Remote Sensing in Ecology and Conservation
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EDITORIAL

A new platform to support research at the interface of remote sensing, ecology and conservation

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Assessing and predicting responses of biological diversity to global environmental change and the effects of such responses on human well-being are high-priority targets for the scientific, management and policy communities (Pereira et al. 2013; Dirzo et al. 2014). These assessments and predictions are essential inputs to inform international initiatives such as the Convention on Biological Diversity and the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (Collen et al. 2013), being fundamental to defining and optimizing adaptation and mitigation strategies. To rise to the challenges posed by global environmental change, in particular, the research, management and policy communities need access to standardised information on changes in the distribution of biodiversity and in the intensity of human activities; these communities also need to know whether management actions are effective (Sutherland et al. 2004; Brooks et al. 2014; Pettorelli et al. 2014a).

Remote sensing (the acquisition of information about an object or phenomenon through a device that is not in physical contact with the object; Jones and Vaughan 2010) has considerable potential as a source of information on the state of, and pressures on, biological diversity and ecosystem services, at multiple spatial and temporal scales. The potential for synergies between remote sensing science and ecological research and conservation science has been highlighted by many (see, e.g. Turner et al. 2003; Koh and Wich 2012; Sueur et al. 2012; Nagendra et al. 2014). The use of remote sensing technologies, including camera traps (Ahumada et al. 2011; O'Connell et al. 2011), field spectrometry (Murphy et al. 2008), terrestrial and aquatic acoustic sensors (Van Parijs et al. 2009; Blumstein et al. 2011) aerial and satellite monitoring (Horning et al. 2010; Pettorelli 2013), as well as shipborne automatic identification systems (Erbe et al. 2012) to support scientific research and conservation practice has also grown exponentially over the past decade.

Remote sensing, ecology and conservation science are each disciplines in their own right (Pettorelli et al. 2014b). Ecology is generally defined as the scientific study of the distribution, abundance and dynamics of organisms and their interactions with other organisms and with their physical environment. Conservation science, which is rooted in ecology and social science, historically has been tasked with coordinating research and monitoring efforts to maximise the probability of persistence of species, ecosystems and ecological processes (Soulé 1985). Both ecology and conservation science have traditionally relied on field data, and the process of obtaining these data generally is resource intensive, difficult to implement across large areas over long periods of time, and sometimes expensive and/or invasive. The roots of environmental remote sensing, in contrast, are in the disciplines of geography and engineering (Barrett and Curtis 1999). Remote sensing is inherently non-invasive, and makes it possible to obtain data that could not be collected by the human eye and ear. Remote sensing also typically collects data over greater spatial and temporal extents than is possible through field-based methods.

Activities aiming to bridge the gap between remote sensing and ecology and conservation science have flourished in the recent past. The diverse sponsorship of such efforts suggests that both decision makers and researchers are committed to advancing the collaborative science and its application. These activities include, for example a German Aerospace Centre-funded Committee on Earth Observation Satellites (CEOS) workshop on remote sensing for monitoring of biological diversity in October 2012 (Leidner et al. 2012); a U.S. National Aeronautics and Space Administration-funded workshop to identify 10 high-priority conservation questions that can be addressed with remote sensing in January 2013 (Rose et al. 2014); a European Union-funded workshop to identify pathways to improve the use of remote sensing products in conservation in October 2013 (http://remote-sensing-biodiversity.org/networks/ceos/workshop2013) and a Zoological Society of London symposium on the use of satellite remote sensing to inform conservation in May 2014 (http://remote-sensing-biodiversity.org/symposium-2014). The U.S. Office of Naval Research now supports both an ocean acoustics program and a program on marine mammals and biology, thus linking research on the physics of underwater sound to the ecology of marine mammals. The Acoustical Society of America also supports both the science of acoustics, which relies heavily on remote sensing, and its biological applications. Platforms facilitating networking between the remote sensing and conservation communities, such as the Group on Earth Observations Biodiversity Observation Network (http://www.earthobservations.org/geobon.shtml), the Tropical Ecology Assessment and Monitoring Network (http://www.teamnetwork.org/), the Remote Sensing Conservation network (http://www.remote-sensing-biodiversity.org/networks/crsnet) and the group on Remote Sensing for Biodiversity within CEOS (http://www.ceos.org), are also starting to appear. Such a level of interdisciplinary activity clearly demonstrates that the dynamic interaction among these communities is changing, with cooperation now reaching a level where many synergistic analyses are surfacing and informing future research.

Remote Sensing in Ecology and Conservation is an open-access journal that aims to capitalise on these developments and support communication and further collaborations between experts in remote sensing, defined in its broadest sense and ecologists and conservation scientists who focus on any terrestrial, freshwater or marine system. This aim reflects the editorial team's belief that the journal and associated activities have the potential to increase the efficiency of research investments and the success of efforts to meet ecological and associated social objectives. Primary goals of the journal are to maximise the understanding and uptake of remote sensing-based techniques and products by the ecological community (both theoretical and practical), prioritizing findings that advance the scientific basis of ecology and conservation science; and to identify ecological challenges that might direct development of future remote sensors and data products.

Manuscript types considered by the journal include original research articles, reviews, policy forums, and interdisciplinary perspectives. Reviews are expected to be topical, succinct contributions that identify current gaps in knowledge; provide novel insights into future interdisciplinary challenges and ultimately guide new research. Reviews may include quantitative meta-analyses, syntheses, as well as modelling approaches. Policy forums should support transfer of information between the research and policy spheres. They should be set within a broad policy context and relevant to constrained decision making; opinions should be identified clearly as such and be grounded in evidence. Interdisciplinary perspectives provide a platform for scientists and practitioners to present personal and well-argued views on current and future priorities for strong, dynamic interactions among the ecological and remote sensing communities. Perspectives also provide opportunities for authors to raise thought-provoking interdisciplinary issues that advance collective thinking.

There are clear indications that the set of interests shared by the ecological, remote sensing and conservation communities is growing, yet no peer-reviewed journal adequately supports the development of these interests. Existing journals mostly lack sufficiently diverse editorial expertise to easily identify remote sensing research and developments that have the potential to significantly advance ecology and conservation. Moreover, the set of remote sensing technologies considered by existing journals is generally not comprehensive, hindering their ability to support knowledge transfer among researchers and practitioners. *Remote Sensing in Ecology and Conservation* aims to fill this gap by supporting innovative thinking and promoting the collaborative development of new tools, sensors, methods and products. We strive to increase understanding and dialogue between communities by avoiding jargon and supporting efforts to detail software packages, algorithms and raw data referenced within publications. We hope our journal will consolidate the growing partnership among the ecological, conservation and remote sensing communities for the future benefits of society.

Conflict of Interest

None declared.

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