



Crowdfunding biodiversity conservation

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Abstract: *Raising funds is critical for conserving biodiversity and hence so is scrutinizing emerging financial mechanisms that may help achieve this goal. Anecdotal evidence indicates crowdfunding is being used to support activities needed for biodiversity conservation, yet its magnitude and allocation remain largely unknown. To help address this knowledge gap, we conducted a global analysis based on conservation-focused projects extracted from crowdfunding platforms. For each project, we determined the funds raised, date, country of implementation, proponent characteristics, activity type, biodiversity realm, and target taxa. We identified 72 relevant platforms and 577 conservation-focused projects that raised \$4,790,634 since 2009. Although proponents were based in 38 countries, projects were delivered across 80 countries, indicating a potential mechanism of resource mobilization. Proponents were affiliated with nongovernmental organizations (35%) or universities (30%) or were freelancers (26%). Most projects were for research (40%), persuasion (31%), and on-the-ground actions (21%). Projects were more focused on species (57.7%) and terrestrial ecosystems (20.3%), and less focused on marine (8.8%) and freshwater ecosystems (3.6%). Projects focused on 208 species, including a disproportionate number of threatened birds and mammals. Crowdfunding for biodiversity conservation is a global phenomenon and there is potential for expansion, despite possible pitfalls (e.g., uncertainty about effectiveness). Opportunities to advance conservation through crowdfunding arise from its capacity to mobilize funds spatially and increase steadily over time, inclusion of overlooked species, adoption by multiple actors, and funding of activities beyond research. Our findings pave the way for further research on key questions, such as campaign success rates, effectiveness of conservation actions, and drivers of crowdfunding adoption. Even though crowdfunding capital raised has been modest relative to other conservation-finance mechanisms, its contribution goes beyond funding research and providing capital. Embraced with due care, crowdfunding could become an important financial mechanism for biodiversity conservation.*

Keywords: conservation finance, donations, entrepreneurship, fundraising, philanthropy

Financiamiento Colectivo para la Conservación de la Biodiversidad

Resumen: *La recaudación de fondos es de suma importancia para la conservación de la biodiversidad, por lo tanto también lo es el escrutinio de los mecanismos emergentes de financiamiento que pueden ayudar a alcanzar esta meta. Hay evidencias anecdóticas que indican que el financiamiento colectivo se está usando para apoyar actividades necesarias para la conservación de la biodiversidad, pero su magnitud y distribución todavía son desconocidas. Para ayudar a tratar con este vacío de conocimiento realizamos un análisis global con base en los proyectos enfocados en la conservación extraídos de plataformas de financiamiento colectivo. Para cada proyecto determinamos los fondos recaudados, la fecha, el país de implementación, las características de quienes lo propusieron, el tipo de actividad, el componente de biodiversidad, y el taxón objetivo. Identificamos 72 plataformas relevantes y 577 proyectos enfocados en la conservación que recaudaron \$4,790,634 desde 2009. Aunque quienes los propusieron radicaban en 38 países, los proyectos se llevaron a cabo en 80 países, lo que indica un mecanismo potencial para la movilización de recursos. Los proponentes estuvieron afiliados con organizaciones no gubernamentales (35%) o con universidades*

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(30%) o eran conservacionistas independientes (26%). La mayoría de los proyectos estaban diseñados para la investigación (40%), persuasión (31%), y acciones concretas (21%). Los proyectos estuvieron más enfocados en especies (57.7%) y ecosistemas terrestres (20.3%), mientras que estuvieron menos enfocados en ecosistemas marinos (8.8%) y de agua dulce (3.6%). Los proyectos se enfocaron en 208 especies, incluyendo a un número desproporcionado de aves y mamíferos amenazados. El financiamiento colectivo para la conservación de la biodiversidad es un fenómeno global y existe potencial para que se expanda, a pesar de las posibles dificultades (p. ej.: incertidumbre sobre la efectividad). Las oportunidades para mover a la conservación hacia adelante por medio del financiamiento colectivo surgen a partir de su capacidad para movilizar recursos financieros espacialmente e incrementarlos establemente con el transcurso del tiempo, incluir a especies ignoradas, ser adoptada por múltiples actores sociales, y financiar actividades más allá de la investigación. Nuestros hallazgos trazan el camino para una mayor investigación sobre preguntas clave, como las tasas de éxito de las campañas de conservación, la efectividad de las acciones de conservación, y los conductores de la adopción del financiamiento colectivo. Aunque el capital recaudado mediante el financiamiento colectivo ha sido modesto en relación a otros mecanismos de financiamiento para la conservación, su contribución va más allá del financiamiento de la investigación y la provisión de capital. Si se aprovecha con el debido cuidado, el financiamiento colectivo podría convertirse en un mecanismo financiero importante para la conservación de la biodiversidad.

