



Valuing Ecological Goods & Services from the Forest

Overview and Results of Five Regional Workshops

This report was prepared by the Private Woodlot Strategic Initiative, a collaboration between the Canadian Model Forest Network and the Canadian Federation of Woodlot Owners



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Executive Summary

Ecological goods and services (EG&S) are the processes, functions and products that provide the basis for life on Earth. The services that people are most familiar with include: water quality, air quality, recreation, wildlife habitat, carbon sequestration and storage (climate regulation), aesthetics, and biodiversity.

EG&S are vital assets, but they are not valued as commodities by conventional markets. Consequently, there has been a strategic separation within resource management between resources that have a commodity value that allows application of economic profit criteria and resources with an intrinsic value as “public” goods. Several programs and pilot projects in Canada are attempting to address this issue on agricultural land.

To bring forests, and in particular, private woodlots, into the discussion, the Canadian Model Forest Network and the Canadian Federation of Woodlot Owners held five workshops across Canada from February 22 to March 8, 2007. The driving concern behind the workshops was the growing need to find relevant and practical solutions to the gap that is developing between society's demands for EG&S and the ability of rural landowners to provide them. Would it be possible to identify workable ways to maintain and enhance EG&S and effectively balance the socio-economic needs of rural and urban populations?

The objectives of the workshop series were to: (i) create a common understanding of the concepts, objectives and definitions relating to the valuation of EG&S, (ii) create a common understanding of the extent to which EG&S are currently being addressed in Canada and internationally, (iii) examine the principles and components that make provision of EG&S (PEG&S)

programs successful and to identify their limitations, and (iv) determine the level of interest to consider the provision of EG&S as a policy approach in Canada.

The purpose of this report is to provide an overview of key pilot projects, research and options presented at the workshops; to summarize the key issues identified and discussed at the workshops; and to recommend the next steps to further the valuation of EG&S in both practice and policy development, based on the workshop conclusions.

Although perspectives and approaches differed across the country, each workshop came to the same general conclusions: EG&S are largely undervalued by Canadian society, PEG&S programs have great potential as a policy tool, and development of PEG&S programs should be pursued in Canada.

The workshop series led to six key recommendations to move forward with the provision of EG&S:

- 1) A National Working Group should be established to address the key issues related to using EG&S as an approach to natural resource and land-use policy in Canada.
- 2) A clear vision for EG&S provision must be identified.
- 3) There are many data gaps concerning EG&S that need to be filled.
- 4) There is a need for further public awareness on EG&S.
- 5) Financing for PEG&S programs must come from a wide array of sources and costs must be shared.
- 6) With growing public concern for finding solutions for climate change, many workshop participants felt that now is the time to move forward in developing this type of policy tool.

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Introduction

Ecological goods and services (EG&S) refer to those goods and services that make the Earth hospitable for human life and other living organisms. These services benefit humans and other living organisms through their existence and proper functioning. Ensuring that EG&S are maintained for current and future generations has been a concern for society since the scars of modernization began to show their effect on the environment through water and air pollution, declines in fish and animal stocks, and declines in the variety and number of different plant, tree and shrub species that naturally inhabit our landscapes.

EG&S provide vital assets, but they are not valued as commodities by traditional markets. Consequently, there has been a strategic separation within resource management between resources that have a commodity value enabling application of economic profit criteria and resources that are intrinsic to the public good.

Recent developments in market-based approaches to resource management are demonstrating that economic growth and ecological health can be brought

together to benefit rural and urban communities, industries, small businesses and governments today and into the future. Environmental practitioners and economists are collaborating across the world to develop Payment for Ecological Goods and Service Programs (PEG&SP) that enable free and open market exchange between those who are willing to pay for the benefits that ecosystems provide and those who are willing to provide them.

All of the EG&S that humans rely on are not yet fully understood. Some examples of EG&S include purification of air and water, maintenance of biodiversity, decomposition of wastes, soil and vegetation generation and renewal, pollination of crops and natural vegetation, groundwater recharge through wetlands, seed dispersal, greenhouse gas mitigation, and maintenance of spiritually and aesthetically pleasing landscapes. These goods and services exist over varying time periods with different degrees of vulnerability to changes in the landscape. It is becoming increasingly important to: (i) identify EG&S, (ii) demonstrate connections between human, wildlife and plant needs and the services in

existence, and (iii) evaluate and monitor practices that could be used to maintain EG&S. In Canada, several programs and pilot projects have been initiated to begin addressing some of these issues, but to date they have mainly focused on agricultural land. Less has been done to account for the EG&S provided by forests, yet they also generate very significant EG&S.

The Canadian Model Forest Network (CMFN) has always recognized the importance of forests, such as private woodlots, in their ability to provide EG&S. As part of its Private Woodlot Strategic Initiative, in cooperation with the Canadian Federation of Woodlot Owners and other organizations, the CMFN conducted a series of five workshops across Canada from February 22 to March 8, 2007 to begin to address some of these issues. The workshops were attended by private landowners,

government officials, non-government organizations, academics and industry representatives. The workshops had the following objectives:

- To understand the concepts, objectives and definitions surrounding the valuation of EG&S;
- To understand how EG&S is currently being addressed in Canada;
- To examine the principles and components that make PEG&S programs successful as well as to identify their limitations;
- To gauge the level of interest in EG&S as a potential policy approach in Canada; and
- To engage the private woodlot community and other stakeholders in consideration of PEG&S as a future policy direction.



Purpose

There are three key objectives for this report:

- 1) To provide an overview of key pilot projects, research, and alternatives presented at the *Valuing Ecological Goods & Services from the Forest workshops*
- 2) To capture and present the discussions and general conclusions of the workshops
- 3) To recommend the next steps to further the valuation of ecological goods & services in both practice and policy development based on the workshop conclusions

Workshop Descriptions

The five *Valuing Ecological Goods & Services from the Forest* workshops were held across Canada. Table 1 provides a brief overview of the different locations,

themes, formats, dates and attendees at each workshop. A list of presenters is available in Appendix A.

