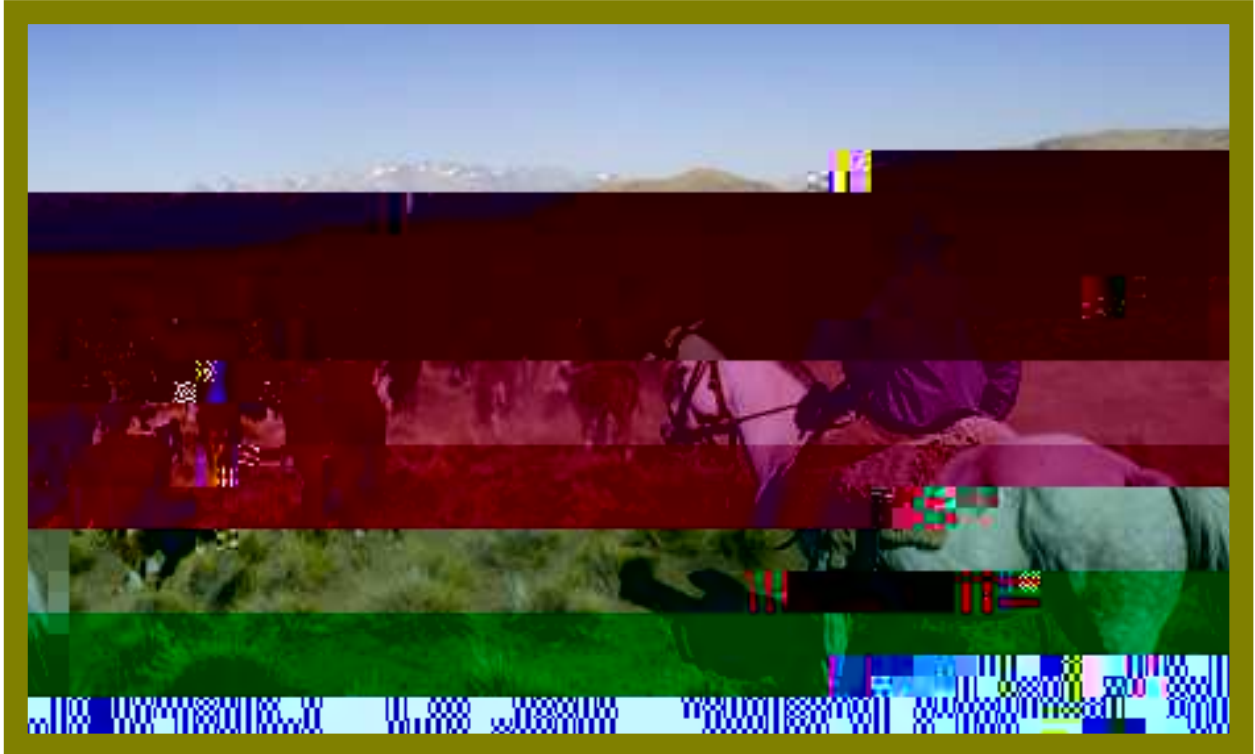


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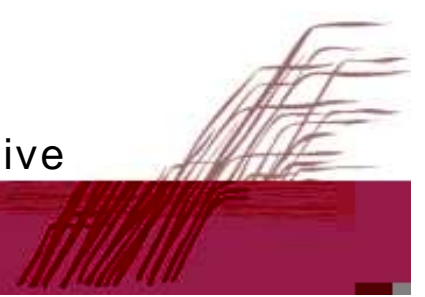


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Temperate Grasslands Conservation Initiative

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CANADA



ACKNOWLEDGEMENTS.....I

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2. TEMPERATE GRASSLANDS AS A SUSTAINABLE ECONOMIC RESOURCE..... 5

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Indigenous temperate grasslands are the most diverse system on earth, with less than half remaining in an intact, natural condition. Intensive agriculture has replaced 41 percent of the world's temperate grasslands and another 13.5 percent have been converted to urban, industrial and other uses. Much of the remainder, although still under grassland cover, is degraded and vulnerable to desertification. The fundamental purpose of the Temperate Grasslands Conservation Initiative (TGCI) is to reverse this trend and increase the level of conservation attention of temperate grasslands through establishing additional formally protected areas and encouraging ecologically sustainable land use practices throughout the biome.