Palabras Clave: donaciones, espíritu emprendedor, filantropía, financiamiento para la conservación, recaudación de fondos

Introduction

Insufficient funding curtails effective and sustained biodiversity conservation (Bayon et al. 2000; Waldron et al. 2017), prompting the need to improve understanding of the conservation finance portfolio (Zavaleta et al. 2008). Capital is essential for on-the-ground actions, environmental campaigning, capacity building, and public education, as well as research and monitoring (Jepson & Ladle 2010). Conservation financing includes a range of mechanisms to raise and manage capital for biodiversity conservation (Clark 2007). Traditional examples include tourism-related taxes and fees (Wilkie & Carpenter 1999), debt-for-nature swaps (Bayon et al. 2000), conservation trust funds (Bonham et al. 2014), payments for ecosystem services (Bishop & Hill 2014), private foundation grants (Zavaleta et al. 2008), and overseas development assistance (Hickey & Pimm 2011). Crowdfunding, a web-based fundraising mechanism, has enabled access to capital for conservation (Buschke 2015; Pimm et al. 2015). Understanding emerging financial mechanisms is important to ensure their full potential is realized, address shortcomings, set priorities for spending, and ensure transparency, accountability, and effective use of resources (Balmford et al. 2003; Coady 2005; Brockington & Scholfield 2010). Novel sources of funding require scrutiny as they may signal transformational processes of governance, such as reconfigurations of the role of actors (Lane & Morrison 2006; Morrison 2017; Wilson et al. 2018). Despite these identified knowledge needs, the contribution of crowdfunding to biodiversity conservation remains poorly understood empirically (Horisch 2015).

The imperative of sourcing funding for conservation and the scant understanding of this novel financial mechanism warrant empirical research. Crowdfunding for con-

servation has been mostly considered tangentially relative to funding research more broadly (Wheat et al. 2013; Pimm et al. 2015). This shortcoming is surprising considering the lauded potential of crowdfunding as a mechanism to foster innovation and entrepreneurship in conservation beyond research (Buschke 2015). We addressed this knowledge gap by evaluating empirically the contribution of crowdfunding to biodiversity conservation in relation to its magnitude and allocation, with a focus on research and other activities that do not entail research (e.g., management, outreach, capacity building) activities. We analyzed crowdfunding at platform and project levels. For the former, we identified the relevant platforms worldwide, where they are based, and how they have emerged over time. For the latter, we determined who uses crowdfunding, where, for what purpose, and how much capital has been raised through crowdfunding.

Conceptual Framework

Pooling resources, expertise, or efforts by individuals to accomplish specific actions is a mechanism through which coordination of social action to attain specific goals is enabled. This phenomenon has historically been a feature of human society, and perhaps one of the best-known early examples of crowdfunding was the construction of the pedestal of the Statue of Liberty (Gray & Zhang 2017). More recently, this phenomenon has become amplified and reshaped through the internet as a web 2.0 phenomenon, known as online crowdfunding (Bouncken et al. 2015; Beck et al. 2016). Generally, crowdfunding is the process of fundraising capital from multiple donors, recognized in this context as the

crowd, either directly or indirectly. Donors in this context are often individuals, but can include other actors, such as companies (Macht & Weatherson 2015; Büscher 2016). Direct crowdfunding is the traditional approach that actors, such as large nongovernmental organizations (NGOs), have used to help raise capital for conservation, in which they directly target their constituents to donate money. Conversely, indirect crowdfunding involves the use of an intermediary, a crowdfunding platform, in this case between the fundraiser and the crowd (Bouncken et al. 2015). This particular model of online crowdfunding primarily commenced in the arts during the mid-2000s (Agrawal et al. 2013) and has expanded rapidly to other endeavors (Bradford 2012), including conservation (Buschke 2015) (hereafter referred to as crowdfunding).

The emergence of the intermediary is what makes this phenomenon novel and different, because it possibly reshapes the relationship between fundraisers and the crowd. Crowdfunding involves 3 actors: the fundraiser, the crowd (i.e., donors), and the intermediary (Bouncken et al. 2015). Crowdfunding platforms, the intermediary in this case, can reduce barriers between the fundraiser and the crowd by providing broader reach across space and sectors of society, increasing legitimacy and enabling information sharing (Agrawal et al. 2011; Wheat et al. 2013; Frydrych et al. 2014). Crowdfunding platforms create an opportunity not only for fundraisers but also for the crowd. Through the power of the internet, individual donors can easily support local causes in distant locations (Agrawal et al. 2011). Within web-based indirect crowdfunding, there are mainly 4 models with some degree of overlap: donation based, reward based, loan based, and equity based (Bouncken et al. 2015). The donation and reward models involve the transfer of funds from a donor to a fundraiser. These 2 models are where philanthropic crowdfunding fits, which is the subject of this study.