Table 1 – VEG&S from the Forest: Canadian Workshop Series Summary

Workshop Location	Theme	Format	Date	Attendees
Amherst, NS	From Atlantic Woodlots and Farms	Morning/early afternoon presentations Afternoon facilitated workshop	02-22-07	<i>c. 80 people</i> Woodlot owners, members of the agricultural community and provincial government representatives from the Maritimes
Quebec, QC	Passing Fad or Emerging Reality	Morning presentations Afternoon facilitated workshop	02-27-07	<i>c. 40 people</i> Members of the academic community, NGOs, and provincial & federal government representatives
Peterborough, ON	An Ontario Perspective	Morning to evening presentations	03-01-07	<i>c. 60 people</i> Woodlot owners, NGOs, members of the agricultural community and provincial & federal government representatives
Saskatoon, SK	Managing Trees in the Agricultural Landscape	Afternoon presentations Evening bearpit sessions Morning presentations Wrap-up discussion	03-05-07 03-05-07	<i>c. 40 people</i> Members of the agricultural community, federal and provincial government representatives and NGOs
Victoria, BC	Incentive-based Stewardship	Morning/early afternoon presentations Afternoon facilitated workshop Morning field trip to Wildwood	03-07-07 03-08-07	<i>c. 35 people</i> NGOs, federal government and First Nations representatives



Key Case Studies and Pilot Programs Presented at the Workshops

1) Compensation for the Provision of Ecological Goods & Services

The following section summarizes presentations of programs and pilot projects involving compensation to private landowners for specific management practices that contribute to fostering EG&S.

a) Costa Rica

Following several decades of rapid deforestation during which forest cover dropped from 75% in 1940 to 21% in 1987, Costa Rica adopted a new forestry law in 1996 which mandated that forests were to be considered as more than a source of timber. This law laid the groundwork for compensation to be given to landowners whose lands are deemed appropriate to provide benefits to society through the provision of four key environmental services: (i) greenhouse gas mitigation, (ii) hydrological services, (iii) biodiversity and conservation, and (iv) provision of scenic beauty for recreation and tourism.

The Costa Rica payment for environmental service program (PES) pays landowners through one of three program contracts:

- 1) Reforestation (contract period of 15 years)
- 2) Conservation (contract period of 5 years)
- 3) Agroforestry (contract period of 10 years)

The contracts require that landowners comply with regulations developed by FONAFIFO (The National Forest Investment Fund). Financing for the program comes from a variety of sources including; a national 0.7¢ / litre gasoline tax, local bottling companies, local hydroelectric companies, World Bank, Global Environmental Facility and numerous international governments. The program has been successful in increasing forest cover, area of forest in protection, participant's household incomes, and participation of woman and indigenous peoples. While

this program is no “silver-bullet”, it is a working program tackling some very difficult issues and producing significant results.

A summary document on this program *Environmental Service Payment: a summary of Costa Rica's experience* by Michael Kennedy is available on the Canadian Model Forest Network Research Database at:

<http://www.modelforest.net/cmfn/en/publications/>

b) Alternate Land Use Services (ALUS)

The Alternate Land Use Services (ALUS) program is a PEG&S with its first pilot project established in western Manitoba in 2005 with funding from the Government of Canada, the Manitoba government, and the Delta Waterfowl Association. Several local municipalities are also contributing to the cost of the three year pilot. Other pilots are under consideration across the country. The program's objective is to maintain key ecological services in the agriculture landscape by providing some financial compensation to farmers who foster particular EG&S.

There are four land types recognized in the ALUS program:

- 1) Wetlands
- 2) Riparian Buffers
- 3) Natural Areas
- 4) Ecologically Sensitive Lands

A schedule of annual payments has been established for various activities that improve protection of these land types (e.g. \$15/acre is paid for riparian buffers and natural areas which are taken out of production). This project aims to share the costs for the provision of EG&S between society and the landowner. ALUS is a farmer-led program with delivery through farmer organizations and existing agriculture agencies. The Manitoba pilot has received strong farmer support with 75% of farmers in the pilot area having joined the program. It also places

considerable importance on involvement of the larger community in tailoring the program to fit local priorities. Further information on ALUS can be found at:

<http://www.deltawaterfowl.org/alus/index.php>

c) The New York City Watershed

The NYC watershed provides good quality drinking water to more than 9 million urban consumers. It covers an area of over 1,900 square miles in the Catskill Mountains and the Hudson River Valley. Seventy percent of the watershed is private land owned by farmers and woodlot owners. In cooperation with communities and landowners in the watershed in the early '90s, the New York City Department of Environmental Protection developed a stringent plan for controlling pollution of surface waters with what has proven to be an effective balance between regulation and incentive programs. The implementation of the plan has improved water quality and helped maintain a prosperous local economy with a strong continuing presence of farm and woodlot businesses.

This is achieved through the implementation of three main programs:

- 1) Watershed Agriculture Program (WAP)
- 2) Watershed Forestry Program (WFP)
- 3) Watershed Easement Program

These programs provide several types of financial incentives to private landowners to manage their land in a way that protects water quality within the watershed.

Further information on the NYC Watershed can be found on the Watershed Agricultural Council website: www.nycwatershed.org; the New York City Department of Environmental Protection website: www.ci.nyc.ny.us/dep; the Catskill Watershed Corporation website: www.cwconline.org; and the Catskill Forest Association website: www.catskillforest.org

2) Valuing Ecosystem Services Research

The following section briefly outlines current research being pursued in Canada in the valuation of EG&S.

a) Watershed Evaluation of Beneficial Management Practices (WEBs)

WEBs is a project initiated by Ducks Unlimited that is intended to study the impact of various beneficial land management practices (BMPs) on water quality. It is a four-year \$5.65 million project involving seven small-scale watershed sites across Canada.

The objectives of the project are to determine the environmental and economic benefits of selected BMPs, to model the data at a watershed scale, to identify those BMPs and lands that will give the greatest return on investment, and to determine an appropriate level of compensation to landowners.

