• ESA assumes that the principal investigator(s) of a research project retain the right to control use of resulting unpublished data, unless otherwise specified by contract or explicit agreement.

We believe ESA needs to clarify whether these principles are also intended to apply to the use of electronically archived data. Specifically, we believe that ESA needs to address the issue of electronically archived data in its code of ethics and/or develop a code specifically addressing this topic. In order to encourage the development of such a code (whether a supplement to the current code of ethics or a separate code), we offer the following working draft that ESA could use as a starting point for such an effort.

A Proposed Code of Ethics for Access and Utilization of Archived Data

Science is a community enterprise that prospers most when there is open dissemination of ideas and data. Thus, The Ecological Society of America supports the archiving and public accessibility of ecological data and urges all ecologists to make their data accessible in this way. It is expected that raw and summary data will be made available promptly following any publication of the data. In addition, all summary and raw data, published or not, normally should be made publicly accessible no more than 5 years following their collection or determination. Should further delay be necessary, reasons for this delay must be publicly provided, along with an expectation of the release date. It is expected that those who gathered the data will document the archived data sets sufficiently to permit their use and interpretation by others. Furthermore, all individuals who access and use data gathered by others are ethically obliged to respect and acknowledge the time, energy, and intellectual effort expended by those who produced the data. Any individual who analyzes or presents archived data, or any portion of the data, in any form or fashion, is required to have contacted those who produced the data and to have thoroughly discussed with them issues of data quality, interpretation, acknowledgment, recognition, and authorship before any dissemination of ideas, results, or conclusions based on the data occurs.

If such a code of conduct were to exist, then individuals and research teams archiving data sets could post a copy of the code to their archive web site reminding users of their ethical obligations. Authors of manuscripts submitted to ESA journals, and authors of posters or oral presentations at ESA-sponsored events, could be required to indicate whether any archived data sets other than those of the author(s) were used in the papers or presentations. If so, the authors could be required to provide the names of those individuals whose data sets were used and to indicate how they had resolved issues of data interpretation, acknowledgment, recognition, and authorship. This could be accomplished via a standardized form provided all authors by the editors or ESA. Should questions remain, editors and meeting organizers could then contact the individual(s) whose archived data sets were being used to obtain additional information and perspective. Although ESA could require such information only for its own journals and meetings, it would be expected that ESA members would abide by the ethical code of conduct no matter where or in what form any dissemination of ideas, results, or conclusions based on another's archived data occurs.

We believe that such a code of ethics would provide the assurances that both data gatherers and data users need to make data sharing a win–win situation. By providing leadership in developing and implementing such a code, ESA could help the ecological community adapt to, and benefit from, the newly emerging culture of open data sharing.

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Managed Ecosystems Deserve Greater Attention

The current debate regarding the relationships between declining biodiversity and ecosystem processes as they relate to aspects of the Earth's support system has garnered much recent attention throughout the scientific community and in the general media (Naeem et al. 1999, Huston et al. 2000, Kaiser 2000). Inconsistent results from a variety of experiments highlight the complexity of interactions among species and their environment. This is particularly true in natural ecosystems. We suggest that understanding the relationships between species diversity and functioning will benefit from greater attention to managed ecosystems. We also suggest that more ecological research in managed ecosystems is necessary for both the conservation of biodiversity and the sustained production of goods and services that we depend upon.

Within the ecological and conservation communities, managed ecosystems have repeatedly suffered from an inaccurate characterization as the root of ecosystem degradation through declining biodiversity. This has led many ecologists and conservation biologists to ignore managed ecosystems in the study of biodiversity and ecosystem processes, and to reject managed environments as conservation priorities because they have been modified by human intervention, and thus are no longer "natural." Certainly, poor management, or lack of management, can lead to ecosystem degradation, which may or may not be caused by a change or loss of species. A more accurate characterization of managed ecosystems is as replicated experiments in the manipulation of biodiversity to achieve specific functional goals. These real-life experiments offer great scientific potential to the ecological community, and in return ecologists can more directly contribute to the achievement of sustainable land use and conservation of biodiversity.