Crowdfunding may also be considered a signal of change in the agency of actors (Dellas et al. 2011) and locus of authority, a process affecting many aspects of global environmental governance, including rule making (Pattberg & Widerberg 2015). Conservation finance is an integral component of environmental governance, as it facilitates the execution of actions guided by norms, rules, and principles. Environmental governance takes place in a tridimensional space, where the state, the society, and the private sector interact with one another (Lemos & Agrawal 2006). In this context, one can conceive crowdfunding as a potential transformative phenomenon where the role of actors that have traditionally provided funding shifts, facilitated by the rise of a new actor, the intermediary platforms. Some consider crowdfunding a signal of state retreat from their responsibilities and failing financial markets (Gossel et al. 2016); however, in the absence of robust empirical evidence the drivers of the emergence of crowdfunding for conservation remain

unclear. It is unknown to what extent crowdfunding is actually increasing the total funds for conservation or whether it is just redistributing the contribution from the same set of actors. Furthermore, crowdfunding may be enabling the emergence of actors who previously did not have agency, not just for those who seek funds but also for those who provide funds.

Methods

Using a mixed-methods approach, we conducted an exhaustive global survey of relevant crowdfunding platforms and projects with a focus on biodiversity conservation. Relevant crowdfunding platforms were defined using project categories (e.g., environmental) as proxies that could be indicative of conservation-focused projects. In turn, conservation-focused projects were defined as those with an explicit or direct biodiversity or ecological dimension with a conservation outcome orientation, at least aspirationally, including both research activities and activities that did not include research. We based our survey on authoritative directories of crowdfunding platforms (Supporting Information), from which we selected platforms according to project categories, used as a proxy for potentially relevant projects (Supporting Information). Subsequently, we searched throughout all selected platforms for successful and completed projects with an explicit biodiversity conservation goal. Using document and thematic analysis (Bowen 2009; Supporting Information), we extracted data from all projects for the following variables: closing date, amount of funds sought, amount of funds raised, country of project, country of proponent, type of proponent, scale of proponent, theme, subtheme, type, subtype, focus species, and conservation status of focus species. Theme represents the focus of projects on biodiversity realms, on either ecosystems or species, whereas type refers to the kind of activity delivered. We focused our analyses on temporal and spatial patterns of crowdfunding used for conservation and on an array of biodiversity realms, conservation activities, conservation priorities, and funds raised (details in Supporting Information).

Results

Relevant crowdfunding platforms and conservation-focused projects emerged within the last 15 years and have a geographically skewed distribution. We identified 72 relevant crowdfunding platforms, which represented all continents except Antarctica (Fig. 1). These platforms were based in 28 countries, primarily western high-income economies (79% of platforms). Countries in the upper quartile of the frequency distribution (>3 platforms) included the United States, United