Examples of BMPs being investigated in the Prairies include:

- Land conversion from annual cropping to grassland
- Management of livestock access to water
- Nutrient management
- Riparian buffer strip enhancement

Further information on the WEBs research project can be found on the Ducks Unlimited website at: <http://www.ducks.ca/province/ab/how/research/webs/>

b) Contribution of Woodlots to Society

With the support of Fundy Model Forest and the Canadian Model Forest Network, Dr. Van Lantz from the University of New Brunswick is currently researching “Valuing the Contribution of Woodlots to Society”. The purpose of the study is to shed light on the value of EG&S

provided by woodlots to the larger community and to examine mechanisms that promote these values. The study area is the Canaan-Washademoak watershed situated in south-eastern New Brunswick.

This study is focused on five key points:

- 1) Identifying the important EG&S at specific scales within the watershed
- 2) Quantifying EG&S currently provided and the desired levels
- 3) Determining the activities required to support EG&S
- 4) Estimating the landowners costs and the desired levels of social benefits
- 5) Exploring mechanisms for implementing an EG&S program

c) Monetization of Intangible Forest Values

A research project on the monetization of intangible forest values is being undertaken by Virginie Mai Hô, a Master's student in forest sciences at Université Laval. The primary objective is to place a financial value on biodiversity in the context of forest management zoning. The goal is to integrate multiple forest values into the decision-making process.

The project will involve three phases:

- 1) Defining the values within the project area
- 2) Monetization of biodiversity
- 3) Integrating monetized values into the decision-making process, with an analysis of the potential for transferability to other contexts

The anticipated result is a decision-making tool that would both aid in incorporating intangible values into forest management decisions and facilitate dialogue between stakeholders.

d) Wildlife Habitat Canada – National Survey of Farmers and Ranchers

In May of 2006 Wildlife Habitat Canada released a survey prepared by the Environics Research Group that examined stewardship practices on Canadian agriculture lands. The survey also gauged landowner knowledge and perception of EG&S.

The purpose of the study was to provide policy-makers and program developers with data to aid in the development of programs and policies related to the stewardship of agricultural land. The survey sample consisted of 1,794 rural landowners across Canada who report owning at least 10 acres of land and who earn more than \$2,500/year from their land.

In general, the survey found that a small proportion of landowners (25%) were aware of the term EG&S. In general, once they understood the concept, a majority of farmers (80%) saw few barriers to incorporating EG&S into their current farming practices. Currently, 70% of farmers felt that they are already providing benefits to society at a personal cost, strengthening their belief that they are part of the solution to current environmental issues. To see more specific results of the WHC survey, please follow the link below: <http://www.whc.org/RESULTSofNationalSurveyonEcologicalGoodsandServices.htm>

e) Environmental Farm Plans

The Ontario Environmental Coalition, Agriculture and Agri-Food Canada, Ontario Ministry of Agriculture, Food and Rural Affairs, and the Ontario Soil and Crop Improvement Association are collaborating to provide farmers in Ontario with Environmental Farm Plans (EFPs). These plans are voluntary, confidential and self-directed. The EFPs are a tool to encourage risk reduction approaches to farming and to create an incentive for continuous improvement in farming practices.

This program was initially started to encourage improvements in current farming practices. The program has been effective at encouraging improved cropping,

manure storage and handling, protection of wells, nutrient management, and pest management. Currently, the Ontario government and its partners are examining the potential to use these plans as a means to enhance provision of EG&S by Ontario farms. Other provinces have similar EFP programs.

f) Prairies Shelterbelt Program

In 2004 Agriculture and Agri-Foods Canada, through the Prairie Farm Rehabilitation Administration, completed a study that quantified the economic benefit accruing to the public from the establishment of shelterbelts planted in the Prairie provinces and assessed the total value of the shelterbelt program to Canada.

This study found that shelterbelts contributed a total of \$132.2 million dollars to the public through a reduction in soil erosion, improved air quality, net reductions in green house gases, improved water quality, increased biodiversity, recreation, and energy conservation. Shelterbelts were also estimated to contribute between \$34 and \$341 million in private benefits to farming producers. The total economic value of shelterbelts was between \$178 and \$473 million. The total government investment to yield this economic value was \$30 million.

g) Pembina Institute Boreal Research

In 2005 the Pembina Institute published an assessment of the value of Canada's boreal forests, which provide a range of EG&S. The boreal forest covers 58.5% of Canada's land mass. As part of this study The Pembina Institute developed a Boreal Ecosystem Wealth Accounting System (BEWAS). This is a tool for measuring and reporting on the physical conditions and the full economic value of the boreal region's natural capital and ecosystem services.

This study found that the net value of Canada's boreal forest natural capital in 2002 was \$37.8 billion. The estimated non-market value of the ecosystem services in 2002 was \$93.2 billion or \$159 per hectare. In comparison, the market value of products from natural resource exploitation was \$48.9 billion in 2002.

3) Alternative Approaches to the Provision of EG&S on Private Land

The following section provides examples of alternatives to a payment or incentive program for private landowners to maintain or enhance EG&S. It illustrates two examples of ways that can foster EG&S while simultaneously generating a profit or financial benefit. In theory, if it can be demonstrated to landowners that certain practices can be both financially and ecologically beneficial, there may be no need for payments or incentives. It is important to note that the following options need careful forest management planning, as they do not necessarily contribute to a healthy ecosystem. They are also heavily dependant on regional conditions and resources; and therefore may not be suitable for all locations.

a) Non-Timber Forest Products

Non-timber forest products (NTFPs) are goods and services from the forest that are not conventional timber products. They include a wide diversity of products such as berries, mushrooms, oils, sap, teas, wild rice, botanicals, crafts, tourism, recreation and education. Unlike EG&S, normal markets for NTFPs exist and pricing is not an issue for these commercial products. However, further research is required in order to better capture market information.

The reason NTFPs complement the maintenance of EG&S so effectively is that many of them can be harvested without eliminating vegetative cover and without significantly disturbing biodiversity or other environmental values. Therefore, EG&S can be maintained or enhanced while simultaneously allowing for economic

return to the landowner. It is an alternative to conventional timber harvesting that may have great potential for fostering EG&S.

