



Introduction to Ecological Goods and Services

Canada boasts a wealth of natural capital, including the ecosystem structures and functions that provide the services that make life possible. This natural capital also provides a stream of ecological goods and services (EGS).

Canadians must learn to value natural capital if future generations are to enjoy the same EGS as we do today.

Ecological goods and services represent the benefits humans

derive from ecosystem functions. Healthy rural landscapes provide important EGS such as wildlife habitat, groundwater recharge, flood and erosion control, carbon sequestration, biodiversity, and air and water purification.

The concept of EGS has become topical because the services – which are so critical to the functioning economy and our life-support system – are at risk.

Agricultural producers manage the landscape in a sustainable manner for the primary purpose of producing food. In the process, they and other landowners provide both public and private EGS through the creation, retention, and stewardship of healthy ecosystems. They maintain natural capital, at private cost, for various reasons. Some value its aesthetic and ecological benefits and/or want to maintain it for future generations. Others employ management techniques that utilize the ecological goods and services provided by the landscape. Table 1 provides an instructive list of EGS.

Unfortunately, the value of EGS is not recognized in the marketplace and remains poorly understood. EGS are rarely accounted for in our determination of wealth. Therefore, the demands of the market motivate farmers to convert natural capital (e.g. wetlands) to produce traditional agricultural commodities instead of EGS (e.g. wildlife habitat).

The EGS concept offers a way for society to invest in and encourage the protection of associated ecosystems. EGS instruments can encourage farmers and other landowners to make land-use decisions with more integrated social, economic and environmental results.

Some producers maintain natural areas as part of their management plan for raising cattle and making a living from the land.



Source: Allen Tyrchniewicz

Many Prairie Habitat Joint Venture (PHJV) partners¹ are already exploring the use of EGS mechanisms to help achieve the partners' habitat goals. PHJV partners use funds raised from groups and individuals to pay private landowners for healthy and diverse waterfowl and other bird populations through conservation and restoration programs. The natural capital in this case is wetlands and associated uplands, and the intended ecological 'good' is waterfowl. These efforts have many other benefits, such as improved water, soil and air quality.

Examples of PHJV programming designed to produce specific EGS include wetland restoration and protection, land purchase and leasing, grazing and haying conversion, and other habitat restoration initiatives.

EGS programs have the potential to increase the scale of societal investment in natural land stewardship and to reverse trends in habitat loss at broad scales. These programs have the potential to make the achievement of PHJV habitat objectives more realistic in a shorter time frame, and may be one of the means for protecting and restoring healthy Canadian landscapes and wildlife populations.

¹ Partners include: Environment Canada, Agriculture and Agrifood Canada, Manitoba Conservation, Saskatchewan Watershed Authority, Alberta Sustainable Resource Development, Manitoba Habitat Heritage Corporation, Ducks Unlimited Canada, Nature Conservancy Canada, Delta Waterfowl Foundation and Wildlife Habitat Canada.



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Table 1: Ecological Goods and Services and ecosystem functions

Ecological Good or Service	Ecosystem functions	Examples
Gas regulation	Regulation of atmospheric chemical composition	CO ₂ /O ₂ balance, O ₃ for UVB protection, and SO _x levels
Climate regulation	Regulation of global temperature, precipitation, and other biologically mediated climatic processes at global or local levels.	Greenhouse gas regulation, DMS production affecting cloud formation.
Disturbance regulation	Capacitance, damping and integrity of ecosystem response to environmental fluctuations	Storm protection, flood control, drought recovery and other aspects of habitat response to environmental variability mainly controlled by vegetation structure.
Water regulation	Regulation of hydrological flows.	Regulation of hydrological flows. Provisioning of water for agricultural (such as irrigation) or industrial (such as milling) processes or transportation.
Water supply	Storage and retention of water.	Provisioning of water by watersheds, reservoirs and aquifers.
Erosion control and sediment retention	Retention of soil within an ecosystem	Prevention of loss of soil by wind, runoff, or other removal processes, storage of silt in lakes and wetlands.
Soil formation	Soil formation processes	Weathering of rock and the accumulation of organic material
Nutrient cycling	Storage, internal cycling, processing and acquisition of nutrients.	Nitrogen fixation, N, P and other elemental or nutrient cycles.
Waste treatment	Recovery of mobile nutrients and removal or breakdown of excess or xenic nutrients and compounds.	Waste treatment, pollution control, detoxification
Pollination	Movement of floral gametes	Provisioning of pollinators for the reproduction of plant populations.
Biological control	Trophic-dynamic regulations of populations	Keystone predator control of prey species, reduction of herbivory by top predators.
Refugia (Habitat)	Habitat for resident and transient populations.	Nurseries, habitat for migratory species, regional habitats for locally harvested species, or over-wintering grounds.
Food production	That portion of gross primary production extractable as food	Production of fish, game, crops, nuts, fruits by hunting, gathering, subsistence farming or fishing.
Raw materials	That portion of gross primary production extractable as raw materials.	The production of lumber, fuel or fodder.
Genetic resources	Sources of unique biological materials and products.	Medicine, products for materials science, genes for resistance to plant pathogens and crop pests, ornamental species (pets and horticultural varieties of plants).
Recreation	Providing opportunities for recreational activities.	Eco-tourism, sport fishing, and other outdoor recreational activities.
Cultural	Providing opportunities for non-commercial uses	Aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems.

Source: Costanza et al. 1997