As an effort to make a stronger case for conservation and protection, the TGCI identified the need to better understand the total economic value (TEV) of temperate grasslands to human social and cultural well-being. This review summarizes the current literature regarding the TEV of goods and services provided by indigenous temperate grasslands, highlights research gaps and identifies future priorities.

The central conclusion is both surprising and disturbing. No empirical valuation research was found by this review that addressed intact temperate grasslands specifically. In a biome with the highest Conservation Risk Index globally, our understanding of the TEV of the goods and services provided by indigenous temperate grasslands is therefore virtually non-existent. As a result, temperate grasslands are one of the least understood global biomes in terms of their value to sustainable economic uses, and the provision of socio-cultural and ecosystem goods and services that contribute to human well-being. If corrected, this lack of understanding will continue to threaten the long-term ecological viability of those indigenous grasslands that remain.

This report documents the current and limited understanding of the TEV of the goods and services provided by temperate grasslands. The need to place value on the ecosystem goods and services and the social and cultural non-use values of natural areas has been identified as important since the 1990s and techniques have been developed to help measure these values. This analysis documents the full range of goods and services provided by com

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<p>Grassland as an economic resource (economic goods and services) that have Direct Use Value and result in conversion of the biome</p>	<p>Grassland as a sustainable economic resource with Direct Use Value, involving some consumption (degradation) of the biome but not total conversion</p> <p>(adapted from Maczko & Hidingen 2008)</p>	<p>Social, cultural goods and services with Non-use Value that contribute to human well being (adapted from Chiesura & de Groot 2003; Maczko & Hidingen 2008)</p>	<p>Ecosystem Functions and corresponding goods and services that have Indirect Use Value</p> <p>(adapted from Costanza,R., D'Arge R., De Groot R., Farber</p>

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The research gaps in understanding values associated with intact temperate grasslands are significant and will be time-consuming and expensive to remedy. With the magnitude of the research effort required seems daunting, the time and costs associated with valuation studies have to be weighed. Full information is not always needed to provide relevant information for decision making. Researchers will need to evaluate costs and benefits of having global monetary values for all or key ecosystem services or whether, in comparing alternatives, the recognition of value and quasi-quantitative relative values provide enough information for decision making. The approach should depend on the purpose of the study and can be part of a scoping process where the required level of detail can also be defined.

Research must be undertaken in a focused way that leads to meeting geographic grassland conservation goals and objectives. Any research responding to the issue of adapting to climate change should have regard to the literature review by Heller and Zavaleta (2009), which synthesizes the potential solutions that have been identified, and the consensus action provided as ways to cope with climate change. The temperate grassland research of Gibbons (2005) and Maczko & Hiding (2008) outlines a multidisciplinary approach linking grassland stewardship and conservation into a complex agro-ecosystem to be managed at a variety of scales: pasture management and livestock farming

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Tools recognized as effective in changing social behaviour include:

- regulatory instruments (laws, regulations and codes);
- market-based (economic) instruments (MBIs) that affect the costs and benefits of different behavioural options and these include subsidies, stand charges, and the creation of markets such as emissions trading systems and carbon markets.
- suasive instruments (education, training, providing information, and social recognition) which capitalize on the importance of unwritten rules of social conduct to change behaviour.

These approaches are seldom alternative options. But tools have been extremely effective in promoting the use of conservation easement agreements and bequests of land to conservation organizations in order to protect sensitive natural areas. However enabling legislation is required that provides registered charitable lands trusts that can provide tax relief in exchange. MBI and suasive instruments focus on providing incentives and disincentives to consumers, investors and producers to enable them to make informed decisions about the environmental consequences of their actions or purchases. The use of regulation to create economic instruments to promote the conservation of temperate grasslands is a direct route to avoid habitat loss; although not as direct as outright securement by acquisition or conservation easements for conservation purposes by government and non-government organizations. A review of recent experience with incentive based instruments (Jack, Kousky, Sims 2008) in terms of design, outcomes, effectiveness, cost effectiveness and lessons learned, emphasizes the importance of context and improved collaborations between economists and ecologists to better specify the production function for ecosystem services as key in achieving policy goals.

