A Methodology to Develop a Framework for Ecosystem Service Assessments across Multiple Scales (regional to national)

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If you can’t measure it, you can’t (sustainably) manage it!

**NSESD** goal ... development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

**Environmental Protection and Biodiversity Conservation Act:** ... to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples ... promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources.

**Caring for our Country:** Aim ... seeks to achieve an environment that is healthy, better protected, well managed and resilient, and provides essential ecosystem services in a changing climate.

**Australian Biodiversity Conservation Strategy:** ... reflects the intention of all Australian governments to ensure our biodiversity is healthy, resilient to climate change and valued for its essential contribution to our existence.
Rationale – International/National Scale

- Environmental-Economic Accounting (UN SEEA; WAVES);
- Economic valuations (TEEB);
- Intergovernmental Panel on Biodiversity and Ecosystem Services (UN);
- Networks and collaboration (Ecosystem Services Partnership);
- Linking biodiversity science and human well-being (DIVERSITAS);
- Status and trends (poverty alleviation) (MA);
- Policy responses (UK NEA; US EPA);
- Community and consumer education: eco-labeling (Rainforest Alliance)
- Payment schemes for multiple benefits (Forest Trends);
- Business sustainability reporting (WRI; WBCSD);
- Wetland assessment (Ramsar);
- Climate change strategies (IPCC);
- Nature/ biodiversity conservation strategies (CBD);
- …
Rationale –
State/Regional/Local Scale

• Statutory Planning Documents
• NRM Plan – targets
• Integrated Catchment Management
• Restoration initiatives
• Local Govt Planning Schemes and Community Plans
• State of Region/State of Environment
• Climate change mitigation sites
• Nature Conservation Strategies
• Water Resource Strategies
• Business Strategies
• Property Management Planning
Applied Research: South East Queensland (SEQ), Australia
South East Queensland (SEQ) Ecosystem Services Project

Aim:
- to identify, measure and value the ecosystem services provided by SEQ.

the SEQ Ecosystem Services Framework
- to provide the tools for a consistent approach to assessing the ecosystem services derived from the SEQ region; and
- to incorporate ecosystem services into natural resource policy, planning and management (mainstreaming).
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Framework:
• The MA describes the importance of developing a basic conceptual framework - solving and/or addressing complex issues; and encouraging a consistent approaches:

  ...given the complex interactions between ecosystems and human well-being, a prerequisite for both analysis and action is agreement [across stakeholders] on a basic conceptual framework.

• a framework is a … structure to solve or address complex issues… providing both guidelines and special tools to work with (WRI).

Methodology:
• looks beyond current frameworks, to determine ‘why’ that process was applied, and why ‘that’ information and ‘those’ decision support tools were developed.
• deliberately non-prescriptive - aims to provide recommendations or criteria for consideration.

Scale:
• Regional to national – lessons learnt from other nations
Learning from experience …how, what, when and why?

Three Lines of Enquiry (LoE’s):

• **LoE 1: Processes** –
  What is an appropriate process to develop an ecosystem services framework?

• **LoE 2: Information** –
  What type of information is required to support an ecosystem services framework?

• **LoE 3: Decision Support Tools** –
  What type of decision support tools are required to support an ecosystem services framework (i.e. to apply and/or communicate information derived from ecosystem service assessments)?

… synergies, interconnectedness, …
Research Approach

Three pronged approach:

• **Applied research (regional scale):**
  South East Queensland, Australia

• **Multiple Case study analysis (national scale):**
  (multiple ES, multiple ecosystems, advanced stage, English speaking, influential)
  – US Ecosystem Services Research Program
    (14 semi-structured interviews)
  – UK National Ecosystem Assessment
    (17 semi-structured interviews)

• **Document/literature reviews:**
  multiple ways
Applied Research:

*South East Queensland, Australia*

**Ecosystem Services Project**

**Coordinating Organisation:** SEQC

LoE 1 - Process:
Identify and apply an appropriate process for developing an ecosystem services framework in a ‘real world’ setting.

LoE 2 - Information:
Identify and develop information to support an ecosystem services framework.

LoE 3 – Decision Support Tools:
Identify and develop the decision support tools to conduct and communicate ecosystem service assessments.

Case Study 1:

*United States*

**Ecosystem Services Research Program**

**Coordinating Organisation:** US EPA

14 Semi-structured Interviews -
LoE 1: Process
LoE 2: Information
LoE 3: Decision Support Tools

Case Study 2:

*United Kingdom*

**National Ecosystem Assessment**

**Coordinating Organisation:** UNEP

17 Semi-structured Interviews -
LoE 1: Process
LoE 2: Information
LoE 3: Decision Support Tools

**Document and literature review:** review documents and literature on ecosystem services and established frameworks.

- Synthesise information across case studies to develop recommendations on an appropriate methodology.

