

Cultural ecosystem services: The inspirational value of ecosystems in popular music



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ABSTRACT

Cultural ecosystem services are nonmaterial benefits people obtain from ecosystems. Due to their nonmaterial quality, cultural services are often much more challenging to evaluate than Supporting, Provisioning or Regulating services. However, some cultural services related with the inspirational and esthetic values of nature are the main ingredient of market goods produced and exchanged in market-places such as, for example, the music industry or the publishing industry. Starting from this consideration, a first estimation of the inspirational value of ecosystems in popular music is presented in this paper. A web-based search of popular songs inspired by different ecosystems is performed on a 30 million tracks repository. Lakes and rivers are the most represented, while wetlands and coastal systems the least. The total number of “ecosystem inspired” songs is multiplied by the average cost of one song on the iTunes Music Store (i.e. a largely used online music store). The cumulative cost is finally multiplied by the total number of downloads in order to estimate the contribution of cultural ecosystem services to the music industry from 2003 to 2014.

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1. Introduction

The Millennium Ecosystem Assessment (MA) defines Cultural ecosystem services as “the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and esthetic experiences” (MA, 2005; see also UK-NEA (2011)). Being nonmaterial, the evaluation of cultural ecosystem services is particularly challenging (Tengberg et al., 2012). Therefore, there is an evident lack in including cultural ecosystem service values throughout the ecosystem service literature. As noted by Schaich et al. (2010) only 3 over 10 sub-categories of cultural services are assessed in the MA (cultural diversity; knowledge systems; educational values; inspiration; social relations; sense of place; and cultural heritage values are not assessed). In contrast, all subcategories are assessed for the other classes of services. Rey Benayas et al. (2009) highlighted that there is not a single quantification of cultural services in restoration assessments, while Provisioning, Regulating and Supporting services are vastly quantified. Katz-Gerro and Orenstein (2015) acknowledged that the identification, characterization and evaluation of cultural services require an entirely different set of research tools than other types of ecosystem services.

One of the cultural benefits of ecosystems is “inspiration”: “Ecosystems provide a rich source of inspiration for art, folklore,

national symbols, architecture, and advertising” (MA, 2005). Inspiration in the Oxford Dictionary is “the process of being mentally stimulated to do or feel something, especially to do something creative”. This “something” could be, for example, an act or a piece of art that embodies an inspirational value itself and could be the source of further cultural benefits for other people. When people is willing to pay a price for enjoying this reflected inspiration, that price could be used as a tool to evaluate the inspirational value of nature.

This interpretation of cultural services, and inspirational benefits in particular, is consistent with the ecosystem service framework proposed by Costanza et al. (2014). To produce human well-being, interactions between Natural, Human And Social capital are required. Ecosystems cannot deliver benefits to people without interacting with these other forms of capital. For inspirational value to contribute to human well-being, Human capital is needed in terms of human knowledge, skills and creativity; Built capital is needed in terms of infrastructures, tools, or whatever else is necessary to put creativity into “something” social capital is needed in terms of a shared cultural background that facilitates cooperation and communication (Bieling, 2014; Barnes-Mauthe et al., 2014). Primarily, Natural capital is needed as the source of inspiration (Fig. 1). Following this interpretation, the logical and physical order of the four forms of capital is respected, with Built and Human capital embodied into social capital, and social capital embodied into natural capital (Fig. 1; Costanza et al., 2014; Pulselli et al., 2015).

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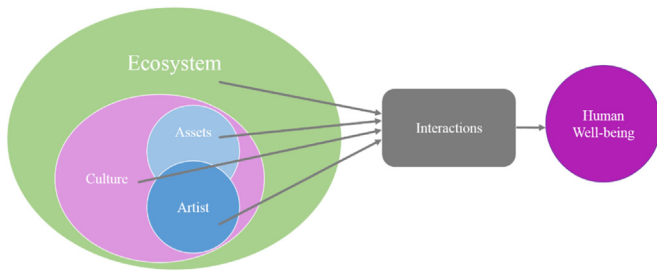


Fig. 1. Schematized interpretation of the inspirational benefit of an ecosystem to music or other forms of art (after Costanza et al. (2014) and Turner et al. (2015)). Human capital (the Artist) and Built capital (the Assets, e.g. the instruments and/or the music store) are embodied into Social capital (the cultural background, e.g. a common language and/or common tastes). Human, Built and Social capital are embodied into Natural capital, i.e. the ecosystem that represents the source of inspiration.

An interesting viewpoint on the inspirational role of nature in ecosystem service literature is maintained by the environmental philosopher Mark Sagoff. To explain his viewpoint, Sagoff cites the 60's popular rock 'n' roll group the Drifters, singing:

*At night the stars put on a show for free,
And darling, you can share it all with me...
Up the roof...*

This example pinpoints the “free” quality of nature's inspirational benefits (Sagoff, 1997). However, the song per se provides a cultural service, and people is willing to pay to enjoy it by buying the record. As for other ecosystem services, the evaluation exercise is important to highlight the contribution of ecosystems to the economy. Cultural services can be expressed in monetary terms as a way to achieve comparability with economic services (e.g. in a cost-benefit analysis) (Costanza et al., 1997).