It is important to note that NTFPs are natural resources that have to be managed on a sustainable basis. Wildlife and other NTFPs are present in commercial forests and can in some cases be enhanced with appropriate timber harvesting. In general, NTFPs demonstrate the potential compatibility of careful management for timber and a variety of other products with EG&S.

b) Agroforestry

Agroforestry is the practice of integrating trees with agricultural production. It is a combination of agriculture, forestry and environmental science. It can involve various systems including shelterbelts and riparian forest buffers.

Carefully managed and maintained treed areas are particularly well suited to provide EG&S. They can also provide significant benefits to producers, some of which have positive financial implications. For example, they can improve soil productivity, can lead to increased crop quantity or quality and hence, greater profit. Other potential benefits include water supply regulation and purification, energy conservation, tourism revenue, pest control and pollination.

In general, agroforestry practices have the potential to simultaneously foster EG&S and the long-term productive capacity of agricultural landscapes.



Summary of Workshop Discussions

The following section provides a brief overview of the key topics of discussion at the workshops.

Urban vs. Rural

At the workshops, one of the major barriers to the provision of EG&S was identified as the disconnect between urban and rural populations. There is a general lack of awareness among urban populations about the value and origin of EG&S and the associated costs borne by the rural residents who provide them.

This presents a challenging dichotomy. Although rural people are those who understand the requirements of providing EG&S and whose land-use and production decisions can directly impact EG&S for the benefit of both urban and rural communities, it is the urban populations who have the voice and the power to determine the broad social and political framework of incentives and disincentives that limit or empower land owners' choices.

One of the main conclusions of the workshops was the need to bridge this urban-rural gap as an important component of any strategy for moving forward with PEG&S programs. For a PEG&S program to work, rural residents need the understanding and support of the people in the cities. One way this challenge can be addressed is through education. Awareness of EG&S needs to be “marketed”; the public needs to begin to understand the concept of EG&S and what is involved in providing and maintaining them.

This could be achieved by connecting EG&S to current environmental concerns. The public is already concerned about the environment, and should therefore be receptive to efforts aimed at helping them better understand what EG&S are. In other words, the first stage of marketing, establishing “demand”, is already partly accomplished as people are already concerned about EG&S. The further stages are to increase understanding of what the products are and what can be done to get more of them.

What Goods and Services?

People are going to be more willing to pay for something that they can identify with. Not all EG&S are viewed as equal in the eyes of the public; the benefits of maintaining some goods and services are better understood than others. Any policy initiatives related to EG&S will need to consider this.

The EG&S that people are most likely to identify with include: water and air quality, wildlife habitat, recreation, aesthetics and to some extent, biodiversity. The level of public support for programs to maintain and enhance supplies of these goods and services will depend on the value they place on receiving them. The EG&S that are important to people will differ based on historical, demographic and cultural variables. It will be important to provide opportunities for public participation in establishing the local priorities for PEG&S. Community involvement is already part of watershed management programs in some jurisdictions, and is one of the key features of the ALUS program. In some cases the public's vision of the future will help clarify a lot of the issues concerning "What goods and services?" A detailed description of the types of EG&S that exist will be useful in most situations.

EG&S are the conditions and processes through which forest ecosystems and the species that make them up help sustain and fulfill human life. There are no substitutes for EG&S, or at least, very limited, inadequate and expensive ones. Finding lower cost alternatives for these functions and processes will be unlikely. On the one hand, we will require nearly all the EG&S that we can procure, while on the other hand, we can only afford to allocate so much public funding to ensuring that these goods and services are maintained. Thus, to move forward

with policy discussions it is important to separate EG&S into clear categories. In general EG&S can be classified as follows:¹

Regulating Services: ecosystems regulate essential ecological processes and life support systems through bio-geochemical cycles and other biospheric processes. These include climate regulation, disturbance moderation and waste treatment.

Provision Services: ecosystems supply a large variety of goods and services for human consumption, ranging from food and raw materials to energy resources and genetic material.

Cultural Services: ecosystems provide an essential 'reference function' and contribute to the maintenance of human health and well being by providing spiritual fulfillment, historic integrity, recreation and aesthetics.

Supporting Services: ecosystems also provide a range of services that are necessary for the production of the other three service categories. These include nutrient cycling, soil formation and soil retention.

From the four categories mentioned above it is clear that many Provision Services are already being bought and sold in formal or informal markets. Less prevalent is the trade in Cultural Services, but effective valuation of the benefits provided by these types of services may enable them to be maintained. The two types of services for which there are very few markets and with which we are generally most concerned are the Regulating and Supporting Services, water quality, wildlife habitat, biodiversity, and landscape aesthetics fall into these categories. Coincidentally, these are the services for which current valuation exercises fall short and where markets do not exist or perform poorly. More information is required in order to effectively incorporate them into PEG&S programs.

1 Millennium Ecosystem Assessment, 2003. Living beyond our means: natural assets and human well-being. www.millenniumassessment.org Accessed 27 March, 2007

Payment Methods

The traditional policy approach to EG&S is to regulate the supplier by imposing fines and penalties on land managers who do not conform to laws and policies put in place to protect certain EG&S on the landscape (e.g., endangered species legislation). Although this has been effective to a certain extent, laws and regulations have not traditionally been all-inclusive and several EG&S are still being undervalued. This approach primarily puts the cost onto land managers and usually incurs high costs in administration and enforcement.

Some assert that this approach is entirely fair. If the land is to be managed for profit, then the land owner should be responsible for minimizing the negative effects of his or her actions. Environmental stewardship is also seen by many as a moral obligation of landowners (these views were not expressed at the workshops).

Others argue that under the traditional regulatory approach, a landowner has little motivation to maintain EG&S, and will respond much better to positive incentives. Complementing this position is the issue of equity: the producers of EG&S bear all the costs, while the consumers enjoy them for free.

This is one of the most debated topics concerning the provision of EG&S. It is one thing to say that EG&S are worth billions, but this does not have much meaning if no one can/will pay for them. The cost has to be brought into the system. If landowners are to be compensated, where will the money come from?

Should there be a new tax, like the gas tax in Costa Rica? Should the provincial or federal governments pay? Should payment be a collaborative effort among a number of funding sources? Since land owners get some of the benefits from the EG&S from their land, should they be responsible for part of the costs? Could payment come from a market system?