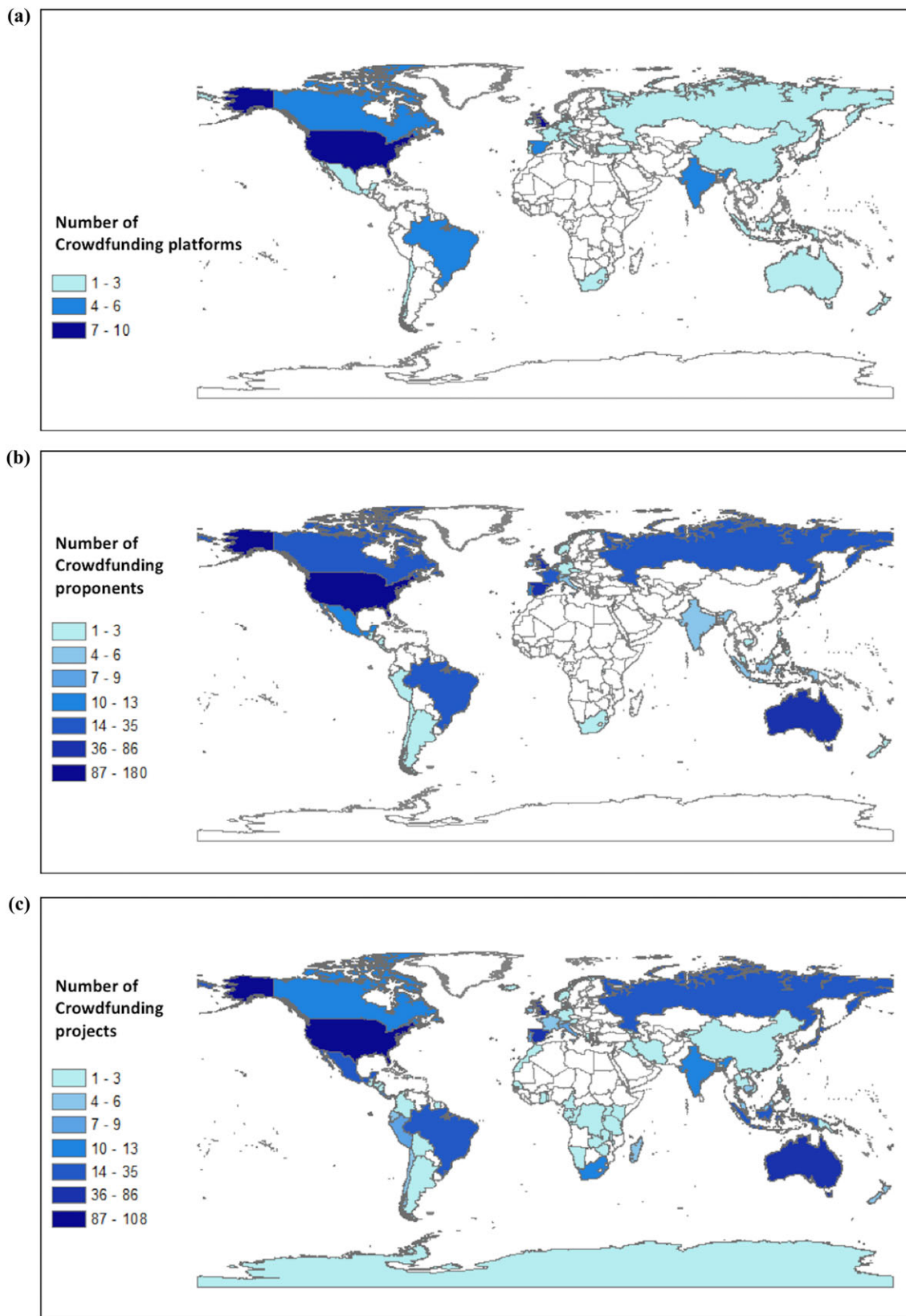


Figure 1. Global distribution of crowdfunding for biodiversity conservation: (a) countries where relevant platforms are based, (b) countries where proponents of projects are hosted, and (c) countries where projects are delivered.

Kingdom, Spain, Brazil, Canada, and India. Crowdfunding platforms emerged in 2002 and increased steeply since the late 2000s. The earliest conservation-focused project recorded was from 2009; 50% of these projects emerged by 2015 after a steep increase since the early 2010s (Supporting Information). Regarding the number of projects per platform, 37.5% of them have no projects that met our criteria, whereas 23.6% of platforms, those in the upper quartile of the frequency distribution (>6 projects), contained 89.7% of all projects found. In total, 577 conservation-focused projects on crowdfunding platforms have raised \$4,790,634 (all monetary units are in U.S. dollars). The mean project value is \$8302 and the median is \$3991, indicating a skewed distribution (minimum \$84, maximum \$561,276) (Supporting Information).

Although project proponents represent a wide range of actors and were based in 38 countries, projects were delivered across 80 countries (Figs. 1 & 2). Projects were primarily proposed by people affiliated with NGOs (35%), universities (30%), or who had no affiliation, as in the case of freelancers (26%). Furthermore, most of the NGOs considered operated at the subnational levels (66.5%); only a small number operated at an international level (14.2%; Fig. 2). Nine countries (Australia, Brazil, Canada, France, Japan, Russia, Spain, United Kingdom, and the United States), primarily with high and upper-middle income economies, hosted the proponents for 83% of all projects. These countries accounted for the upper quartile of the frequency distribution. Proponents of one-third of all projects were based in the United States. Conversely, 10 countries, mostly with lower-income economies, each hosted the proponent for only a single project. The majority of projects (95.8%) were delivered within single countries, and only a small proportion (4.2%) spanned >1 country. Projects within single countries were primarily delivered in the United States (19%), Australia (12.4%), and Spain (10.3%). A few countries with lower-income economies, including Brazil (4%), Indonesia (4%), and Mexico (3.8%), had single-country projects.

The increasing geographic spread from where platforms are based to where proponents are hosted and where projects are ultimately delivered signaled a global-scale mechanism of flows (Fig. 1). A large proportion of projects (62.5%) occurred only within a single country across platform, proponent, and project. However, one-third of projects (31.2%) were delivered in countries different from where their proponents were based, and the proponents of 12.8% of projects were based in a different country to their corresponding platform. Consequently, there are international project outflows and inflows. The United States, United Kingdom, and Australia had the highest outflow, whereas Indonesia, South Africa, Costa Rica, and Mexico had the highest inflow (Fig. 3). In total, 16 countries presented outflows, whereas 60 presented inflows, denoting an asymmetric relationship. The majority of flows (85%) occurred from coun-

tries with high-income economies to countries with lower-income economies.