The music industry is an economic sector that largely benefits from nature as a source of inspiration. Just to cite one case, rivers, with their constant flowing, are often associated with the irreversible passing of time or the conformity of society (see for example, “Watching the river flow” by Bob Dylan, or Bruce Springsteen's “The River”). Despite its relevance, the inspirational value of nature to the music industry has never been assessed. Macadam and Stockan (2015) acknowledged the inspirational benefits of freshwater insects to music. The authors focus on the inspirational role of stoneflies drumming features (in the male location strategy) but do not identify any musical track inspired by it. Instead, they provide examples of musical outfits named after aquatic insects (i.e. the North Carolina rock band the Mayflies; the French Mayfly Symphony Orchestra; the Croatian band Dragonfly; Macadam and Stockan, 2015). Szent-Ivany and Ujházy (1973) investigate the inspirational role of several animals in Hungarian folksongs. However, they do not focus on the inspirational role of entire ecosystems and they do not provide monetary estimations.

Due to the overwhelming amount of songs, artists and compositions inspired by nature, it is only feasible to estimate the value of a subset of them. The subset could be defined by focusing on a specific sector of the music industry and/or a specific selling platform. Accordingly, in this paper, a quantitative estimation of the inspirational benefit of ecosystems to the digital sector of the music industry is presented. A search has been performed on an online 30 million tracks repository (<http://www.allmusic.com>) by considering a set of keywords related with major ecosystem types. An average price per track and total number of downloads have been retrieved from the iTunes Music Store (<http://www.apple.com/itunes/music/>). Far from being exhaustive, this analysis intends to be an example of how the four capitals interaction framework (Costanza et al., 2014) can be adapted to the evaluation of

inspirational values (Fig. 1).

2. Methods

A first list of keywords that identify different ecosystems has been compiled starting from the classification in 16 major ecosystem types used by Costanza et al. (1997). “Urban” and “Ice/rock” ecosystem types have been excluded being not relevant and too generic, respectively. “Lakes and rivers” have been divided into two separate categories. Further, one most relevant synonym has been related to each of the keywords. The synonyms have been selected by introducing each ecosystem type in the online synonyms dictionary Thesaurus (<http://Thesaurus.com>). With over 1 million synonyms, Thesaurus is the largest online synonyms dictionary. Moreover, Thesaurus associates a relevance score to the matching synonyms, providing a selection criteria. No relevant synonym has been found for the ecosystem type “swamps and floodplains”. Consequently, it has been excluded from the analysis to improve comparability of results. In this way, a final list of 14 ecosystem types and 28 keywords has been produced (Table 1).

The original keyword and the most relevant synonym have then been used as inputs to search the popular songs database Allmusic.com. Allmusic allows to refine the search by only considering “songs”, instead of “albums”, “artists” and “compositions”. The number of songs identified for each keyword and its synonym have been summed up together in order to extract the total number of songs inspired by each one of the 14 ecosystem types considered (Table 1).

The average cost per song has been derived from Horace Deidu's Asymco project analysis (<http://www.asymco.com>) and is equal to 1.20 \$ per track. This unitary cost can be used to calculate the overall unitary value of “ecosystems inspired” songs.

The number of downloads has been calculated by considering the total download rate from iTunes from 2003 (when iTunes was first launched) to 2014. At his appearance at the 2014 Code Conference, the Apple SVP Eddy Cue declared that iTunes sold 35 billion songs from 2003 to 2014. Apple declared that iTunes offers around 43 million of songs (Apple, 2012). By dividing the total number of downloads to the total number of songs available in the store it is possible to calculate the average number of downloads per song during the time period considered. These data can be

Table 1

Number of songs inspired by 14 ecosystem types. The value of the songs (p) is multiplied by the average number of downloads (d) from 2003 to 2014 in order to estimate the total contribution of ecosystems to music industry's digital revenues during this period.

Ecosystem type	Synonym	Number of songs (n)	Unitary value (1.20 \$ per song) (p)	Inspirational value (2003–2014) ($p \cdot d$)
Lakes	Lagoon	2.33E+05	2.80E+05	9.76E+07
Tropical forest	Jungle	2.11E+05	2.53E+05	8.83E+07
Rivers	Stream	1.94E+05	2.33E+05	8.14E+07
Tundra	Steppe	1.50E+05	1.80E+05	6.29E+07
Grassland	Prairie	1.20E+05	1.43E+05	5.00E+07
Desert	Dune	1.44E+05	1.73E+05	6.05E+07
Cropland	Farm	7.38E+04	8.85E+04	3.09E+07
Ocean	Sea	7.36E+04	8.83E+04	3.08E+07
Temperate forest	Wood	6.06E+04	7.27E+04	2.54E+07
Marsh	Bog	3.95E+04	4.74E+04	1.65E+07
Shelf	Beach	3.66E+04	4.40E+04	1.53E+07
Coral reef	Atoll	1.56E+04	1.87E+04	6.52E+06
Estuary	Bay	1.50E+04	1.80E+04	6.29E+06
Seagrass	Seaweed	4.12E+03	4.94E+03	1.72E+06
Total		1.37E+06	1.65E+06	5.74E+08

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