



## Methodological and Ideological Options

# Debunking trickle-down ecosystem services: The fallacy of omnipotent, homogeneous beneficiaries



Raoul Wieland <sup>\*</sup>, Sarah Ravensbergen, Edward J. Gregr, Terre Satterfield, Kai M.A. Chan

*Institute for Resources, Environment & Sustainability, University of British Columbia, 2202 Main Mall, Vancouver, BC V6T 1Z4, Canada*

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## ABSTRACT

Ecosystem services research broadly assumes that an increased supply of nature's goods and services will yield increased benefits. We challenge this 'trickle-down' assumption by explicitly investigating the factors that might impede ecosystem services yielding benefits to different stakeholder groups, based on a targeted literature review of First Nations' access to shellfish on Canada's Pacific Coast. Our review revealed four sets of barriers to realizing benefits from ecosystem services despite their abundance within many First Nation territories. The barriers highlight problems of access, particularly as driven by geographic location, technical capacity, markets and user conflicts, and management (of harvest and access), all of which limit First Nations' procuring of resources linked to key services. Our findings demonstrate that simply increasing ecosystem service supply does not necessarily increase benefits for individuals or groups. Realizing the promise that ecosystem services research will enhance human well-being through improved management depends on the explicit consideration of how access mediates the distribution of benefits.

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## 1. Introduction

The concept of ecosystem services (ES) has become a valuable, widely used framework for conceptualizing how people benefit from and depend on the diverse goods and services derived from the biosphere (Lele et al., 2013). Much work has gone into mapping, quantifying and monetizing ecosystem services and the benefits they yield. Such services have been categorized as provisioning (e.g., provision of food and clean water); regulating (e.g., flood and disease risk mitigation); cultural (e.g., contribution to spiritual, recreational, and cultural benefits); and supporting (e.g., nutrient cycling and soil formation) (de Groot et al., 2002; Millennium Ecosystem Assessment, 2005; Chan et al., 2012a). In other words, ecosystem services are the conditions and processes through which natural ecosystems and their constituent species sustain and fulfill human life (Daily, 1997).

A close reading of the ES literature reveals that the field as a whole effectively makes the implicit assumption that increasing the supply of an ecosystem service (e.g., available shellfish) will inevitably trickle down and lead to increased stakeholder benefits (e.g., via shellfish consumption). This tacit assumption is manifest in the lion's share of ES literature addressing metrics of ES supply rather than realized benefit (Tallis et al., 2012). Even those studies that assess the benefits or value of ES largely ignore how those benefits might actually be realized,

let alone how evenly they may be realized across groups with diverse capabilities. While the importance of access to equitable ES benefit distribution was articulated by the Millennium Ecosystem Assessment (2003), and the United Kingdom's Ecosystem Services and Poverty Alleviation (ESPA) program provides a notable example where access is treated explicitly, such insights about the true realization of benefits by diverse groups have not yet percolated through the literature. An important component of how benefits are realized relates to the barriers that impede diverse groups, and not just those less-developed nations, from realizing the benefits of ES. Such barriers have yet to receive comprehensive treatment in the ES literature.

Despite this deficit, a broad diversity of research has provided a more nuanced perspective of ecosystem service benefits. For example, several authors have pointed to the need to disaggregate ES beneficiaries to articulate policy trade-offs, or identify winners and losers (Chan et al., 2007; Tallis et al., 2008; Daw et al., 2011; Ferraro & Hanauer, 2011; Butler et al., 2013; Poppy et al., 2014). Others have demonstrated the importance of space and scale to ES management, as potential beneficiaries ascribe (cultural) value to and subsequently navigate space according to a particular social, economic, or historical contexts (Alessa et al., 2008; Aswani & Lauer, 2006; Dalton et al., 2010; Sherrouse et al., 2011; Teh et al., 2012). ES benefits vary and are experienced differently depending on the scale of analysis (Hein et al., 2006; Barbier et al., 2008; Carpenter et al., 2009; Martín-López et al., 2009; Plieninger et al., 2013), thus the need for ES trade-off and conflict analysis to be spatially and temporally explicit (Douve & Ehler, 2009; White et al., 2012). The linkages between ES and realized benefits, human well-being, and poverty alleviation have also been explored (Brown et al., 2008; Daw et al.,