The effort in developing and applying conservation tools to grasslands is recent and extensive. It deserves its own research review. Some useful references include: Curran (n.d.), Danielson (1995), De Civita (n.d.), Dutilly-Diane (2007), Ferraro (2002)

C-G *

Temperate grasslands are recognized as the most threatened ecosystem in most countries where they occur. Yet this biome clearly remains one of the least understood in terms of the value of its sustainable economic uses, social-cultural services, as well as the many ecosystem goods and services that it contributes to human well-being. In a biome with the highest Conservation Risk Index (Figure 1) globally, our understanding of the full monetary value of the goods and services provided by natural temperate grasslands is virtually nonexistent. This has fundamental implications to the wise use of the remaining undisturbed biome.

What do we know about the total economic value of natural temperate grasslands?

There is a good overall qualitative understanding of the elements that together make up the concept of the total economic value of the biome (Section Table 1). The role of ecosystem goods and services has been identified as important since the 1990s, and social and cultural non-use values of natural areas have also been identified and recognized as having value although there is little qualitative research in this field that is temperate grasslands specific. Techniques have been developed to help monetize these values. Quantitative valuation of sustainable economic, social and cultural non-use values and ecosystem goods and services has occurred in many biomes. However, no empirical valuation research was found by this review that addressed intact temperate grasslands specifically.

Quantitative data specific to natural temperate grasslands that would allow a comprehensive total economic valuation of this biome is simply not available.

The figures that have been developed and used in “grasslands” (Table 2) are not based on temperate grassland data, but extrapolated from other grassland data and value transfer from other biomes. This needs to be remedied as the total economic value of intact biomes appears to be highly location specific.

Table 2 summarizes the research review results for natural temperate grasslands. It also provides an overview of the research gaps.

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Ecosystem functions and corresponding goods and services that have Indirect Use Value

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Some additional observations emerge from this review

- One issue that needs immediate attention is to raise the profile of the temperate grassland biome, publicize its Conservation Risk Index and ensure that this biome is recognized as a research priority. Directed research funds are urgently needed. The awareness initiated by the TGCI 2008 Hohhot Workshop within the grasslands research community must expand beyond the temperate grassland community to the broader environmental and ecological economics community and TGCI needs to advocate for a focused research agenda for this imperiled biome.
- In addition to the gaps in the qualitative recognition of the direct use, non-use and indirect goods and services as provided by natural temperate grasslands (Section 1 - Table 1), there is almost a complete absence of quantitative empirical data on natural temperate grasslands that fit into accepted valuation methodologies i.e. survey data on the type of goods/service provided, the quantity provided, or the change in quantity provided. Research is needed that would enable estimates of total economic value data using specific temperate grassland data by geographic area.
- These research gaps in the recognition, quantification and valuation of natural temperate grasslands goods and services that have direct use and non-use are significant and will be time-consuming and expensive to remedy. However, such work must be undertaken as understanding and quantifying value assists in the identification of stakeholders and supports more sustainable decision making by providing better information on the consequences of policies or planned developments. Clear research priorities for immediate action are needed in order to focus scarce resources. Potential areas have been highlighted in Section 5.
- Absolute valuation figures are not always needed to provide relevant information for decision making; relative values are often sufficient to evaluate alternatives. However, the quantification and monetization of total economic value which includes ecosystem services, social-cultural non-use values plus the type of fiscal analysis provided by cost-benefit analysis (CBA) or cost-benefit analysis (CBA) does offer a higher degree of leverage in having unsustainable projects modified or cancelled.
- It has been argued that the cultural context and biodiversity among biomes and between temperate grassland geographic regions limits applicability of transferring research results ("value/benefits transfer" technique) from one area to another, e.g. tropical grasslands to temperate grasslands, and between geographic regions of the biome e.g. temperate grasslands in Australia to temperate grasslands in China. Pragmatically, the estimates are better than the alternative of

