess the conservation status of all native plants of Sabah
  - Identify those species most at risk and where they occur
  - Implement conservation measures to prevent the extinction of species at risk
  - Part of Sabah’s commitment to sustainable forest management
  - But also to address Sabah’s commitments to National Plant Conservation Strategy for Malaysia (Target 2) and also the commitments under the international Convention on Biological Diversity
<table>
<thead>
<tr>
<th>All families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant taxa in Sabah</td>
</tr>
<tr>
<td>Borneo endemics found in Sabah</td>
</tr>
<tr>
<td>Sabah endemcis</td>
</tr>
</tbody>
</table>

Working out what we have in Sabah is still very much a work in progress
• International Union for the Conservation of Nature (IUCN’s) standard techniques
  – Extent of Occurrence and Area of Occupancy

• Predictive modeling
  – Species distribution modeling/ecological niche modeling
Species Distribution Modeling

- Relates locality data to environmental data
- Predicts where the species is likely to occur

Locality data
- Sandakan Herbarium
- HoB & other SFD expeditions

*Niche modeling system with environmental layers*

*Predicted distribution*

*Soils*

*Temperature*

*Rainfall*

*Dipterocarpus lamellatus*
Overlay current land-use map to estimate habitat loss for conservation assessments.

Overlay the maps to examine diversity patterns or to identify Important Plant Areas.

Project the models over different climate change scenarios.
### Dipterocarps in Sabah

<table>
<thead>
<tr>
<th></th>
<th>All families</th>
<th>Dipterocarps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant taxa in Sabah</td>
<td>~7840</td>
<td>195</td>
</tr>
<tr>
<td>Borneo endemics found in Sabah</td>
<td>~3840</td>
<td>108</td>
</tr>
<tr>
<td>Sabah endemics</td>
<td>~1050</td>
<td>6</td>
</tr>
</tbody>
</table>

~250 of the Sabah endemics and the majority of the Dipterocarps have already been modeled.
Dipterocarps

• Seraya/Meranti (red, yellow, white), Selangan Batu, Keruing, Kapur, etc.

• Were the most important commercial trees in Sabah & dominate the lowland forest of the State

• Best known part of the flora (taxonomically & ecologically)

• Habitat specific and often with disjunct distributions

• Highest diversity in the lowland forests
Habitat specialization

Distribution of *Shorea johorensis* within a 68 ha plot in the Sepilok forest reserve

Distribution of *Shorea macroptera* within a 68 ha plot in the Sepilok forest reserve
<table>
<thead>
<tr>
<th>Genera</th>
<th># of Borneo endemics found in Sabah</th>
<th># of Borneo endemics recorded from Sabah’s HoB Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anisoptera</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Dipterocarpus</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Dryobalanops</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Hopea</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Parashorea</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Shorea</td>
<td>60</td>
<td>46</td>
</tr>
<tr>
<td>Upuna</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Vatica</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>108</strong></td>
<td><strong>85 (78%)</strong></td>
</tr>
</tbody>
</table>
Mean estimated habitat loss for Bornean endemic Dipterocarps

Species found within the Sabah's HoB Area
Species found outside the Sabah's HoB Area

Habitat loss estimates from Maycock et al. 2012a,b, Amaludin 2012, Keung 2013
Some of the species found outside of the Sabah HoB area are found in other parts of HoB

But not all!

Trying to find and plug the gaps in current conservation efforts

National Plant Conservation Strategy for Malaysia

2010 – 2020 Strategic Plan on Biodiversity (part of Convention on Biological Diversity)
Distribution of critically endangered species in Sabah

- Begonia angustilimba, 1920
- Calamus sabensis, ~1897
- Melanochyla woodiana (1955)
Conclusion

• 78% of the Bornean endemic Dipterocarps found in Sabah are contained within the HoB Area
• Most are doing okay and have populations in well protected areas
• The critical area for plant conservation in the State lie outside of HoB
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References


