Integrating Biophysical Sciences, Social Sciences, and Economics in Ecosystem Service Assessment: New Guidance

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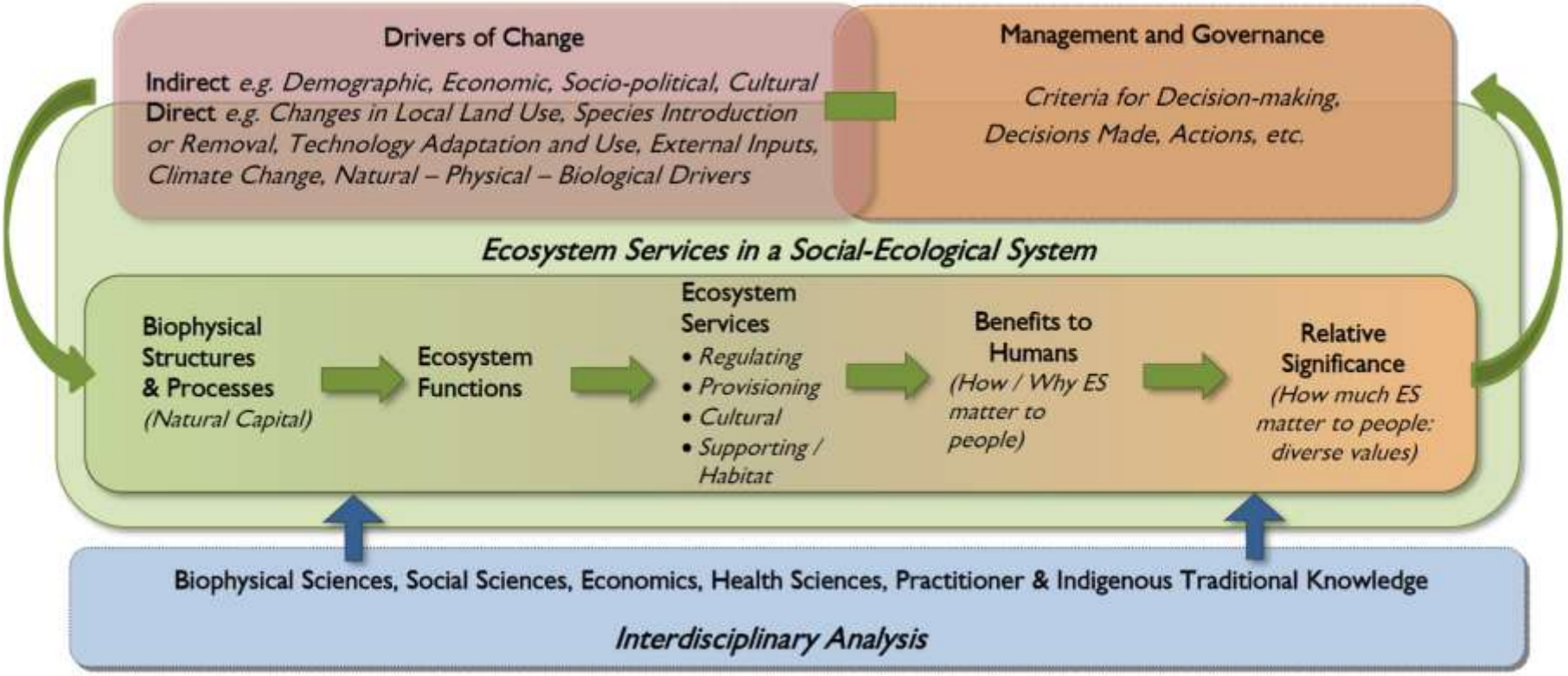
Many Useful Guides on ES
So Why Create a New One?

- Most focus on economic how-to but short on approaches to values from other social sciences and biophysical sciences
- Working group in Canada tasked by Federal, Provincial, and Territorial Assistant Deputy Ministers to develop detailed how-to guide:
  1. How to determine is ES assessment/analyses were right for the case
  2. **How to complete fully integrated, interdisciplinary ES assessment**
  3. How to understand what the results mean AND do not mean
  4. How to use ES assessment/analyses in government decision contexts

Ecosystem Services is an inherently interdisciplinary subject…

Our Conceptual-Analytical Framework



…so integration has to be part of each step in assessment

- From setting up the assessment team, to sorting out what to assess, how to assess it, and how to understand and report results
- Challenges team members from different disciplines to develop shared understanding of issues, concepts, terminology, and to listen to and understand each other
- Tasks and Tools are organized thematically rather than by disciplinary role – i.e. the approach is horizontal and depends on collaboration across disciplines

Nine Practical Worksheets

Flow from the six main steps

1. Defining the issue and context
2. Identifying priority ES and beneficiaries for assessment
3. Identifying what needs to be evaluated to answer assessment questions
4. Identifying and using indicators, data sources, and analysis methods
5. Synthesizing results to answer assessment questions
6. Communicating assessment outcomes

