



The concept of stewardship in sustainability science and conservation biology

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1. Introduction

Stewardship is about caring for what we value (Berry, 2006; Palmer, 2006). In conservation policy, stewardship is often used as a simple rewording for wise resource use or sustainable management of wildlife or ecosystems. However, the attention given to the concept of stewardship is growing in the contemporary environmental sciences and conservation literature, especially in the natural resource use (Rawat, 2017), the agri-environmental (Hejniewicz et al., 2016) and protected areas-related literature (Wells and McShane, 2004; Mathevet et al., 2016; Jepson et al., 2017). About 75% of the citations and 62% of publications on stewardship as a key concept or a pathway for action in conservation and environmental science have appeared within the last five years (Fig. 1).

In the 1990s and early 2000s, stewardship was broadly used to describe a land ethic of care (Callicott, 2013). The stewardship concept has its roots in cultural traditions and religions worldwide (Beavis, 1994; Berry, 2006). People are the stewards of nature, they are responsible for the future of God's creation and are encouraged to actively maintain or preserve its richness and fertility (Passmore, 1974; Attfield, 2001; Callicott, 2013). In other words, people must make good use of, and take care of nature (Mathevet and Bousquet, 2014). In the first half of the 20th Century, the North American thinker Aldo Leopold developed a stewardship approach based on a “land ethic” integrating human relationships with their environments as animals and plants that inhabit them (Leopold, 1949). This stewardship approach aims to improve care for farmed fields and forests but also nature as a whole. During the 1980s, constructed as “citizen environmental practice” the Judeo-Christian tradition of stewardship environmental ethic (i.e. in contrast with a despotic reading of Genesis developed by White, 1967) had become more and more institutionalized in the United States throughout land stewardship projects involving farmers and focusing on education and dialogue (Worrell and Appleby, 2000; Wunderlich, 2004). Aiming to prevent farmland from being converted into urban areas with the growth and sprawl of cities, and to promote agro-ecology

principles in farming practices, land stewardship projects are effective, practical and consistent with the leopoldian ecocentric environmental ethic (Callicott, 2013). Thus, considering that the stewardship environmental ethic is a consistent human-nature relationship from both theoretical and pragmatic perspectives, it nurtures more and more environmental attitudes, values and policies (Welchman, 2012; Ogden et al., 2013).

However, in recent years the stewardship concept has taken on a range of different meanings in the environmental management and conservation science literatures. Stewardship can be understood as an essential feature contributing to human preference for visual landscape character (Ode and Tveit, 2013). From a primary production perspective, stewardship refers to an ethic toward “the responsible use (including conservation) of natural resources in a way that takes full and balanced account of the interests of society, future generations, and other species, as well as of private needs, and accepts significant answerability to society” (Worrell and Appleby, 2000: 263). In the context of social-ecological systems, stewardship is expressed as an approach that actively shapes trajectories of systems in order to enhance ecological resilience and support human wellbeing through the provision of ecosystem services (Chapin et al., 2009). In urban environments, urban ecological stewardship engages networks of community-based urban land management not only to clear air and provide green space (Fisher et al., 2015), but also to enhance green infrastructure, ecosystem services, and human well-being in cities (Krasny et al., 2014). Stewardship has also been used as a way to brand policies and incentive schemes that encourage sustainable farming, logging or fishing productions or protection of privately-owned land estates (Adams et al., 2012; Burivalova et al., 2017; Farmer et al., 2017; Pienaar et al., 2017). Thus there is a plurality of understandings of stewardship which are linked to distinguishing sets of landscape values and land management actions (Raymond et al., 2015).

Stewardship appears more and more as a sound alternative for fostering global change and biodiversity conservation policy as a result of recognition of the political failures of both climate change mitigation

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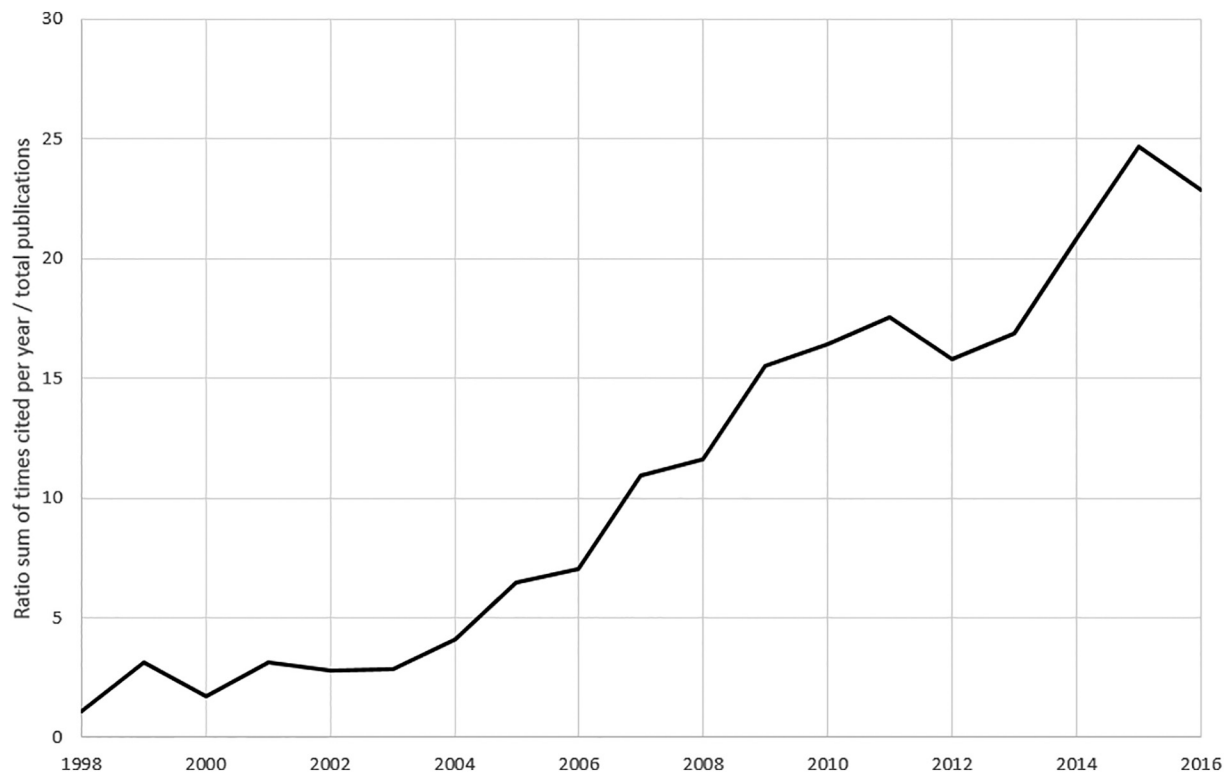


