



## SPECIAL FEATURE: APPLYING ECOLOGY

## The involvement of naturalists: Introduction to the Special Feature “Applying ecology”

### La participación de los naturalistas: Introducción al Tema Especial “Aplicando la ecología”

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#### ABSTRACT

This article firstly introduces the Special Feature “Applying Ecology”, addressing the use of ecological information for dealing with conservation and environmental problems in Chile. This is part of a series of special features in *Revista Chilena de Historia Natural*, intended for exploring the contribution of naturalists in making sound decisions in social-environmental planning. However, the low involvement of Chilean biologists has become a factor potentially affecting the quality of environmental decisions and policies, and increasing the chance of unwanted results, which raises some open questions about ethics. In such a context, the second part of the article analyzes the issue of involvement from different perspectives, considering its causes and consequences at individual and collective levels.

**Key words:** conservation biology, ecology, ethics, occupational identity, society.

#### RESUMEN

Este artículo presenta en primer lugar el Tema Especial “Aplicando la Ecología”, que aborda el uso de información ecológica para enfrentar problemas ambientales y de conservación en Chile. Este es parte de una serie de temas especiales en la *Revista Chilena de Historia Natural*, destinados a explorar la contribución de los naturalistas en la toma de decisiones bien fundamentadas en planificación socio-ambiental. Sin embargo, la baja participación de los biólogos chilenos se ha convertido en un factor que potencialmente afecta la calidad de las decisiones y políticas ambientales, y aumenta la probabilidad de los resultados no deseados, lo cual plantea algunas preguntas abiertas sobre ética. En este contexto, la segunda parte del artículo analiza el problema de la participación desde distintas perspectivas, considerando sus causas y consecuencias a nivel individual y colectivo.

**Palabras clave:** conservación biológica, ecología, ética, identidad ocupacional, sociedad.

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#### PRESENTATION

Basic science is a priority for *Revista Chilena de Historia Natural* (RCHN), albeit the journal does recognize the role and importance of biological knowledge for making well-founded decisions in social-environmental planning. In such a context, RCHN opens the present issue with the first of a short series of special features dedicated to conservation and environmental themes, aimed at exploring the views of the Chilean naturalist community on the contribution of Biology to societal demands, and helping to acknowledge the importance of the participation of Chilean naturalists in public processes.

While applied contents are not the core of RCHN, this is not just a political gesture for attracting new readers and contributors. The publication of this special series arose in response to a welcome initiative from the National Center for the Environment (Centro Nacional del Medio Ambiente, CENMA), a foundation of the Universidad de Chile intended to provide the Chilean State with scientific information for assisting the development, improvement and execution of environmental policy and regulation. Echoing its goal, then, CENMA enthusiastically offered to fund the publication of articles dealing with the application of biological knowledge in areas within the scope of RCHN, leaving the

journal with the only mission to proceed independently in every respect.

The decision of RCHN was then twofold. First, transferring this support directly to the potential contributors by requesting proposals, and then selecting groups of manuscripts for peer-review in order to be published as special features. Second, obtaining a diversity of views by channelling the initiative through the naturalist scientific societies affiliated to the Biology Society of Chile, extending open invitations to their members to submit their works (though not aimed at representing official views of these societies or expressing views on their behalf). Therefore, each of these special features (unlike regular ones in RCHN) may be considered a sample of disciplinary perspectives on a broad theme, rather than a comprehensive analysis of some particular topic. This first time, the present Special Feature resulted from an invitation directed to, and well received by, the members of the Sociedad de Ecología de Chile (Ecology Society of Chile), and we hope to obtain a similarly enthusiastic response from other scientific societies in the near future.

#### *The Special Feature “Applying Ecology”*

“Applying Ecology” addresses the provision of naturalist information and the use of ecological approaches for dealing with conservation and environmental problems in Chile. The five articles following this introductory paper are highly diverse in their approaches and subject matters, although such variety is a good sample of the ways in which naturalists may inform decision makers at different levels and contexts.

The first article by Simonetti (2011) assesses whether Chilean biologists are fulfilling their social contract in regard with biodiversity conservation, evaluating the match between scientific production and research priorities and the factors affecting the institutionalization of scientific knowledge and experience. Worth to note, this essay is based on a lecture given by its author as recipient of the Patricio Sánchez Prize, awarded by the Ecology Society of Chile. In the context of industrial effects, Cárcamo et al. (2011) assess the impacts and conflicts derived from the possible installation of three coal-fired power plants in northern Chile close to key areas for

the conservation of marine and terrestrial biodiversity, suggesting approaches and tools for assisting decision making and conflict resolution. Changing the focus to natural disasters, De la Barrera et al. (2011) deal with the destruction of the Chaitén city after the eruption of the Chaitén volcano in southern Chile, conducting multi-criteria and landscape analyses for evaluating the relocation alternatives of new urban developments and their potential impacts on local biodiversity, integrating environmental criteria at early stages of decision making in land use and urban planning processes. Approaching another industrial impacts, Fernández-González et al. (2011) focus on heavy metal pollution and freshwater biota, conducting experimental evaluations of the vertical (transgenerational) transfer of effects driven by sublethal copper stress on key biological parameters of parental and filial generations of water fleas, showing that such tests provide a closer view of the actual threats derived from stressors, and are a more sensitive probe for measuring ecosystem health. Finally, Fontúrbel & Jiménez (2011) address the case of the only extant species of Microbiotheria, the marsupial “monito del monte” endemic to temperate rainforests from Chile and Argentina and targeted as a conservation priority, showing how the key ecological knowledge of a single species may generate a new environmental policy allowing the conservation of the species, its habitat, its interactions, and ultimately the rainforest itself.