1. Define the issue and context
2. ES Priority Screening Tool
3. Summarize Screening/Confirm Priority ES
4. Characterize the Priority ES
5. ES Cascade Tool
6. Develop Detailed ES Assessment Plan
7. Select Relevant Indicators to Assess ES
8. Determine Approach to Analysis Methods & Tools
9. Synthesize Analysis Results

…along with 9 other "Tools"

Tab 1: ES Descriptions

Tab 2: Cross-cutting Issues & Key Considerations

Tab 3: ES Assessment Involving Indigenous Communities

Tab 4: Worksheets for Completing ES Assessment

Tab 5: Indicators of Natural Capital, ES & Benefits from ES

Tab 6: Values & Valuation: Economic & Socio-cultural

Tab 7: Compendium of Data Sources, Analysis Methods & Tools

Tab 8: Answers to Frequently Asked Questions (FAQs)

Tab 9: Glossary

Tab 10: Canadian ES Reference List

So it looks like this in Step 1…

Step 1: Defining the Issue and Context

- Task: setting up a lead team
- Task: defining issue and context using Worksheet 1 to identify/document
  - issues driving the assessment
  - geographic, environmental, policy, socio-cultural, and economic context
  - critical issues that cannot be ignored (could be of any kind, requiring varied expertise)
  - decision time horizon
- Task: reviewing key terms using Tool Tab 9: Glossary (11pp)
  - especially those with different meanings in different disciplines, e.g. values, valuation
- Task: reviewing crosscutting issues using Tool Tab 2 (8pp)
  - One-pager for each of 7 issues: scale, ES flows across time and space, resilience, uncertainty, biodiversity and ES, drivers of change, cumulative effects
- …and refer back to Tool Tab 1 (4pp) for detailed definitions of each ES

…and this in Step 2

Step 2: Identifying Priority ES and Beneficiaries for Assessment

- Task: Identifying priority ES & beneficiaries using Worksheets 2 and 3
  - Screening tool provides evidence basis for choosing which ES to assess
  - Charts all ES relevant to policy site, all beneficiary groups, relevance of ES to each, and ranks factors e.g. risk to ES – biophysical, sociocultural, economic all together
  - Function as decision analysis tools to rank ES and reveal 'hot' issues
- Follow links to explanations using Tool Tab 8 (23pp): Answers to FAQs
- Read Tool Tab 3 (7pp): ES Assessment involving Indigenous communities
  - guide with supporting glossary and references
  - how ES pertain to Indigenous communities/cultures
  - the role of Indigenous traditional knowledge (ITK) as a source
  - specific advice on how to appropriately seek access to ITK and other information
  - role of Indigenous worldviews in relation to nature
  - suggested sources, suggested questions for obtaining culturally relevant information

…and in all of the other Tools

Tool Tab 5 (8pp): Table of natural capital, ecological functions, ecosystem services, and human benefits indicators for each ES, e.g.:

Ecosystem Service	Indicators for Natural Capital, Ecological Functions and ES	Human Benefits Indicators
• Climate regulation and carbon sequestration • Global climate regulation • Regional and local climate regulation	• Greenhouse gas balance (especially C-sequestration) • Land-cover characteristics • Quantity of greenhouse gases fixed and/or emitted • Effect on climate parameters (e.g., leaf-area index, total crown cover) • Carbon stocks above and below ground • Soil organic matter • Exchange of carbon between biosphere and atmosphere	• Extent of forced migration from areas no longer habitable or capable of supporting communities (e.g., Arctic or drought-prone areas) • Loss of livelihoods or cultural activities associated with changing climate • Risk of drought/flooding associated with agricultural production • Security of regional food sources if regional production declines due to climate change or other climate-related impacts

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Tool Tab 6 (23 ppp): Values and Valuation: Socio-cultural and Economic

- Key issues common to both; considerations distinctive to each
- Difference between "socio-cultural values" and "cultural ecosystem services"
- Theory/basis for the approach, contexts for use, and identifying appropriate methods

Table T6.1. *CES and their benefits (why and how they matter) to people.*[220]

Type of CES	Abbreviated Description (see *Tools – Tab 1* for full version)	Benefit (how/why it matters to people individually and collectively)
Cultural identity and heritage	Identity and heritage are grounded in experience everywhere, in every type of ecosystem, and informed by relationships with nature that are distinctive to each place.	Feeling of personal and group security, groundedness, of being embedded in the collective home, connection and purpose, being part of something grounded in the knowledge and practices associated with place. Orienting the self socially and in time and space.
Spirituality and religion	Many religions, cultures, and individuals around the world attach spiritual and religious values to the earth and to ecosystems or their components, or find deep spiritual inspiration in their experience of nature.	Connection to a mystical "higher power," or "divine" or "life force" that most humans believe in as a creative force in the universe, provides a deep sense of meaningfulness in life. Feelings of love, affection, awe, and gratitude that can inform moral attitudes and beliefs about human place in nature, including feelings of genuine kinship and compassion for other living things.[221] *Continued on next page...*

Questions?