Financing PEG&S

There are several tools that policy makers can use to begin addressing the issue of payment other than the use of general revenues. Many of these tools are traditional economic tools that are already being used by society. Some of the more common tools used for EG&S include:

a) Special or “Dedicated” Taxes

Taxes, established for a narrowly defined purpose are sometimes an acceptable tool. An example is a surcharge on hunting licences that helps fund a wildlife habitat management program. The Costa Rica case study had several examples of this kind of tax.

b) Tradable Quotas

Tradable quotas — or cap & trade systems — are a tool used by governments to reduce specific pollution levels or encourage alternative land uses. The “cap” is established by government as a legal limit on the quantities of pollutants or of undesirable land uses that are permitted. Businesses must reduce emissions to the maximum allowed or buy credits from other businesses that have succeeded in reducing their emissions below the maximum. Governments are in fact creating a market for the credits, backed by the fines or other penalties established for non-compliance. As demand for credits pushes up their price, an incentive is created for the production of additional credits. Other activities that reduce the pollutant may also be recognized as credits. These are known as “offsets”. Offset credits can be produced from land use changes, agriculture conversion, increased forest yields and activities targeted at mechanical removal of pollutants from the atmosphere. The cap and trade system is currently being promoted by some environmentalists and policy advisors as an efficient means to lower overall emissions of carbon dioxide.

c) Private Contracts or Deals

In some situations, industries and businesses clearly benefit from specific EG&S. Some obvious cases include: water regulation for hydroelectric production, water purification for beverage bottling and aesthetic benefits for recreation and tourism. In some cases these situations may present an opportunity for land owners to be compensated for good environmental stewardship by entering into watershed or landscape agreements with businesses who will pay for the benefits they are deriving from landowners' management decisions.

d) Information, Education and Recognition Programs

Many landowners take pride in the land they own and want to do their best to care for it. In circumstances where financial pressures on landowners are tolerable, effective information and education programs may accomplish much of the work required to meet EG&S objectives. Information can be in the form of management plans, technical reports, and advice on websites. Public recognition of landowners who practice good stewardship can also contribute in ways "that money can't buy". Conversely, landowners who have made a serious effort to be good stewards can be deeply offended by imposed regulations that appear to treat their hard work with indifference.

e) Eco-Labeling

Eco-labelling may be a way to finance provision of EG&S by enabling landowners and businesses to sell to consumers who are willing to pay a premium for products that come from forests where EG&S are being maintained. This tool can be used to label wood products, non-timber forest products, bottled water, or even energy.

f) Hybrid Approaches

Various combinations of the tools listed above are possible. In particular, tax programs can be coupled with a market-based framework where EG&S are

bought and sold much like commodities in the current economy. In such cases it can become economically beneficial for landowners and practitioners to comply with a particular ecological mandate because they can be compensated, through cash payments, tax deductions and rebates, rather than being forced to comply at an economic disadvantage. Also, the overall costs of compliance with particular policies are shared in a market-based, tax funded, framework. Education and recognition programs are likely to be important components of most types of programs.

The financing tools listed above can be used collectively or individually depending on the needs and objective of the PEG&S program. What is important to note is that programs with diverse sources of funding are those that are most likely to be sustainable over time.

PEG&S for Public Land

Potential application of PEG&S will differ greatly between public and private land.

On private land, the land managers are private citizens. There may be a minimum expectation for stewardship, but to some degree, the private landowner provides public benefits at private cost. Where that line can and should be drawn, and once drawn, at what levels and through which mechanisms compensation for costs should be provided are, of course, central issues in this discussion.

On public land, the situation is quite different. In Canada, forest land managers are mainly provincial governments and forest products companies. The applicability and design of PEG&S programs will depend on who is managing the land and what kind of agreements have been made concerning rights and access to the land. There are many long-term binding agreements for land management between industry and government giving industry certain rights. If some of those rights are modified to better foster EG&S, there may be a case for

some form of compensation. How a PEG&S program would work in an area where the provincial government is the land manager is unclear since it is difficult to imagine the rationale for a situation where the government pays itself. Many variations in the arrangements of rights and responsibilities exist across the country. An interesting example is in parts of British Columbia where many watersheds are managed by municipalities.

Valuation of EG&S

Valuation of EG&S is one of the most highly debated areas of study in environmental economics. Valuation is particularly difficult because the concept of “How much is an ecosystem worth?” can be interpreted in many different ways. It can be interpreted as the value of current benefits provided by the ecosystem, or of potential future benefits. Its worth can also be interpreted as the value of conserving a particular ecosystem compared with the value of converting it to other uses. A further challenge in valuation is that the benefits often accrue unequally to various groups at various scales.

To begin to address these issues, economists have turned to various valuation techniques as a means to value ecosystems or particular EG&S. The goods and services are first classified according to the way in which they are consumed by society. Unlike the classification discussed earlier, which was a more holistic classification of EG&S, the economists’ version of classifying EG&S is meant to help in determining the best techniques to use to estimate a value for a particular good or service.

Typically, valuation exercises seek to determine the total economic value (TEV) of a particular ecosystem or EG&S. To calculate TEV, EG&S are separated into two categories, use value and non-use value. As the name suggests, EG&S with use-values are those used by

humans in our daily lives. Non-use values are the values that some EG&S have by simply existing.

Use-values of EG&S is then separated into a further three categories: direct-use values, indirect-use values and option values. A direct-use value refers to EG&S that are used directly by humans. The things that typically come to mind when thinking of EG&S from forests are timber, food, fuel, medicines, hunting, recreational and cultural activities that do not necessarily require the harvesting of products. Indirect-use values are derived from EG&S that provide benefits outside of the ecosystem itself. Examples of this include: water filtration, storm protection, climate regulation, erosion control and aesthetics. Option values are derived from preserving the option to use EG&S in the future, either by the present generation (option value) or by future generations (bequest value).

In general, direct-use EG&S are the easiest to value. Measuring the other uses is much more difficult. Analysts and economists have developed various methodologies to address the different values of EG&S based on the specific use of the resource and the service provided. The main economic valuation techniques used in these exercises are shown in Appendix B.