**SCALE**

- **REGIONAL**
- **STATE**
- **NATIONAL**
<table>
<thead>
<tr>
<th>Project / Key Features</th>
<th>SEQ Ecosystem Services Project</th>
<th>US Ecosystem Services Research Program</th>
<th>UK National Ecosystem Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving Forces</td>
<td>Main Driver: Millennium Ecosystem Assessment Other Driver: Population growth</td>
<td>Main Driver: Millennium Ecosystem Assessment Other Driver: Decrease in Budget</td>
<td>Main Driver: Millennium Ecosystem Assessment Other Driver: Climate change; CBD Biodiversity Targets 2010; European Policy</td>
</tr>
<tr>
<td>Call for Research</td>
<td>SEQ Stakeholders through the Natural Resources Management Plan workshops and the Regional Landscape and Open Space Advisory Committee</td>
<td>US Environmental Protection Agency</td>
<td>DEFRA based on a report by the House of Commons Environmental Audit Committee</td>
</tr>
<tr>
<td>Coordinating Sector</td>
<td>Non-government organisation</td>
<td>Federal Government</td>
<td>Non-government organisation</td>
</tr>
<tr>
<td>Coordinating Organisation</td>
<td>SEQ Catchments</td>
<td>US Environmental Protection Agency</td>
<td>United Nations Environment Program</td>
</tr>
<tr>
<td>Funding Organisation</td>
<td>Originally AU Gov't. changed to State Government when Au Govt changed and changed funding programs</td>
<td>US Gov't</td>
<td>DEFRA; Natural Environment Research Council; Economic and Social Research Council; Northern Ireland Environment Agency; the Scottish Government; the Countryside Council for Wales; and the Welsh Assembly Government</td>
</tr>
<tr>
<td>Scale</td>
<td>Property – Local - Regional Area: approx. 22 000 km² Population: 3 500 000</td>
<td>Local – National Area: 9 181 859 km² Population: 313 478 205</td>
<td>Local – Multi-national Area: 243 610 km² Population: 62 262 000</td>
</tr>
<tr>
<td>Program Leader</td>
<td>1 x Project Manager</td>
<td>1 x Program Manager</td>
<td>2 x Co-Chairs</td>
</tr>
<tr>
<td>Program Aim(s)</td>
<td>1. To develop an 'agreed' ecosystem services framework for SEQ. 2. To incorporate ecosystem services and the framework into natural resource management, planning and policy in SEQ.</td>
<td>Vision: Contribute to a comprehensive theory and practice for characterizing, quantifying, and valuing ecosystem services, to ensure that their relationship to human well-being is consistently incorporated into environmental decision making. Mission: Provide the information and methods needed by decision makers to assess the benefits of ecosystem goods and services to human well-being for inclusion in management alternatives. Goal: To transform the way decision makers understand and respond to environmental issues by making clear the ways in which our policy and management choices affect the type, quality and magnitude of the goods and services we receive from ecosystems.</td>
<td>1. Assess the status and trends of ecosystems and the services they provide at multiple spatial scales. 2. Describe key drivers of change affecting ecosystems. 3. Examine plausible futures (scenarios) for ecosystems and the services they provide. 4. Outline response options to secure continued delivery ecosystem services. 5. Value the contribution of services to human well-being.</td>
</tr>
<tr>
<td>Number of People assigned to the Program</td>
<td>1.5 assigned (over 190 involved)</td>
<td>Originally 272 assigned (over 500 involved)</td>
<td>? assigned (over 500 involved)</td>
</tr>
<tr>
<td>Duration of program</td>
<td>4 years</td>
<td>5 years</td>
<td>2 years</td>
</tr>
<tr>
<td>Budget</td>
<td>AU$ 80,000 (approx. per year)</td>
<td>US$ 70 million (approx. per year)</td>
<td>£ 1.3 million (approx. over 2 years)</td>
</tr>
</tbody>
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Line of Enquiry 1: Process

SEQ – extremely adaptive and participatory

- the **multi-disciplinary** nature of ecosystem services requires a multi-disciplinary approach to information collection;
- **legitimacy** (fairness) to stakeholders would be higher through a participatory approach;
- the coordinating organisation being a non-government organisation would require wider input from stakeholders to increase **credibility** (authoritative, believable and trusted) information for policy and planning applications;
- **expert local opinion** was recognised as an **important resource**, particularly when information and data is limited;
- involving a wide range of stakeholders would improve the **saliency** (relevance) to decision making at multiple scales and for different applications;
- the **resources** (including time, number of staff, expertise and funds) limited alternative approaches to developing the methodology; and
- a participatory approach would improve **social learning** (learning while doing) amongst stakeholders.
Were there discussions with other departments/ offices/ agencies/ organisations about working collaboratively? (1 US)

- a more collaborative approach to the program across federal agencies was recognised as preferable. A "relationships across employees that could make it work", past experiences and the agencies' objectives and missions were considered different enough to deter a more collaborative approach on a day to day basis.

- Scale was not considered an issue to engaging stakeholders "because all local governments and stakeholders have groups that aggregate up and we certainly could have gone to them as representatives of these stakeholders"
Based on your experience what are the benefits and dis-benefits of a government agency coordinating this research?

