Empowering through science into the future

Healthy Estuaries 2111 Forum

Dr Kerry Trayler, Swan River Trust
Assumptions

We want healthy estuaries into the future;
Management should be based on best science;
Environmental science on estuaries and their catchments needs better coordination.
Focus

Role of the scientist;

Existing tools for better coordination with a working example;

Innovations and new ways of doing business;

Science for empowering change.
Changing role of scientist

Separatist model
Distinguishes roles of scientists and policy makers.

vs

Integrative model
Greater involvement in decision making.
Perspectives on the role of scientists in NRM decision making

<table>
<thead>
<tr>
<th></th>
<th>Scientists</th>
<th></th>
<th>Managers</th>
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<tbody>
<tr>
<td></td>
<td>Agreed</td>
<td>Disagreed</td>
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<tr>
<td>Report only</td>
<td>39</td>
<td>48%*</td>
<td>42</td>
<td>34%</td>
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<tr>
<td>Interpret</td>
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<td>5%</td>
<td>78%</td>
<td>7%</td>
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<tr>
<td>Integrate</td>
<td>76%</td>
<td>7%</td>
<td>90%*</td>
<td>3%</td>
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<tr>
<td>Advocate</td>
<td>16%*</td>
<td>63%</td>
<td>9%</td>
<td>60%</td>
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<tr>
<td>Make decisions</td>
<td>4%</td>
<td>81%</td>
<td>7%</td>
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* Significant difference (P<0.05)

Loss of credibility was seen as a barrier to becoming more involved in decision making

## What Makes a Scientist Credible?

<table>
<thead>
<tr>
<th>Scientists Top Credibility factors</th>
<th>Scientists</th>
<th>Managers</th>
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<tbody>
<tr>
<td>Quality of methods</td>
<td>96%</td>
<td>81%</td>
<td>*</td>
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<tr>
<td>Data generated</td>
<td>96%</td>
<td>64%</td>
<td>*</td>
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<tr>
<td>Hypotheses and theories</td>
<td>90%</td>
<td>57%</td>
<td>*</td>
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<tr>
<td>Reputation</td>
<td>84%</td>
<td>64%</td>
<td>*</td>
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<tr>
<td>Ability to communicate with peers</td>
<td>78%</td>
<td>Not asked</td>
<td>*</td>
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<tr>
<td>Quality of journals</td>
<td>78%</td>
<td>35%</td>
<td>*</td>
</tr>
<tr>
<td>Ability to communicate with resource managers</td>
<td>71%</td>
<td>90%</td>
<td>*</td>
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</table>

**Managers Top Credibility factors**

<table>
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<tr>
<th>Managers</th>
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<th>Scientists</th>
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</thead>
<tbody>
<tr>
<td>Ability to communicate with resource managers</td>
<td>90%</td>
<td>71%</td>
<td>*</td>
</tr>
<tr>
<td>Ability to translate results into usable information</td>
<td>90%</td>
<td>Not asked</td>
<td>*</td>
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<tr>
<td>Practical results</td>
<td>87%</td>
<td>54%</td>
<td>*</td>
</tr>
<tr>
<td>Experience and / or knowledge of managing public lands</td>
<td>83%</td>
<td>57%</td>
<td>*</td>
</tr>
<tr>
<td>Quality of methods</td>
<td>81%</td>
<td>96%</td>
<td>*</td>
</tr>
<tr>
<td>Reputation</td>
<td>76%</td>
<td>84%</td>
<td>*</td>
</tr>
<tr>
<td>Interdisciplinary focus</td>
<td>76%</td>
<td>69%</td>
<td>*</td>
</tr>
</tbody>
</table>

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Perspectives on the role of scientists in NRM decision making

- Integrative role of scientists is supported
- Scientists should be working closely with managers to integrate scientific results into NRM decisions
- To have credibility with managers, scientists will need the ability to communicate well with non-scientific audiences and provide practical results
Tools for better science coordination

- Science strategies / R&D plans/WQIPs
- Collaborative projects; Co-investment opportunities
- Technical advisory / working groups;
- Shared communications plans;
- Multi-scale & multiple-media approaches to sharing results and context;
- MER frameworks
- Data storage facilities (IVEC);
Coordination in action

### Investment

**Ellen Brook Wetland feasibility study**
End of catchment wetland implementation

**Ellen Brook riparian management**
In-stream nutrient intervention

**Soil amendment trial**
Quantifying riparian best management practices

Building community engagement and participation
Coordination in action

- Large scale adaptive management trials;
- Working groups
- Involving scientists from DoW, DAFWA, CSIRO, Chem Centre; consultants;
- Industry involvement (WaterCorp; Iluka; Alcoa);
- Complex planning / approvals processes;
- Community consultation;
- Communications planning;
- Field days; open forums
- Monitoring, evaluation and reporting;
Challenges

These large scale adaptive management approaches require scientists to work closely with teams of collaborators in NRM agencies to design and monitor ecosystem experiments and set new management directions using the results.

- Risk of technical error and failure
- Often long time spans
- Polarized nature of interest groups and debates about alternatives;
- Public and interest group scrutiny;
- Objectivity may be questioned (perhaps by peers);
- Communication will be tested.
Knowledge Broker

- **STRATEGY**
  - RESOURCES
  - RISK ASSESSMENT
  - ETHICS
  - POLITICAL DRIVERS
  - HORIZON SCANNING & FUTURES
  - LEGAL CONSTRAINTS

- **POLICY ISSUES**
  - Evidence providers and evidence users jointly scope the question...
  - ...procure new evidence...
  - ...and jointly interpret the results to inform...
  - ...assemble any evidence that exists & is emerging...

- **TARGETS**
  - UNCERTAINTY

**KB** = knowledge brokering
Innovations in the digital age

- Web 2.0 functionality
- On-line networks (info sharing; directories; virtual workspaces; document storage)
- New age media - You-tube, twitter, facebook;
- Smart phone;
- Real-time monitoring
New ways of doing business

- **Scientists**
  - Ongoing assessments:
    - Scientists assess predictions, improve the underlying science, innovate new developments, and increase model rigour

- **Regulators & Managers**
  - Vision
  - Constraints & Pressures
  - Policy formulation
  - Stakeholder Engagement
  - Management Plans & Actions

- **Community**
  - Provide feedback and views on: Water resources, environment condition, fishery, tourism & aesthetic condition, agricultural conditions, etc.

**Community Online Information Portal**
- Web portal for visualising data & forecast predictions
- Test and evaluate management scenarios
- Inform policy decisions

**Open-Source Integrated Model Library**
- Hydrology, Hydrodynamic & Ecological Systems
  - Process and data-driven models to simulate current & future conditions, including physical & ecological condition & uncertainty metrics.

**Hydroinformatics System**
- Collects and manages data streams including ad hoc and historical data
- Supports model simulations
- Advanced distributed computing

**Report Cards**
- **State of Estuary, Rivers and Catchment**
  - Based on incoming data, aquatic health and catchment sustainability indicators updated regularly

**Operational data**
- River flows & river gaging
- Nutrient inputs
- Environmental sensors
- Meteorology & climate
- Temperature, Salinity, Oxygen, Nutrients
- Beneficial ecological health
- Beneficial ecological health

**Experimental data**
- Ecological surveys
- Stable isotopes

**Geographical data**
- Land use demographics

**Diagram provided Matt Hipsey**
New ways of doing business
Knowledge is Power

Sir Francis Bacon (1561-1626)
Thankyou for listening

Painting: Melanie McDonald