It is important to note that Environment Canada has been working with the governments of the United States, France and the United Kingdom to develop an Environmental Valuation Resource Inventory (EVRI). The EVRI is intended primarily as a tool to assist policy analysts using the benefits transfer approach to estimate economic values for changes in EG&S and in the area of human health. In the benefits transfer approach, the results of previous EVRI studies can be used to estimate the economic value of changes stemming from current programs or policies.²

2 EVRI, 1998. About EVRI. <http://www.evri.ca/english/about.htm> Accessed 28 March, 2007.



Should a PEG&S Program be established in Canada?

Although perspectives and approaches differed greatly across the country, each workshop came to the same conclusions: EG&S are currently largely undervalued in our society. This failure to fully value EG&S is a cause of many environmental challenges we face. PEG&S programs are a valuable tool for addressing these challenges; we should therefore give serious consideration to the development of PEG&S as a priority for public policy development in Canada.

There are two overarching arguments that support this conclusion. The first is that if we do not put a price on EG&S, then it will not be valued in decision making. This pricing must not undermine the intrinsic and ethical values of ecosystems, but if we call EG&S “priceless”, then the value will be set at \$0.

The second argument is that EG&S cannot be maintained or fostered by regulation alone. Enforcement is not necessarily efficient and is often costly. Secondly, people tend to respond much better to positive incentives than to imposed constraints. A more effective, efficient and equitable balance is needed between positive and negative incentives.

We do not necessarily need an entirely new program to move forward. There are many tools already available that would be useful in the adoption of PEG&S approach in Canada, but before PEG&S programs can be adopted on a wide scale in Canada, there is much that needs to be done.

Next Steps

Although the same topic (valuation of ecological goods and services) was discussed at each of the workshops, a great diversity of opinions and perspectives were expressed, highlighting the importance of local conditions. However, the discussion in all workshops led to six key recommendations on how to move forward with the PEG&S concept:

- 1) A National Working Group should be established to address the key issues related to using EG&S as a market-based regulatory approach to natural resource management and land-use policy in Canada. The fact that the variety of land uses in Canada (forestry, agriculture, environment, development, tourism etc.) are managed by different jurisdictions and separate departments can present a major barrier to effective policy development for landscape management issues. A National Working Group could help overcome this barrier if it includes all the major players on the landscape and can establish an effective dialogue on how to make PEG&S work. Given its extensive experience in bringing together stakeholders from a wide array of different backgrounds, the Canadian Model Forest Network is in an ideal position to initiate such a working group.
- 2) The first task of a National Working Group would be to establish a clear vision for future provision of EG&S. A carefully crafted vision is an essential foundation for development of credible PEG&S program proposals.
- 3) There are many data gaps concerning EG&S that need to be filled. Most of the discussion on filling data gaps involved identifying links between EG&S and their associated social benefits. In many cases gathering this information can be done by building on current efforts to catalogue the ecological functions, productivity and output of our natural resources. Another key data gap is the lack of indicators to monitor performance and success of programs. Many of the current initiatives relating to indicators can be applied to these programs. For example the Principles, Criteria and Indicators that resulted from the Montreal Process are one set of indicators that will be useful to EG&S programs for forests. In many cases data and information is available that will aid in the success of EG&S programs. A concerted effort to bring all relevant data sources together will be needed.
- 4) There is a need for increased public awareness and understanding of EG&S. As demonstrated by the Wildlife Habitat Canada survey of farmers and ranchers, there is some knowledge about EG&S in Canada, but the idea is far from being a household concept. Efforts should be put forward to promote public education related to the concept of valuing EG&S and how a PEG&S policy approach can benefit Canadians. A place to start might be a national survey of public perceptions of EG&S, specifically with respect to the use, management approaches to, and priorities for natural resource development and land use. The results of the survey should be well publicized and would be very valuable in helping design a public education campaign.
- 5) Financing for PEG&S programs should come from a wide array of sources and costs must be shared. Federal, provincial and municipal governments, private businesses and public organizations should be relied upon to leverage resources that can contribute to PEG&S programs. While in some cases tax increases for EG&S programs may be acceptable, it is a widely-held view that any tax revenues allocated for EG&S programs should be revenue neutral. In order to effectively establish financing for PEG&S programs, the links between the benefits to society and the costs associated with providing EG&S will need to be clarified.

6) Because of growing public concern for finding solutions for climate change, many workshop participants felt that now would be an opportune time to introduce and establish PEG&S as a policy tool. If applied correctly, this policy tool could provide significant opportunities for Canadian businesses. Three particular areas of concern will need to be kept in mind as this effort proceeds: constraints from agricultural trade policy, carbon trading and developing new markets for the forest sector.

