Mapping Ocean Wealth
Valuing Australia’s coastal wetlands

Dr Paul Carnell
Ecosystem Services

ATLAS OF OCEAN WEALTH
Representing the largest collection of economic, social and cultural values of coastal and marine habitats globally
1. Fisheries
Valuing the contribution of coastal wetlands to fisheries

Using stable isotopes to measure dietary contribution and reliance
Valuing the contribution of coastal wetlands to fisheries
Flathead and whiting rely on seagrass to provide 20-30% of their diet in Port Phillip and Western Port bays.

<table>
<thead>
<tr>
<th>Proportional contribution</th>
<th>NSW</th>
<th>QLD</th>
<th>SA</th>
<th>VIC</th>
<th>WA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>2</td>
<td>13</td>
<td>54</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>15</td>
<td>19</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Species</td>
<td>State</td>
<td>Saltmarsh</td>
<td>Mangrove</td>
<td>Seagrass</td>
<td>Total value attributable to ecosystem ($ yr(^{-1}))</td>
</tr>
<tr>
<td>------------------------------</td>
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<td>----------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Eastern king prawn (Melicertus plebejus)</td>
<td>NSW</td>
<td>$4.4 M</td>
<td>$0.5 M</td>
<td>$8.8 M</td>
<td>$13.6 M</td>
</tr>
<tr>
<td>School prawn (Metapenaeus macleayi)</td>
<td></td>
<td>$4.1 M</td>
<td>$0.5 M</td>
<td>$2.1 M</td>
<td>$6.7 M</td>
</tr>
<tr>
<td>Sea mullet (Mugil cephalus)</td>
<td></td>
<td>$3.9 M</td>
<td>$2.1 M</td>
<td>-</td>
<td>$6.0 M</td>
</tr>
<tr>
<td>King George whiting (Sillaginodes punctatus)</td>
<td>VIC</td>
<td>$0.2 M</td>
<td>$0.2 M</td>
<td>$0.8 M</td>
<td>$1.2 M</td>
</tr>
<tr>
<td>Black bream (Acanthopagrus butcheri)</td>
<td></td>
<td>-</td>
<td>-</td>
<td>$0.5 M</td>
<td>$0.5 M</td>
</tr>
<tr>
<td>Rock flathead (Platycephalus laevigatus)</td>
<td></td>
<td>$0.02 M</td>
<td>$0.02 M</td>
<td>$0.2 M</td>
<td>$0.2 M</td>
</tr>
</tbody>
</table>
2. Tourism & Recreation
Recreational fishing in Port Phillip & Western Port

Dr Biao Huang
Postdoctoral Fellow
Recreational fishing catch relies on seagrass
Recreational fishing catch relies on seagrass
Choice modelling to value seagrass contribution to boat-based recreational fishing
Contribution of coastal wetlands to recreational birdwatching
Using citizen science data and a survey of users to assess value
Saltmarsh and mangroves contribute to areas of higher recreational birdwatching value
Example: Tufted duck at the Western Treatment Plant

Resulted in a “mega-twitch” with an estimated 50 visitors in a single day
3. Blue Carbon
How do we remove already-released CO$_2$?

Biosequestration
Blue carbon soil sampling
Developing national blue carbon inventory and maps
How does mangrove rehabilitation influence plant biomass & soil carbon?
A case study from the Richmond River, NSW
Soil carbon accumulated since rehabilitation in 1990

Mangrove tree biomass carbon accumulated since rehabilitation in 1990
4. Coastal protection
Developing our own model from the following open-source models:

- XBeach
- Delft3D

InVEST Toolbox

InVEST

integrated valuation of ecosystem services and tradeoffs

http://swanmodel.sourceforge.net/

http://oss.deltares.nl/

https://naturalcapitalproject.stanford.edu/invest/

Jaya Kelvin
PhD Candidate

Simulating WAves Nearshore

http://swanmodel.sourceforge.net/
Coastal Wetland role in coastal protection
Total protected values (property) from coastal wetlands
Making the case for conservation of coastal wetlands

- Carbon sequestration
- Coastal protection
- Fisheries
- Tourism & recreation
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VIEW THE ATLAS