Benefits:

• **Better leverage** of other agencies – it is more natural and easy for government agencies to work together than mixing across sectors

• The US EPA was considered to be in a unique position to propose a **nationally standardised accounting and classification system** - could support the creation of **markets** (e.g. cap and trade)

• A consistent stream of **funding** within government

Dis-benefits:

• **Inflexibility** of government - the number and magnitude of rules and regulations (e.g. community surveys, workshops) and releasing information - "sometimes regulations can provide a hindrance to achieving [research goals] because they **often focus on one problem** at a time rather than taking a systems approach – also they can be short sighted"

• The US EPA is recognised by others "as **coming in over the top**" with regulatory solutions - as a Researcher [this] can hinder your position because "no-one wants to interact with someone who might turn around and regulate them" - Gaining access to properties for research purposes is often difficult as "some are afraid you might sue or fine them and/or tell them what to do with their property". One respondent said "you can really disrupt a local process with, 'We're from the federal government. We're here to help you!'"

• Often **released material was considered "old"** by the time it had been through the peer review process
What is the role of government in developing ecosystem service frameworks? (9 UK)

Co-Chairs, government representatives from the England, North Ireland, Scotland and Wales (Client Group - funders), coordinating organisation (UNEP).

- as **funders** of the program; to have a say where money is being spent; "to have a mechanism for potentially locating more money or for stopping it if it was all proving to be a waste of time";
- as one of the **stakeholders**, to have **ownership** of the program;
- to ensure the outcomes have **policy relevance**;
- to ensure the outcomes have "traction";
- to be able "**to understand and communicate** the information to **their ministers** and then the ministers can talk to the other ministers";
- to **oversee** the program;
- for **data collection** purposes, including access and consistency; and
- to contribute to **agenda setting** and developing the major questions.
Why the program should be coordinated independent of government, such as:

- "the need for it [the program] to be an independent review";
- "it [the program] requires independent scientific leadership"; the "leader needs scientific credibility (which usually is not held in government or their position in government taints their credibility)"
- "an individual leading it from one specific agency, isn’t so favourable to the other agencies"
- "it needs to be kept at arm’s length of Politicians"
- “if the government itself did it, its legitimacy is less in the eyes of many other stakeholders"
- "UNEP were attractive to them [the British Government] as they are actually one step outside the normal UK institutions" [so are less bias to politics and stakeholder agendas]
- **collaborating is easier** for non-government organisations "... they have greater flexibility"
What type of information is required to support ecosystem services frameworks?

1. Biodiversity
2. Ecological Units
   1. SEQ - ecosystems/biomes
   2. US – ecosystems (wetlands, streams, coral reefs)/environmental classes
   3. UK - habitats
3. Ecosystem Functions (SEQ, UK)
4. Ecosystem Services
   - 3 different definitions – Benefits; FEGS; FES
   - 65 ES assessed across programs
   - 19 common ES
5. Ecosystem Valuation
   - SEQ – well-being
   - US – monetary (place-based) and human health and well-being (national and place-based)
   - UK – individual well-being (monetary £ and health +/-) and shared social values 😊 / 😞
Line of Enquiry 2: Information

**What is the role of biodiversity in ecosystem service assessments? Is biodiversity and ecosystem services or not?**

<table>
<thead>
<tr>
<th>SEQ</th>
<th>10 US</th>
<th>17 UK</th>
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<tbody>
<tr>
<td>No</td>
<td>7 = No - habitat (1), people cared about - this still did not make it an ES (5), a “structural thing” (2), FEGS are dependent upon b’versity (5), subjective nature and our inability to actually measure and value (2).</td>
<td>1 = No - habitat types</td>
</tr>
<tr>
<td>-</td>
<td>2 = Yes - extrinsic value</td>
<td>15 = Yes - linkages between people and other species, when it is appreciated as biodiversity, charismatic species, IES and FES</td>
</tr>
</tbody>
</table>
UK ... *it is quite an important question to solve at the very beginning* because a lot of people have been working in the biodiversity paradigm for a really long time ... and we’ve spent all this time convincing governments that’s what they should be worried about ... and to suddenly now turn around and say, “Oh, it’s about ecosystem services” without making the link is quite dangerous ... and I think you have the potential then also to alienate so many stakeholders.

US ... as a nation "the US is not quite oriented towards biodiversity".

US ... "biodiversity is not an EPA mandate" - it [the EPA] tended to be more regulatory towards pollutants and did not have the authority to legislate land-use key to protecting biodiversity".
Line of Enquiry 3: Decision Support Tools

- SEQ – mapping, website
- US – mapping, modelling, scenarios, website
- UK – mapping, (modelling in economic valuation), scenarios, website

Multiple Stakeholders
Resource (time, staff and money) dependant!
Key Findings

- Two main approaches – in-house and participatory
- Multi-disciplinary approaches essential
- Social learning - policy driven/drive policy
- Policy relevant not policy led
- Well-being and $ valuations
- Importance of ‘visual’ decision support tools
- A mapping/modelling plan is required up front for consistency
- A range of tools are required – capacity of stakeholders - access to tools and information
- Flexibility of application
- Culture of nations and missions of organisations will influence process, information and decision support tools

Process is as important (if not more) as product!