Crowdfunding has funded an array of conservation-related activities focusing on various biodiversity realms (Fig. 2 & Supporting Information). The majority of projects focused on research (40%), followed by persuasion (31%), on-the-ground actions (21%), and capacity building activities (7%). Within research, projects focused on autecology (29.4%), threats to biodiversity (23.8%), and biological surveys (18%). Fewer research projects evaluated conservation interventions (4.3%). Most projects related to persuasion focused on awareness raising (87%), whereas on-the-ground actions generally involved vegetation or habitat management (36%), and building animal or plant facilities (22%). Over half of projects focused on species (57.7%), followed by terrestrial ecosystems (20.3%), whereas marine (8.8%) and freshwater (3.6%) ecosystems received the least attention. For terrestrial ecosystems, forests received the most attention (67.5%) and deserts the least (0.8%). For marine ecosystems, coastal (31%) and coral (16%) ecosystems had the greatest representation and kelp forest ecosystems the least (1.9%). Furthermore, river ecosystems presented the highest proportion (47.6%) of freshwater-focused projects and wetland ecosystems the lowest (14%).

More than one-third of projects (39%) focused explicitly on one or more species, covering among them 208 species and spanning various taxonomic groups (Fig. 2 & Supporting Information). Mammals (43%) and birds (25%) were the most well represented and amphibians the least (2%). When considering the number of projects per species, the gray wolf (*Canis lupus*), loggerhead turtle (*Caretta caretta*), African elephant (*Loxodonta africana*), black rhinoceros (*Diceros bicornis*), Bornean orangutan (*Pongo pygmaeus*), and green turtle (*Chelonia mydas*) had the highest frequency (≥ 5 projects per species). Conversely, 80.7% of species had only 1 project. Focus species included in projects were as often of least concern (40.8%) as they were threatened (39.4%). Threatened species were almost equally distributed across threaten categories (critically endangered, endangered, vulnerable [IUCN 2017]) (Supporting Information). Moreover, when each taxon was considered individually, mammals ($\chi^2 = 21.1898$, $p < 0.00001$, $p < 0.01$) and birds ($\chi^2 = 10.4541$, $p = 0.001224$, $p < 0.01$) presented a disproportionate number of threatened species relative to the expected values based on all species on the global International Union for Conservation of Nature Red List (IUCN 2017).

Discussion

Our results showed that crowdfunding for biodiversity conservation is a burgeoning and global phenomenon.