Going back to Simonetti (2011), the low commitment of biologists is a recurrent theme of his article which has been the subject of many similar discussions in the international literature, often involving ethical aspects in indirect or indirect ways. In this regard, therefore, the remaining of this paper explores the issue of involvement in simple terms (not judgemental or admonitory) in the context of the Chilean naturalist science.

#### NATURALISTS AND INVOLVEMENT: CLOSING THE LOOP FOR LOOPING THE LOOP

##### *The issue of involvement*

Paul McCartney once wrote that “people are the same wherever you go”, and naturalist

biologists seem to be no exception, at least in regard with their reluctance to direct participation in decision and policy processes outside the scientific realm (e.g., see Steel et al. 2004). Such a "behavioral trait" helps to explain why the demands for a greater involvement of biologists have been increasing in this and other countries, emerging even from science itself in the form of an ethical claim (e.g., Lubchenco 1998, Simonetti 2011 in this issue). On the other hand, involvement face scientists with the need to deal with unfamiliar contexts and counterparts, and sometimes with not-so-ideal ways of solving environmental problems, differing from the supposedly neutral and objective paths of science (Oltra 2009). Indeed, we witness how environmental debates in Chile are increasingly pervaded by non-collaborative approaches (see Karl et al. 2007) of the adversarial type, where advocates (politicians, scientists, or interest groups in general) try to prevail over the opponents, or even of the top-down type, where authorities can make decisions regardless of scientific advice. Thus, the above may help to explain why some biologists simply depart from public affairs, or become not eager to engage in the transmission and interpretation of knowledge to those responsible for societal decisions.

Low involvement is a rather intriguing problem as it seems to combine from active responses (e.g., reluctance derived from particular views of science or ethical dilemma; see below) to passive attitudes (e.g., indolence or apathy), all of which have a similar result (inaction or restricted involvement), generating a mostly summative phenomenon (an additive effect). Apparently, getting involved is not an all-or-nothing decision for biologists, but a decision range with many options between the absolute "yes" (always taking a leading role or being in the heart of the battle) and "no" (never or in no case). Then, a frequency distribution of the degree of involvement would probably be unimodal with a strong positive skew. In fact, by choice or any other reason, a high number of biologists at different career stages participate only indirectly in decision processes by acting occasionally or regularly as third parties, i.e. providing basic information (data, analyses, studies) for other participants (consulting firms, public or private institutions, persons).

However, such information is not always easily accessible for others to judge its appropriateness, and third parties do not often get involved in the further course of action, remaining little aware of the incidence (or the lack of it) of their information in later stages of the process. Consequently, a right-skewed distribution of involvement may reflect a vast grey area of professional participation, leaving room for uncertainties in the outcome of decision processes. As a result, there is a growing concern nowadays that the low involvement and low participation rate of the naturalist community is affecting the quality of environmental decisions and policies, and increasing the chance of unwanted results, which raises some open questions about ethics.

#### *Involvement, ethics and norms*

Leaving legal, political and economical aspects aside, a basic question is whether Chilean biologists must engage or assume responsibility in decision processes if requested to do so, whenever and to the extent possible. This would require the acceptance or adoption of some mandatory principle (an ethical imperative or a collective ethical decision), but no such principle is found, for instance, in the ethical codes or statutes of important Chilean scientific societies such as Biology, Botany, Ecology and Evolution (i.e. the decision would be largely a personal matter). A second question is to what extent non-engaged biologists and third parties are willing to assume responsibility for wrong or unwanted outcomes, or from another viewpoint, how far their responsibility goes in those cases. The answer would lie outside the personal sphere if such aspects were formally defined in some normative dimension, although this is seldom the case. For instance, the code of ethics of the Biology Society of Chile does not explicitly include such requirements, but instead urges members to comply with institutional, national or international norms applicable to their profession or professional field (which use to be little precise in this regard). Therefore, ethical demands for engaging and assuming responsibility would lack a mandatory basis and rely on a wide and interpretable domain, which is perhaps a proximate cause for the low

response of the Chilean naturalist community. Accordingly, participation seems to be assumed only voluntarily as a service or obligation, accepting that the degree of responsibility (for good or bad results) increases with the degree of involvement, whereas refusing involvement conveys no responsibility. Interestingly, even though this state-of-the-art of involvement may reflect collective inaction, it had not been construed or foreseen by the naturalist community, and most likely it did not emerge from a collective indifference towards environmental or societal problems. Thus, considering that decisions to not engage would hardly be random or neutral, it is probable that the present scenario (right-skewed distribution of involvement) could be predicted by some null model assuming possible constraints on individual choices between biologists.