<sup>\*</sup> Corresponding author at: 2840-B Lamont Road, V8M 1W5 Saanichton, BC, Canada.  
 E-mail addresses: [raoul.wieland@alumni.ubc.ca](mailto:raoul.wieland@alumni.ubc.ca) (R. Wieland), [sravensb@uoguelph.ca](mailto:sravensb@uoguelph.ca) (S. Ravensbergen), [ejgregr@gmail.com](mailto:ejgregr@gmail.com) (E.J. Gregr), [terre.satterfield@ires.ubc.ca](mailto:terre.satterfield@ires.ubc.ca) (T. Satterfield), [kaichan@ires.ubc.ca](mailto:kaichan@ires.ubc.ca) (K.M.A. Chan).

2011; Polishchuk & Rauschmayer, 2012; Sikor, 2013), with some pointing out that such benefits are inextricably linked to intangible benefits or cultural ecosystem services which may require separate characterization (Chan et al., 2011, 2012b; Satterfield et al., 2013).

However, only a small number of papers drawing on the ES framework have explicitly accounted for how access to ES and the associated benefits varies across space, groups, or communities (e.g., Martín-López et al., 2009; Daw et al., 2011; Hicks & Cinner, 2014). The paucity of studies investigating how benefits are realized by disadvantaged groups makes it clear that the field as a whole is still largely based on the assumption that increasing ecosystem service supply will generally increase benefits. We begin to address this gap in the literature using the case of Vancouver Island, British Columbia (BC), to demonstrate the unavoidable link between the availability of an ES (in this case, shellfish for commercial and subsistence harvesting), its distribution, and its promise of well-being, where well-being is linked in part to the cultural benefits accrued as part of harvesting culturally valued food species.

### 1.1. Erroneous Assumptions – The Fallacy of ‘More Is Better’

Shellfish harvesting continues to be important in maintaining cultural practices and livelihoods of many First Nations groups along BC's coast, and coastal Vancouver Island is no exception (Karpiak, 2003; Ban et al., 2008; Menzies, 2010). Culturally valued shellfish species on Vancouver Island include sea urchins, chitons, snails, mussels, barnacles, abalone, geoduck, and a variety of clams. Accordingly, the 1990 Sparrow decision set out that “aboriginal rights to fish for food, social, and ceremonial purposes have priority over all other uses of the fishery” (DFO, 2008). A 2014 ruling by the Supreme Court upheld this decision by asserting both the right to food fish and the right to fish for limited commercial activity (The Globe and Mail, 2014).

If the implicit assumption that an increased abundance of goods and services correlates directly with increased benefits to communities holds true, then this court ruling could reasonably mean that First Nations communities' ability to benefit from shellfish should now be closely linked to the abundance of harvestable shellfish populations in the region. In other words, if benefits are not being realized, then abundance must be the primary issue we address.

Acknowledging that low abundance of harvestable shellfish remains a significant issue on northern Vancouver Island (Heaslip, 2008a), we nonetheless find that access is an equally large if not larger problem. Drawing on the work of Ribot and Peluso (2003) and Brown et al. (2008) to characterize access, we illustrate that many access barriers currently exist to limit the benefits First Nations communities derive from this marine resource, even where shellfish abundance is high. We begin by defining what we mean by access, and then define four sub-categories of barriers (geographical location, technical capacity, markets and user conflicts, and management), each of which captures a related set of circumstances that demonstrate the fallacy of trickle-down ecosystem services. This, in turn, establishes the need to seriously consider the link between ES availability, access, and realized benefits.