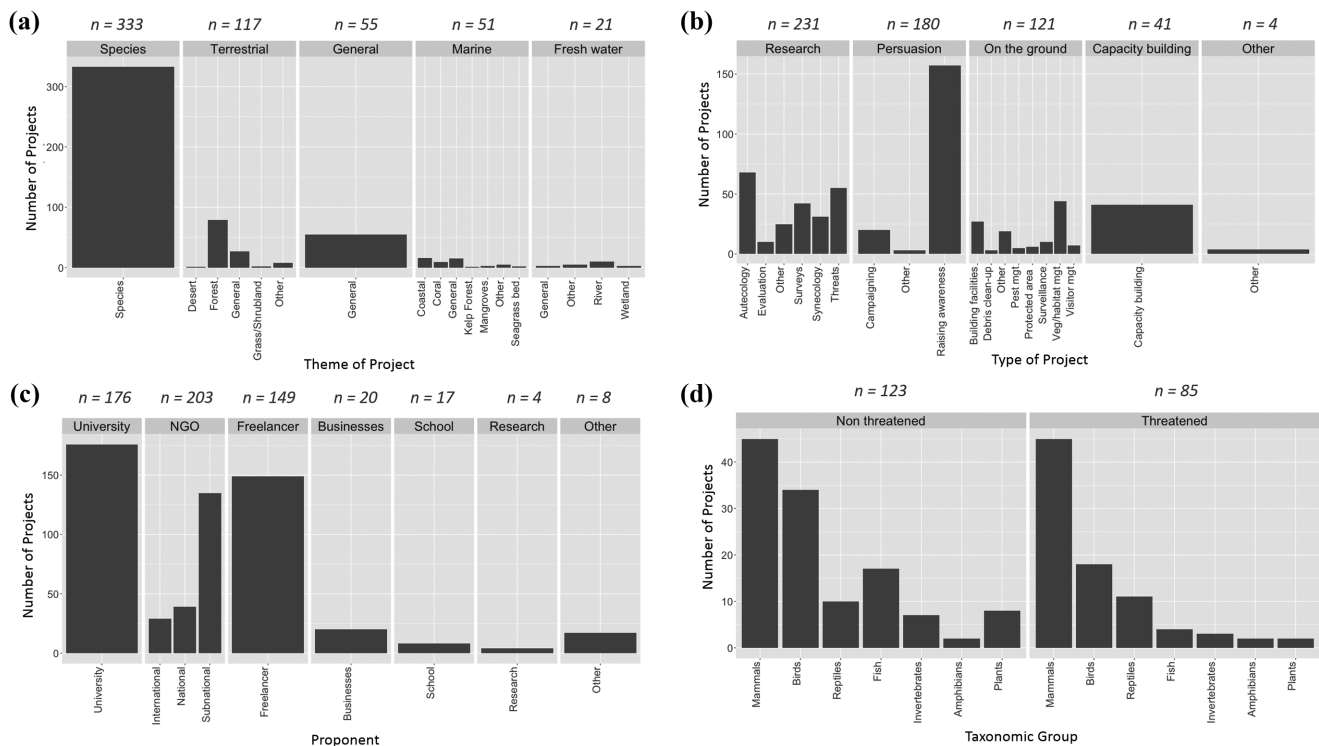


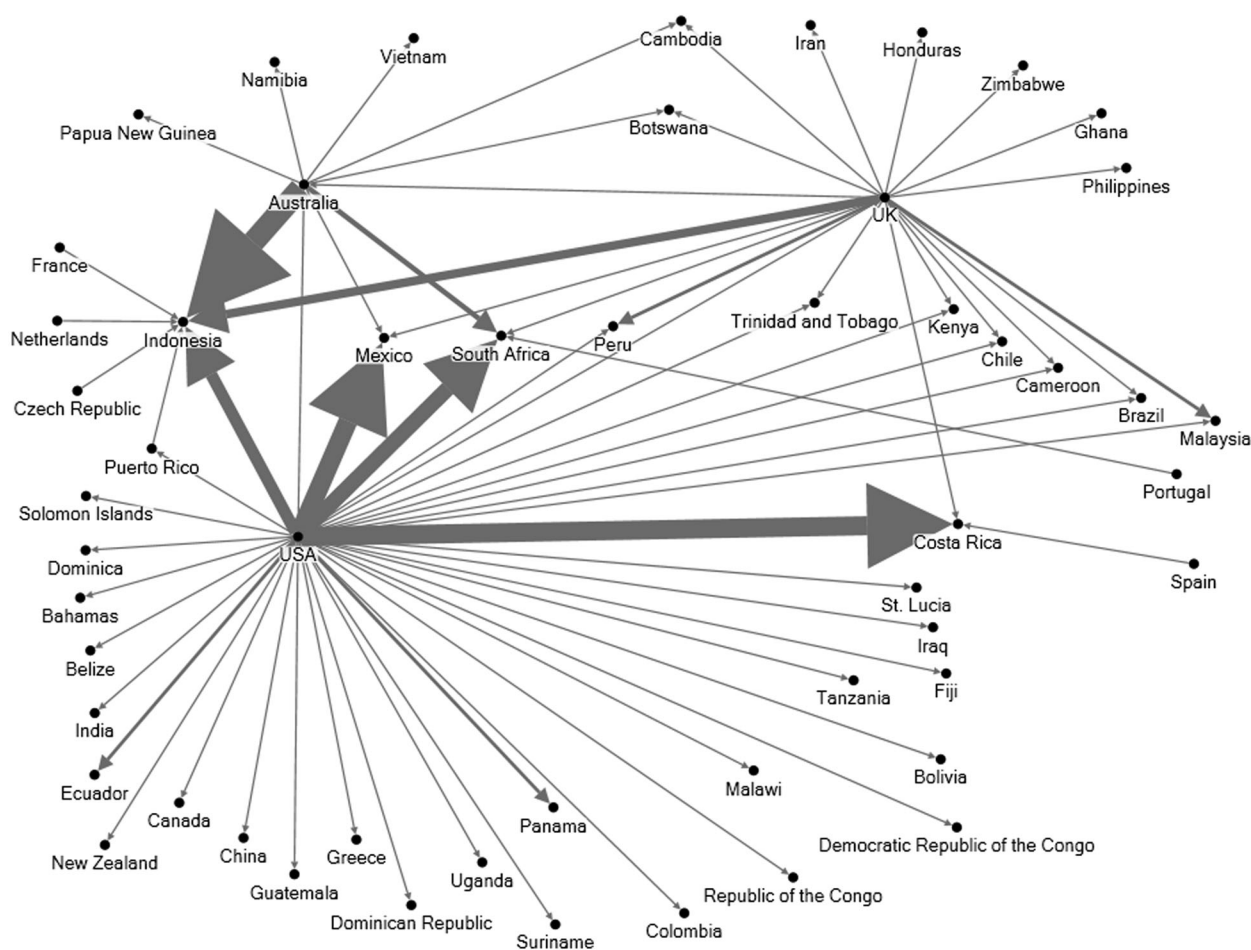
Figure 2. Conservation-focused projects according to (a) biodiversity realm, (b) type of activity, (c) type of project proponent and scale at which nongovernmental organizations operate, and (d) number of focus taxa and their conservation status.

Crowdfunding primarily originates from countries with high income and emerging economies. This financial mechanism is likely enabling resource mobilization across national borders reaching lower-income countries, has funded an array of conservation activities, and has been used across multiple ecosystems and taxa, including threatened species. The capital input from crowdfunding has been modest relative to other sources of conservation finance. Nevertheless, our results indicate further potential within specific areas, as well as impact beyond funding research and providing capital.

