Making Sense of Ecosystem Services: Developing a New Tool-kit

An initiative of Canada’s Federal, Provincial, & Territorial Government Departments Responsible for Biodiversity

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The Project...

• Context
• Objectives
• Issues
• Progress
• Next steps
Value of Nature to Canadians Study

- FPT Government departments responsible for biodiversity – collaboration under the Canadian Biodiversity Strategy and CBD

- Require information on socio-cultural, ecological, & economic importance of nature

  - and how to operationalize ‘ecosystem services’ for decision-making
ES Science & Measurement in Canada

ECOSYSTEM SERVICES

**KEY FINDINGS II**: Canada is well endowed with a natural environment that provides ecosystem services upon which our quality of life depends. In some areas where stressors have impaired ecosystem function, the cost of maintaining ecosystem services is high and deterioration in quantity, quality, and access to ecosystem services is evident.

**SOME OBSERVED TRENDS THAT AFFECT ECOSYSTEM SERVICES**

- Changes in human activities, such as land use, pollution, and climate change, affect ecosystem services, often in ways that are not fully understood.

**Ecosystem services are important because they provide critical life support, they underpin our economy and quality of life, and the full suite of services cannot be duplicated with human-made alternatives.**

**Valuation of ecosystem services**

Failure to recognize the economic value of healthy ecosystems has contributed to the continuing decline of biodiversity worldwide. **Depletion or replacement of ecosystem services with human-made alternatives is costly and can lead to irreversible losses of biodiversity and ecosystem services.**

**Regulating**

- **Climate regulation**
- **Water regulation**
- **Pollution regulation**

**Supporting**

- **Provision of ecosystem services**
- **Food production**
- **Genetic diversity**

**Human/ecosystem interactions**

The relationship between people of northern Canada and caribou has developed over thousands of years and underpins many cultural values. People living in the range of the Beverly caribou herd, predominantly have harvested caribou for approximately 8,000 years. An examination of the services provided by the Beverly and Qamanirjuaq caribou herds found that the value of harvest, including meat, hides, and antlers, is approximately $1.93 million per year. Previous studies in the region, augmented with questionnaires and interviews, concluded that traditional harvest of caribou and associated activities were valued by people throughout the range of the herds. Many people interviewed talked about how important the caribou harvest was to their identity and to the well-being of their communities.

**The ecosystem services that people of the North derive from caribou are threatened. The Beverly herd has declined severely since the last survey in 1994. As a result, people from northern Saskatchewan who traditionally harvest Beverly caribou have had to fly north on expense for their harvest. These caribou are from other declining herds, such as the Qamanirjuaq, Bathurst, or Abitibi.**

**Ontario’s Greenbelt Act of 2005 protected 7,200 km² of land for further urban development in the Golden Horseshoe region of southern Ontario. The Greenbelt is a network of green spaces, farmlands, communities, and wetlands, and includes habitat for more than 300 species of plants and animals.**

**The economic benefit to the area’s measurable non-market ecosystem services is approximately $0.4 billion annually.**

**The proposed Greenbelt is only a small fraction of the area that is provided by the Greenbelt. The Greenbelt also represents a valuable tool in the responsible development of the area.**

**The full suite of ecosystem services cannot be duplicated with human-made alternatives.**
ES Valuation in Canada

- Numerous Canadian case studies in last 20 years at different geographical scales
- Diverse approaches, methods
- Diverse end uses, users
What’s Missing?

• Values studies often lack science: measuring the sources of ES (extent, condition, relations)

• And typically lack integration of social values using other-than-economic means, even as prominent sources (e.g. TEEB) advise these other means should also be used

With a few exceptions!
Tool-kit is Procedural Guidance

1. How to decide if an ES values assessment is needed to support decision-making

2. How to complete an integrated interdisciplinary values assessment
   - ecological, social, cultural, economic
   - Not reducing to a single common metric, still useful to support complex decisions

3. How to make sense of complex values information once you have it
   - for practical use in policy, decision-making, and communications
Considerations

- Ecosystem complexity, interdependence, connectivity; systemic impacts
- Cumulative effects of change; projecting scarcity; thresholds
- Logic of proximity → ‘benefits to people’ – whose values are considered, and which ES?
- Assumptions about methods and values
- Effective interdisciplinarity and communication
- Ethics every step of the way
- Limitations of knowledge - uncertainty
Analytic Framework

**Ecosystem Science:**
Identify, measure, assess ecosystem process/function, indicators of ES capacity

**Ecosystem & Social Sciences:**
Identify, measure ES and their benefits to people
- Pathways
- Functions

**Social Sciences:**
Identify, measure significance (values)
- Non-economic
- Economic non-monetary
- Monetary as appropriate

Assess Impacts of Decisions
Inform Decisions
Workshop highlights

- Developed mock Terms of Reference
- Guiding Principles: adaptive, iterative, legitimacy, relevancy, and credibility
  - Phase 1: Define objective or problem
    - Decision context, social – ecological context (overview), deliverables
  - Phase 2: Pre-feasibility
    - Flesh out Social-Ecological-System context, determine affected and priority ES: ask beneficiaries + ecological review - Priority ES Screening Tool
  - Phase 3: Targeted analysis
    - Drill down on Priority ES in relation to project
# First Level Priority ES Screening Tool

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<tr>
<td>1</td>
<td>Check list of all potential ES (start with a full list)</td>
<td>2A</td>
<td>Potential benefits from services to extent possible</td>
<td>3A</td>
<td>Who benefits?</td>
<td>Local, regional, distant</td>
<td>4A</td>
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<td>5</td>
<td>Is the ES that is being negatively impacted substitutable? Availability of alternatives? To what degree?</td>
<td>6</td>
<td>Is substitute contested or disputable and to what extent?</td>
<td>7</td>
<td>Is the service scarce relative to demand?</td>
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<td>2B</td>
<td>Any dis-benefits tied to these services?</td>
<td>3B</td>
<td>What is magnitude of the benefit?</td>
<td>4B</td>
<td>Is a negative impact likely?</td>
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<td>Is there an associated threshold?</td>
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Features of Phase 3

• Uses expert opinion including from literature, and ‘local’ input
  – Current state / recent trends in availability and use
  – Identify critical benefits
  – Knowledge basis for specific priority ES
  – External (to project) drivers of change – what is at risk?
  – Project impacts on priority ES, present and future
  – Values for those priority ES using interdisciplinary tools
  – Consider: risk of exceeding tolerance/threshold, reversibility, confidence in identified values
  – Opportunities to enhance/improve effects of project
It’s a work in progress with a way to go still. Your thoughts are greatly appreciated, so please catch up with me between sessions or by email at susan.preston@ec.gc.ca

Thanks!