The issue of low involvement of biologists in environmental decision processes is similar to that observed in areas such as innovation for development, education outreach and others, which also demand more commitment from scientists. In all such cases it is clear that a problem exists, and perhaps most biologists would acknowledge the ethical value of being engaged, but as long as it remains as a voluntary choice. This attitude may be partly related with the positivist roots of science, still alive and influential, giving a high value to neutrality in the generation of objective knowledge and the provision of expert advice, which explains why the role of external consultant fits so suitably to scientists (see Oltra 2009). Two difficulties with this view are that claiming neutrality is itself an ideological claim (Harvey 1974), and that responsibility in the face of environmental problems affecting people or natural entities is not ethically neutral (Lenk 1998). On the other hand, scientists currently face a number of requirements in their academic positions, and any command to engage may be felt as compromising other values related with their autonomy and free choice, and their possibility of accomplishing with external standards on productivity and research (Steel et al. 2004, Oltra 2009).

From the above, naturalists urged to respond to conflicting demands (whether factual or experienced) face ethical paradoxes

that may be among the ultimate causes for low involvement, which actually implies different ethical dilemmas, both pure and mixed according with professional and philosophical criteria (e.g., see McKay & O'Neill 1992). Owing to the projected environmental scenarios, the demands for involvement are expected to increase, and ethical dilemmas should become increasingly evident because, in academic professional terms, they encompass virtually all the options and choices forming the "fundamental niche" of naturalists. The issue is in fact inescapable under a relational approach, where every potential contributor bears co-responsibility for her/his choice of action (if, how and to what extent) in the context it is made, and therefore active inaction (a decision to not engage) may entail as much responsibility as insufficient or inappropriate action. In fact, the notion of co-responsibility has been proposed as the core for a modern definition of scientific integrity in the science-society relationship (Mitcham 2003), although this kind of approaches are still far from being hot topics for most scientists.

#### *The role and identity of naturalists*

Although public involvement is not a defining aspect of the role of Chilean naturalists in the society, such role has not been entirely clear (apart from some well-known professional niches and academic competences), and had disregarded the construction of an occupational identity at both individual and collective levels. Such identity (following Phelan & Kinsella 2009) refers to a composite sense of who naturalists are and wish to become as occupational beings, a sense shaped through individual choice orientated by a socio-cultural frame for achieving a meaningful and socially valued work. So far, however, the sense of being a naturalist has been largely confined to the traditional and narrow domain of disciplinary enrollment.

Since the 19<sup>th</sup> century, naturalists differentiated themselves into organizational units of knowledge production (see Hjørland 2007), each one developing a specific communication system which, by excluding amateurs and non members, served for legitimating authority and scholarship within a

given area (i.e. creating a discipline), and restricting a field work for their members (i.e. creating a profession). Such disaggregating process is now reflected in the social structure of science, closely matching the designation of professional roles and instruction domains in higher education (Hjørland 2007), and the recent emergence of new scientific societies in Chile suggests that this process is still perceived as the way of acquiring and reinforcing an independent identity. However, while a discipline-based structure will likely continue to be functional within the domain of basic science, it seems no longer sufficient for developing a role in the society and a meaningful occupational sense, and some kind of reappraisal may be timely.

#### *Closing the loop for looping the loop*

A direct consequence of low involvement is the generation of different kind of gaps at different stages and levels of decision- and policy-making processes, weakening the links between their outputs and outcomes (see SSC 1999). A greater disciplinary involvement may thus help to avoid inadequacies in the provision, interpretation and implications of biological information throughout a process, for ensuring the quality of its final output (e.g., a report or recommendation). The solution therefore involves a sort of "mass effect", i.e. an increased presence of naturalists in places and situations in which they do not often occur and where they are required to apply what they know, which simply means filling the gaps for closing the loop.

However, naturalists are also needed at higher (more political) levels in these processes, where they may play informing, assessing and modulating roles. Such participation may help to strengthen the bridge between outputs and outcomes (e.g., decision or policies) in terms of the adequacy and use of biological information. When such processes are conducted several times for similar cases (e.g., evaluations for the possible installation of energy plants, marine concessions for salmon aquaculture, etc.), they become to some extent cyclical (the same administrative process is repeatedly applied by the same governmental instances or authorities), and thus they may generate

undesired feedbacks (inadequacies that repeat in, or set precedents for, new similar processes). Therefore, naturalists may also assess the consistency of the processes and their outcomes for ensuring that they have the desired effects. As part of the sphere of responsibilities claimed by Lubchenco (1998), such roles are little seductive as they demand public involvement or even engagement in public service, and few naturalists are willing to interrupt their scientific careers. However, these tasks are critical for improving decisions based on previous experience, which means refining the cycle or looping the loop (SSC 1999).

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