Crowdfunding appears to geographically expand access to capital for conservation. Platforms and project proponents are concentrated in fewer countries than where projects are delivered. Consequently, crowdfunding as an intermediary platform, which is the subject of our study, has a spatial amplifying effect. By spatial amplifying effect, we mean crowdfunding enables an expansion of the number of countries in which funds are available for conservation. This can have profound implications because crowdfunding may be allowing access to capital in places where other sources of funding are scarcer (Gray & Zhang 2017). Although we did not determine the actual provenance of individual donations for each project, other research suggests donors in the vicinity of proponents can play an important role (Agrawal et al. 2011; Dahlhausen et al. 2016). Therefore,

it is likely that at least a proportion of capital, which remains unquantified, of the projects whose proponents are based in a different country from where projects are delivered are flowing across national borders. The pattern of international flows of crowdfunding projects mirrors that reported for international aid for conservation, in which financial flows occur from high-income countries to lower-income countries (Miller et al. 2013). Moreover, at least in some cases, those flows of crowdfunding projects are occurring to countries where biodiversity conservation priorities are high and conservation remains underfunded, such as Indonesia (Lee & Jetz 2008; Waldron et al. 2013; Wilson et al. 2016).

Crowdfunding may be expanding the agency of some actors that have limited fund-raising capacity. We found that NGOs, universities, and freelancers most often used crowdfunding for conservation. Among NGOs, this financial mechanism is primarily enabling those operating at a subnational level to access capital. Subnational NGOs frequently have low fundraising capacity and are vulnerable to changes in the conservation finance portfolio (Coady 2005; Parks 2008; Armsworth et al. 2012). Likewise, freelancers accounted for one-quarter of proponents. Hence, crowdfunding platforms may be providing not only a logistical mechanism for raising funds but also a mechanism for legitimation. The participation of subnational NGOs and freelancers could increase democracy in



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Figure 3. Weighted network indicating flows of crowdfunding conservation-focused projects for those countries with the highest outflows (i.e., United States of America [USA], United Kingdom [UK], and Australia) and inflows (i.e., Indonesia, South Africa, Costa Rica, and Mexico).

conservation by pluralizing discourses and practice. This becomes paramount when considering a large proportion of NGOs operate at a subnational level, at least, in particular countries, such as the United States (Armstrong et al. 2012).

We systematically revealed the use of crowdfunding for broad-based conservation and across biodiversity realms. Research activities have received the most attention; however, persuasion and on-the-ground actions have also frequently featured. Furthermore, we unpacked those activities more specifically for the first time, providing additional insights into the use of crowdfunding for conservation. For instance, most research projects focused on autecology and threats, whereas most persuasion projects targeted raising awareness. Even though crowdfunding projects targeted various biodiversity realms, half of the projects focused on species, particularly mammals and birds, which could be potentially associated with their broader appeal to both fundraisers and donors (Clucas et al. 2008). Those species represent a disproportionate

number of globally threatened species of mammals and birds, such as the Javan slow loris (*Nycticebus javanicus*) and Orange-bellied Parrot (*Neophema chrysogaster*), both critically endangered (IUCN 2017). Although some projects focused on well-known and charismatic species, other projects focused on less popular species, such as the fishing cat (*Prionailurus viverrinus*) and Wolffsohn's viscacha (*Lagidium wolffsohni*). These last 2 species could be considered Cinderella species because they are currently overlooked but have the potential to garner public support (Smith et al. 2012). Our findings may indicate how crowdfunding can increase the conservation-funding base and make it more resilient through diversification.

In general, the financial contribution of crowdfunding to conservation appears relatively small, but it could fill critical gaps. The total contribution of crowdfunding to conservation seems minor ($\approx \$4.8$ million) compared with the annual income of conservation NGOs in the United States alone ($\$6.32$ billion) (Armstrong

et al. 2012), estimated budgets for expanding and managing global networks of protected areas (\$57.8 billion) (McCarthy et al. 2012), annual expenditure of the World Bank for supporting national parks in developing countries (\$275 million) (Hickey & Pimm 2011), and allocation to conservation through international aid (\$18.55 billion) (Miller et al. 2013). However, based on the experience of crowdfunding users for conducting research, as well as studies on crowdfunding use in the business sector, this novel mechanism has the potential to complement existing financial mechanisms. For instance, crowdfunding may provide seed capital that can be used to leverage larger funding sources (e.g., Feder 2013; Makris 2015; Sorenson et al. 2015), bridge funding gaps between project cycles, support specific tasks as part of larger initiatives, cover shortfalls left by the erosion of traditional funding sources, lower access barriers given increased competition for traditional funding sources (Bakker et al. 2010; Kaplan 2013; Marshall 2013), and fund initiatives that would not likely be funded otherwise (Dahlhausen et al. 2016). Crowdfunding may also overcome bureaucratic challenges associated with other funding sources (Kaplan 2013), as well as expedite the fundraising process at times of urgency when extinction of species appears imminent (Martin et al. 2012).