### 1.2. Defining Access (to Ecosystem Services)

Access is listed by Schlager and Ostrom (1992) as one of five rights linked to resource control – access, withdrawal, management, exclusion, and alienation. These are understood as the right to enter a defined physical property and so the ability to withdrawal rights to obtain products or resources. For our purposes, we use “access” to refer to spatial, legal, policy, or economic considerations that may prevent individuals from realizing benefits from a supply of some good or service. Put simply, access is the “the ability to derive benefits from things” (Ribot & Peluso, 2003). In a coastal marine resource context, Brown et al. (2008) further considered barriers to access that include permits and licenses, land availability, gendered divisions of labor or gender-

delimited access, geographical location, coastal development, climate change, marine protected areas, technical capacity (fishing gear, boats, processing facilities, storage equipment, skills), market isolation, user conflicts and pollution.

### 1.3. Geographic Location: A Resource Does Not Benefit People if It Is Physically Inaccessible

Two aspects of geographical location largely determine the degree of access and benefits derived by coastal communities from marine resources. The first relates to physical and spatial barriers, while the second relates to timing. Historically, restriction of physical proximity to coastal resources began with the government instituted system of Indian Reserves along coastal BC that relocated and restricted First Nations communities inland (Harris, 2002; Heaslip, 2008a; Joyce & Canessa, 2009). This has had numerous far-reaching effects, and its legacies continue to pose obstacles today.

There is much evidence that First Nations communities used to access marine resources by locating villages nearby. Forced inland relocation means that many First Nations must now travel to harvest resources that were once adjacent to their communities, or have completely lost access to areas still considered part of their traditional territories. The problem is amplified by the fact that the Department of Fisheries and Oceans Canada (DFO) will only allow communal commercial harvest for “First Nations who have reserves fronting beaches with clam resources ...” (DFO, 2013). This problem extends to many First Nations along BC's coast, not just those on Vancouver Island, in particular those whose reserves do not directly front beaches that contain harvestable shellfish or that define those beaches as public, not reserve, space (Heaslip, 2008a).

Such harvesting has always been seasonal because of winter weather and tides, and contemporarily, some First Nations still maintain seasonal harvest camps, especially on the east coast of Vancouver Island. But the reserve system and its accompanying economy (e.g., wage labor where available) have made it increasingly difficult to accommodate temporal harvesting patterns based on weather and seasonal abundance (Heaslip, 2008a). Climate effects producing changing timing of environmental conditions has only increased this post-colonial predicament (Turner & Clifton, 2009).

Access on Vancouver Island is also undergoing ecological change as invertebrate populations, including shellfish, decline in the face of predation from recovering sea otter populations (Watson & Estes, 2011). Virtually no shellfish harvesting occurs in some areas, although limited harvesting still occurs mainly on small remote beaches by hand along the lower intertidal zone. Such areas must now be accessed mainly by boat, except for the few clam beaches that are directly adjacent to reserves. Consequently, other factors such as fuel or moorage costs have emerged with a disproportionately large impact on the ability of people to harvest (Heaslip, 2008a, Joyce & Canessa, 2009).

### 1.4. Technical Capacity: A Resource Does Not Benefit People if They Lack the Technical Knowledge or Capacity to Harvest It

There are two aspects of technical capacity to access: the first relates to the technical knowledge held by those who might benefit from a particular service, while the second considers technical ability. Historically, digging for shellfish was a coordinated community effort involving a system of hereditary chiefs, each head of a lineage or other kinship grouping with access rights to foreshore areas. Gathering was done by hand, or with a trap set at low tide and then retrieved by foot or small canoe at the next low tide (Menzies, 2010). Many places along the BC coast were consistently used for harvesting (McKechnie, 2005), so much so that K'wakwaka'wakw groups created over 350 culturally modified clam beaches and terraces (Harper et al., 1995). Indeed, recent research has shown that these ancient clam gardens, a marine management tool used by First Nations groups all along the northwest Coast of

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