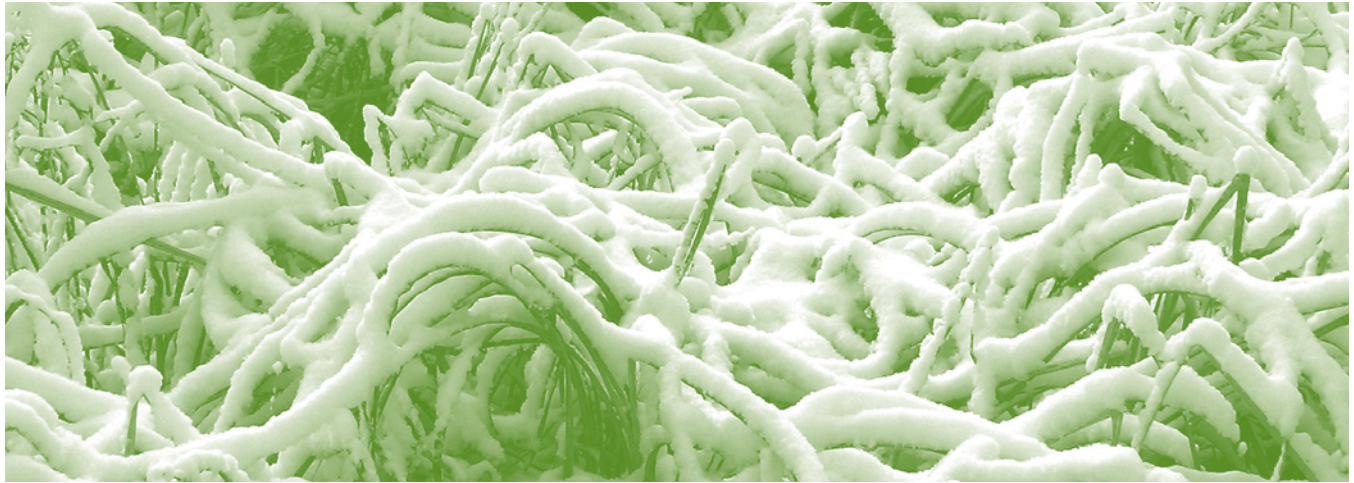
From the experience with ALUS, it appears that programs that support investments in the natural environment are considered to be trade neutral. The World Trade Organization welcomes subsidies to domestic agriculture sectors that do not distort trade. Some of these options include programs that contribute to environmental protection and regional development. While PEG&S is not considered a subsidy there are subsidies to the Canadian agriculture sector that infringe upon World Trade policies. These funds, when re-directed towards programs like PEG&S, could serve as revenue neutral and trade friendly means of helping Canada both support agriculture and the closely related woodlot sectors and contribute to sustainable environmental management.

Carbon trading represents an opportunity for strong links between businesses, landowners and the environment. Given the current attention in Canada and the world to carbon trading, immediate action on the part of Canadian policy makers to promote the development of carbon sinking technologies and carbon sinking land management policies and programs will serve to enhance Canada's position in a burgeoning world market place for carbon offsets. Revenues from trading offsets may be strategically very useful in leveraging funds from both public and private sources for programs that extend beyond carbon offsets to other EG&S.

Recent events in the Canadian forest sector such as declines in annual allowable cuts, the rising Canadian dollar, mill closures and the softwood lumber dispute have created uncertainty about the future of the traditional forest industry. The promotion and development of alternative markets for forest goods and services will help to enhance economic resilience and sustainability in forest dependent communities.

It was resoundingly emphasized by the workshop participants that the sooner we can implement programs like PEG&S the sooner Canada, woodlot owners, and local communities can gain much needed ground in world trade, economic security, and environmental enhancement.

A sample briefing note on the provision of EG&S is included in Appendix C.



Appendix A

Presenters

Workshop Location
Amherst, NS

Presenters

Dave Neave, General Manager,
Canadian Model Forest Network

Peter deMarsh, President,
Canadian Federation of Woodlot Owners

Kate MacQuarrie, Director, Forests,
Fish and Wildlife, PEI

Dr. Van Lantz, Associate Professor, Faculty of
Forestry & Environmental Management and
Department of Economics, University of
New Brunswick

Deanne Meadus, Manager of Conservation Programs
in Atlantic Canada, Ducks Unlimited Canada

Mike Nabuurs, Executive Director,
PEI Federation of Agriculture

Michael Kennedy, Former Environmental Economics
Specialist with CUSO and the Latin American and
Caribbean Model Forest Network

Workshop Location
Quebec, QC

Presenters

Denis Brière, Dean, Faculty of Forest
and Geomatics, Université Laval

Peter deMarsh, President, Canadian Federation
of Woodlot Owners

Michael Kennedy, Former Environmental Economics
Specialist with CUSO and the Latin American and
Caribbean Model Forest Network

Victor Brunette, Director, Agence de mise en valeur
des forêts privées outaouaises

Virginie-Mai Hô, Master's Student, Faculty of Forest
and Geomatics, Université Laval

Isabelle Breune, Agro-environment Program Officer,
Agriculture and Agri-Food Canada

Yves Bourassa, Senior Economist,
Environment Canada, Ottawa

Workshop Location Peterborough, ON

Presenters

Peter deMarsh, President,
Canadian Federation of Woodlot Owners

Robert Babe, Chair in Media Studies,
University of Western Ontario

Ed Hannah, DSS Management Consultants Inc.

Lynn McIntyre, Director of Stewardship,
Wildlife Habitat Canada

Cathy Nielsen, Biodiversity Standards Project
Coordinator, Environment Canada

Andy Gordon, Agroforestry Specialist,
University of Guelph

Erling Armson, Conservation Programs Leader,
Ducks Unlimited Canada

Daryl Finnigan, Resource Management Policy
Analyst Environmental Management Unit, Ontario
Ministry of Agriculture, Food & Rural Affairs

Mike Puddister, Manager of Lands & Stewardship,
Credit Valley Conservation

Laura Haynes, Presidential Management Fellow,
Natural Resources Conservation Service,
United States Department of Agriculture

Michael Kennedy, Former Environmental Economics
Specialist with CUSO and the Latin American and
Caribbean Model Forest Network

Dave Richards, District Biologist, Aylmer District,
Ontario Ministry of Natural Resources

Dave Reid, Stewardship Coordinator, Norfolk
Land Stewardship Council, Ontario Ministry
of Natural Resources

Bob Bailey, Vice President of National Policy,
Delta Waterfowl

Workshop Location Saskatoon, SK

Presenters

Peter deMarsh, President,
Canadian Federation of Woodlot Owners

Mark Anielski, President, Anielski Management Inc.