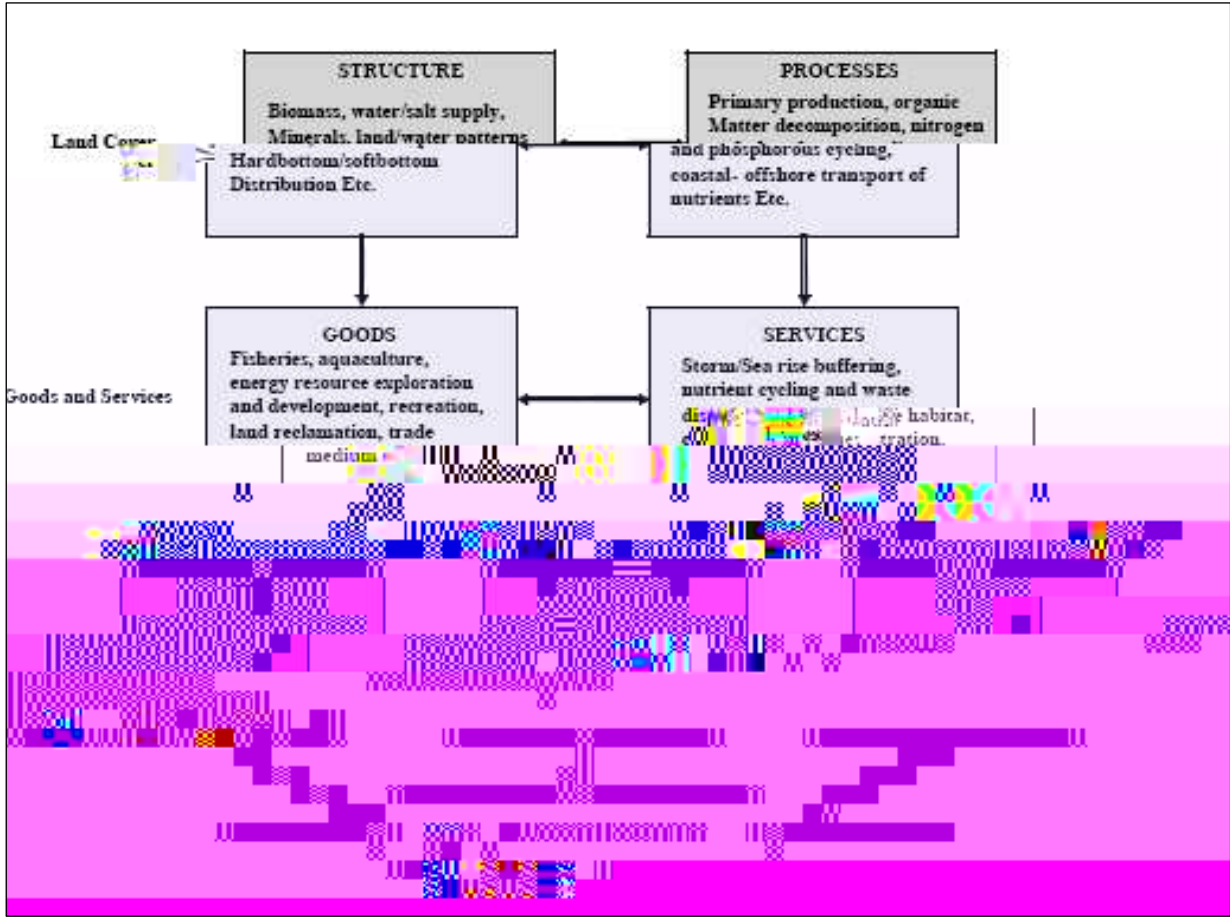
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Source: Costanza, Wilson, Troy et. al. 2006. The Value of New Jersey's Ecosystem Services and Natural Capital Appendix A, Figure 2, p. 63.

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- **New Zealand** (Mark & McLennan 2005; Mark & Dickinson 2008; Mack et al. 2009). The South Island government-leased high country of extensively grazed rangeland, occupies 2.6 million ha (10% of the total land area). It is currently undergoing tenure review whereby lessees can apply to freehold (privatize) the more productive, generally lower-altitude lands while the less modified, generally higher-altitude areas, valuable for water and nature conservation and recreation revert to full government control, are destocked and managed by the Department of Conservation in the public interest. To date (March 2009) 59 of the leasehold properties have completed tenure review, with 179,132 ha (56%) being privatized and 138,110 ha (44%) reverting to conservation management, together with an additional 125,792 ha through government purchase of five whole properties. Another 105 properties are at various stages of review. Nine conservation parks totalling more than 480,000 ha. of mainly indigenous grassland have been created in the South Island high country since 2000. There has thus been a major increase in the area of formally protected indigenous grasslands within the last decade, now amounting to 15.1% of the original baseline (1840: pre-European) grassland area.

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