One of the reasons that many ecologists shun managed ecosystems results from a misunderstanding of what management entails. It has been argued that humans have impacted the entire planet, and thus no area is truly wild (Janzen 1995). But not all landscapes impacted by humans are managed. Managed ecosystems require human inputs to maintain a desired function. Often, ecosystem management is a prescription for manipulating biodiversity to assure particular functions that are vital for people and the human environments that support civilization. Ideally, managed ecosystems are under the care of professionals who follow management plans based on science. Managing ecosystems requires application of knowledge from social, biological, and physical sciences (Johnson et al. 1999, Sexton et al. 1999, Szaro et al. 1999). Food and fiber production, water quality assurance, flood control, rehabilitation of damaged lands, and buffering of human activity are but a few examples of situations that require properly managed ecosystems.

Many manipulations of ecosystems fail, usually because of insufficient understanding and/or poor applications. This is where ecologists can make important contributions to the conservation of biodiversity in managed landscapes, and to the ultimate sustainability of management activities. Sustainability of management activities benefits society and indirectly contributes to biodiversity conservation by decreasing the need to exploit new lands. Collaboration between managers and scientists to apply the principles of adaptive management (Bormann et al. 1994) is likely to help achieve these goals. Management failures should not to be confused with ecosystem exploitation, conversion, or misuse. There are many examples of polluted, overexploited, or converted ecosystems that have not been managed.

A challenge to our civilization is to conserve biodiversity while maintaining humans on Earth. To do so, we must manage ecosystems to derive products and services that are vital to our well being. While management often requires the manipulation of biotic communities, it is counterproductive to assume a priori that managed ecosystems are detrimental to the conservation of biodiversity. Pimentel et al. (1992) estimated that a significant fraction of the world's biodiversity resides in managed landscapes. They suggested that a large part of the success or failure to conserve biodiversity depends upon how we deal with species in managed ecosystems.

Demographic and economic trends require more, rather than less, human control of biodiversity. Ecologically engineered ecosystems will become increasingly important in the future as the need for higher yields and environmental quality force us to apply science for the purposeful design of new ecosystems. This will require greater understanding of how ecosystems—managed or natural—function. We can improve understanding of ecosystems by testing our ability to use ecological knowledge to manipulate and manage biodiversity for the control of ecosystem functions to meet specific human needs (Ewel 1987). Better communication and increased collaboration between those land management professionals and ecologists will accelerate the rate of knowledge acquisition and improve the effectiveness of ecosystem management for both the conservation of biodiversity and the production of goods and services.

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A History of the Ecological Sciences: Early Greek Origins

Editor's Note: Frank Egerton, a well-known science historian, has been working on a history of ecology for some time. He has agreed to provide the history to the ESA Bulletin, *in readable-sized units, as he finishes them. This installment is the first of several.* —A. M. Solomon

Introduction

Ecology is the most comprehensive and diverse of the sciences. Its scope is enormous, and it may be the most important science for managing the earth as an abode for humanity and for what is left of our natural environment. Yet ecology is also one of the youngest sciences, and its history is not well known. Histories of ecology already published attempt to describe the origins and development of some basic ecological concepts. That was a sensible way to begin, but it is time to move on to a more comprehensive history.

In doing so, we must recognize organizational realities. On the one hand, ecology is organized around certain concepts and perspectives. On the other hand, because it is such a diverse science, most ecologists think of themselves as belonging to a more narrow specialty, such as marine ecology, limnology, plant ecology, or animal ecology. They write textbooks for these specialties and teach courses in them. Many of these specialized fields arose before the umbrella science of ecology did, and members of some of these specialized sciences prefer to maintain their separate identities. Parasitologists and bacteriologists would perhaps find it presumptuous for anyone to place them under the ecology rubric. Nevertheless, the history of these subjects is still part of the history of ecology in a way that is not true of the history of physical sciences, however essential these latter are as foundations for ecology. Advances in physical sciences must still be noticed as they become relevant.

Observations and interpretations of ecological interactions extend back to the origins of science, but the term "oecologie" was not coined until 1866, and steps to organize the science were not taken until the 1890s. So where should we begin the history? If the ancient writings that now seem relevant had been forgotten and the science had been built only upon observations and interpretations made during the 1800s, it would be unnecessary to look back in history before 1800. However, the balance of nature concept was the earliest ecological notion, and it remained a fundamental ecological idea until recent times, even though reinterpreted in different ages. The problem was that ecological ideas got more or less lost within the framework of a broader science