Patricia Pohrebniuk, Executive Director,
Manitoba Forestry Association

Toso Bozic, Woodlot Specialist/Agroforester,
Woodlot Extension Program

Chris Smith, Manager, Industry and Community
Relations, Ducks Unlimited Canada

Robin Woodward, CEO, Saskatchewan Forestry Centre

Mark Wonneck, Prairie Farm Rehabilitation
Administration, Agriculture and Agri-Food Canada,
Calgary, AB

Bob Turnock, Shelterbelt Specialist/Agroforestry
Resource Coordinator, Prairie Farm Rehabilitation
Administration, Indian Head, SK

Michael Kennedy, Former Environmental Economics
Specialist with CUSO and the Latin American and
Caribbean Model Forest Network

Ian Wishart, Vice President, Keystone Agricultural
Producers, Winnipeg, MB

Shane Tornblom, Business Development Specialist,
Manitoba Agriculture, Food and Rural Initiatives,
Carman, MB

Gerry Ivanochko, Provincial Specialist, Northern
Agriculture Crop Development, Saskatchewan
Agriculture 7 Food, La Ronge, SK

Monica Gabay, National Coordinator,
Argentine Model Forest Program

Dave Halland, Halland Forest Products

Workshop Location Victoria, BC

Presenters

Michael McCarthy, Esquimalt First Nation

Peter deMarsh, President,
Canadian Federation of Woodlot Owners

Michael Kennedy, Former Environmental Economics
Specialist with CUSO and the Latin American and
Caribbean Model Forest Network

Steve Hamm, ALUS Project Manager, Manitoba,
Keystone Agricultural Producers

Darcy Mitchell, Director, Centre for Non-Timber
Resources, Royal Roads University

Appendix B

Methods used in the Valuation of EG&S

Table 2 — Main economic valuation methods (Adapted from Pagiola 2004)³

Methodology	Application	Data Requirements	Limitations
Production Function	Any measurement of impacts on produced goods	Changes in EG&S: impact on production, net value of produced goods	Data that links the changes in EG&S with the change in production often lacking
Cost of human capital	Any impacts that affect health	Changes in EG&S impact on human health, cost of health care or quality of life	Linking environmental conditions to human health is difficult and data is often lacking.
Replacement cost	Any loss of goods or services	Extent of loss of goods or services. Cost of replacing them (e.g., cost of replacing forests)	Tends to over-estimate actual value, should be used with extreme caution.
Travel Cost	Recreation	Survey to collect monetary and time costs of travelling to a destination	Limited to recreational benefits; hard to use when trips are to multiple destinations
Hedonic Pricing	Air quality, scenic beauty, cultural benefits	Prices and characteristics of goods (e.g. Housing values)	Requires vast quantities of data, very sensitive to specification
Contingent Valuation	Any service	Survey that presents scenarios and probes people's willingness to pay (WTP) for specific EG&S	Many potential sources of bias in responses; guidelines exist for reliable application.
Choice Modeling	Any service	Survey of respondents	Similar to that of contingent valuation; analysis of the data is complex
Benefits transfer	Any service for which there are comparison studies	Valuation exercises at another, similar site	Can be very inaccurate, as many factors vary even when the context seems similar

³ Pagiola, Stefano, 2004. How much is an ecosystem worth? Assessing the economic value of conservation. The World Bank. www.biodiversityeconomics.org/document.rm?id=710 Accessed 28 March, 2007

Definition of Terms

Ecological Goods & Services: the benefits arising from the ecological functions of healthy ecosystems

Biodiversity: the variety of life on Earth and the natural patterns it forms

Opportunity Cost: the value of the next best alternative not chosen (e.g., one opportunity cost of agriculture land is its value as a forest)

Natural Capital: natural resources, living systems and ecosystem services provided by the Earth's biosphere, including the ecological systems that support life

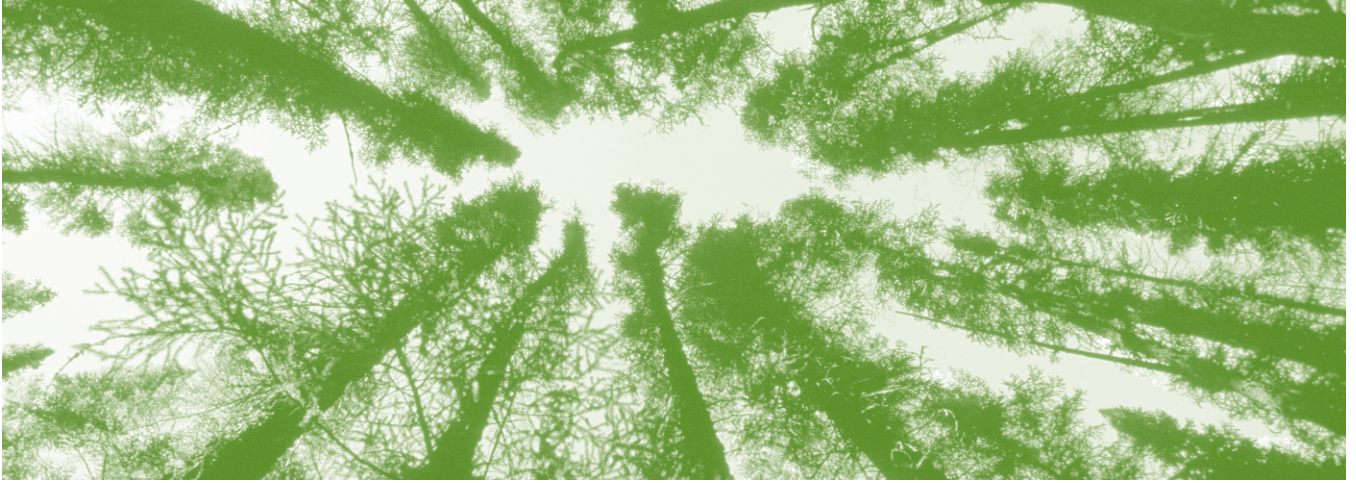
Valuation: a tool for determining the impact of human activities on an environmental system, by assigning an economic value to an ecosystem or its ecosystem services

Shelterbelt: a row of trees or shrubs planted on agricultural land to provide shelter from the wind and prevent soil erosion

Forest buffers: an area of trees and other vegetation around surface water bodies and wetlands, along public roadways, and in other areas with some type of sensitivity. Buffers are intended to remove or soften the effects of nearby land management practices.

Acronyms

BEWAS	Boreal Ecosystem Wealth Accounting System
BMPs	Beneficial Management Practices
EFP	Environmental Farm Plan
EG&S	Ecological Goods & Services
NTFPs	Non-Timber Forest Products
PEG&S	Payment for Ecological Goods and Services
PEG&SP	Provision of Ecological Goods and Service Programs
TEV	Total Economic Value
WEBs	Watershed Evaluation of Beneficial Management Practices



Notes



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