There are also nonfinancial advantages and possible pitfalls of using crowdfunding for conservation, which need further consideration. Although we did not conduct an explicit empirical analysis of pros and cons of crowdfunding use for conservation, it is important to interpret our results critically. For instance, this mechanism could be a source of innovative ideas with potential for diffusion because proponents are not constrained by priorities set by traditional funding agencies. Additionally, crowdfunding enables greater engagement with the public throughout the entire project cycle (Kaplan 2013; Wheat et al. 2013). These personal connections are vital not only for meeting fund raising goals, but also for creating opportunities for education enhancing conservation awareness (Marshall 2013; Wheat et al. 2013; Dahlhausen et al. 2016). Because crowdfunding is a nonmarket-based mechanism drawing funds primarily from individuals, funding is less likely to be affected by market forces and vested interests. By contrast, this financial mechanism has potential drawbacks due to uncertainty about the effectiveness of funded actions (Buschke 2015), latency for fueling discourses leading to erosion of government funding (Brabham 2017), disconnects between expectations and outcomes (Büscher 2016), and lack of coordination in setting priorities for allocating funds.

We focused on the extent and allocation of capital from crowdfunding for conservation, paving the way for further research. For instance, we did not evaluate success rates of projects and the variables that explain them, including donor motivations. Some of the

biases we discovered, such as the emphasis on species or terrestrial ecosystems, should be explored because it is unclear to what extent they are given by success rates or by the preference of proponents. Our focus was on strict-sense conservation funding. Hence, further research on mixed conservation funding that also includes other societal goals, such as poverty alleviation, would expand on the additional contribution of crowdfunding and possible interactions with other issue areas, including synergies and trade-offs. Comparative studies focusing on the performance of funding allocation to achieve conservation goals between strict-sense and mixed funding from crowdfunding would contribute to the broader question of funding effectiveness (Miller 2014; Waldron et al. 2017). What explains the emergence and uptake of crowdfunding for conservation remains an empirical area of enquiry. Addressing these and additional questions would advance conservation goals through further crowdfunding adoption, but would require different methodological approaches than the one we adopted here.

Crowdfunding is a novel financial mechanism contributing to biodiversity conservation globally and has further potential. Opportunities arise from its spatial amplifying effect, steady temporal increase, inclusion of Cinderella species, adoption by multiple actors, and funding of a suite of activities beyond research. However, it remains to be determined whether crowdfunding is just another conservation fad (Redford et al. 2013). More importantly, although it is innovative and appealing, crowdfunding should be used with consideration of its advantages and challenges, which will vary in relation to specific conservation objectives and proponent capacity within the context of the broader conservation finance portfolio. Further research on the use of crowdfunding for biodiversity conservation can potentially advance conservation practice. Key research topics, such as success rates, effectiveness, uptake, and raising the public profile of environmental issues, would also contribute to the conservation finance (Zavaleta et al. 2008), environmental governance (Lemos & Agrawal 2006), and crowdfunding literature (Gossel et al. 2016). Embraced with due care, crowdfunding has the potential to become an increasingly important financial mechanism for biodiversity conservation.

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Supporting Information

Directories of crowdfunding platforms (Appendix S1), metadata on crowdfunding platforms (Appendix S2), coding framework for thematic analysis of projects (Appendix S3), further details on methods (Appendix S4), temporal emergence of platforms and projects (Appendix S5), full data set of conservation-focused projects supported through crowdfunding (Appendix S6), and further data on theme, subtheme, type, subtype, and focus taxa (Appendix S7). The authors are solely responsible for the content and functionality of these materials. Queries (other than absence of the material) should be directed to the corresponding author.

Appendix S4: further details on methods

Figure SI.4.1. Methodological process of our study on the use of crowdfunding for supporting biodiversity conservation-focused projects.

Table SI.4.1. Criteria for inclusion and exclusion of crowdfunding projects that have a focus on biodiversity conservation.

Table SI.4.2. Scores of Kappa Analysis for interpretative variables

Appendix S5: temporal emergence of crowdfunding for biodiversity conservation

Figure SI.5.1. Temporal trends of emergence for: a) number of relevant crowdfunding platforms, and b) number of conservation-focused projects funded through crowdfunding. (vertical dashed line in both graphs represents the earliest date of data collection)

Appendix S7: further data on theme, subtheme, type, subtype, and focus taxa

Table SI.7.1. Frequency of themes and subthemes per project

Table SI.7.2. Frequency of types and subtypes per project

Table SI.7.3. Frequency of species and threatened species per taxonomic group

Table SI.7.4. Frequency of species across IUCN Red List categories (EX: extinct; CR: critically endangered; EN: endangered; VU: vulnerable; NT: near threatened; LC: least concern; Unknown: data deficient, not evaluated, or not found on IUCN Red List)

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