Fig. 1. The ratio of the number of citations of stewardship per year to the number of published items in each year, in publications in environmental sciences, ecology, and biodiversity conservation journals (after ISI Web of Science, accessed 10/10/2017).

efforts (Keohane and Victor, 2016) and numerous biodiversity conservation programs (Muhumuza and Balkwill, 2013), mixed with the social demand for collaborative and bottom-up approaches (Reed et al., 2016). However, few studies have explored the political ideology and philosophical underpinnings of stewardship policy and practices (Berry, 2006; Chapin et al., 2011; Mathevet and Bousquet, 2014). The objective of this paper is to discuss the various meaning of stewardship in the fields of environmental science and biodiversity conservation. Our main interest is to explore how different political ideologies and ethical values of stewardship shape the conceptualisation of conservation actions and policies, and why do these matter for conservation policy in the context of the new conservation debate (Miller et al. 2011). To address this objective, we adapt the political science framework developed by Dryzek (2013) and apply it to existing stewardship approaches in use. After a short presentation of the classification of environmental discourses by Dryzek (2013), we present and illustrate a typology of stewardship. In the last section, we discuss these results and present future directions for both research and conservation policy.

2. Values, discourse and conservation/environmental politics

Many scientific disciplines are relevant to biodiversity conservation, from ecology and evolutionary biology or geology and climatology to geography, sociology and economy (Soulé, 1985; Meine et al., 2006). But conservation is not a matter of science alone, it is also a range of practices mixing various activities, techniques and technologies (Bennett et al., 2017). It is also underpinned by ethics and philosophy where different schools of thought are competing, and it engages with policy on how we have to decide and govern both ourselves and our interactions with non-humans (Robinson, 2011; Norton, 2005; Callicott et al., 1999). This specific set of relationships between conservation science, practice, philosophy and policy occurs within a changing social-ecological context (Young et al., 2014; Rozzi et al., 2015). The complexity of the social and ecological challenges and of their consequences in time and space requires that ecology, political ideology

and ethics be in close and constant inquiry to prevent the worst effects of both current ecological threats and implementation of contemporary conservation policy (Norton, 2005; Ogden et al., 2013). Thus it seems essential to clarify here the general philosophical and political underpinnings behind each stewardship approach.

As the world is changing rapidly and at multi-scales, the previous set of values and assumptions that underpinned ecology are changing (Minter and Miller 2011; Steffen et al., 2011). The need for interdisciplinary synthesis and theory development are widespread and crosscutting themes. What is distributing/dividing the conservationists today is the idea of a human-managed Anthropocene (Couix and Hazard, 2013; Corlett, 2015). Some conservationists claim there is a need to preserve slightly modified natural ecosystems to value “pristine” nature, others accept the idea to enable natural processes wherever possible to value “naturalness” and “wildness” arguing that nowhere on Earth is pristine anymore; others believe in technoscience and its advancement to solve ecological problems and to manage nature (Terborgh, 1999, 2000, Sanderson et al., 2002, Miller et al. 2011; Schwartz et al., 2016). Thus the stewardship ethic falls into the “new conservation” debate that mobilised the same previous and old debates in conservation science and policy (Brandon et al., 1998; Brockington, 2002; Adams and Hutton, 2007; Dowie, 2009; Minter and Miller 2011): wise use vs preservation (i.e. sustainable development vs biodiversity should be protected for its intrinsic value), parks vs people (i.e. people-free protected areas vs extractive reserves, social justice and poverty alleviation), radical anthropocentrism (i.e. view where only people matter) vs radical biocentrism (i.e. view where humans are just another species). The different stewardship approaches described in the natural resource management, agri-environment and protected area literature are not fundamentally differing in terms of environmental ethic and philosophy (Robinson, 2011). Most of them are based on a more or less enlightened anthropocentric ethic or an ecocentric ethic (Norton, 2005). They differ primary from a political-economy theory perspective. The political economic critique of the stewardship analytical framework may focus on three areas: (1) the emphasis placed on

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