

Table of Contents

<u>Bridging the Gap between Ecology and Resource Management</u>	0
<u>RESPONSES TO THIS ARTICLE</u>	1

Bridging the Gap between Ecology and Resource Management

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The culture of a scientific discipline does not change overnight. I agree strongly with Professor Baskerville that scientists and managers need to work more closely together and that more ecological research must be done at the temporal and spatial scales encountered by resource managers. But I am perhaps more optimistic than he in my opinion that ecological research is already moving in the right direction, and that the gap between management and ecological research is slowly, but surely, being bridged.

When I was a graduate student, I was taught that the best science was "pure" science, motivated entirely by elegant theories and scientific curiosity. I was told that ecological studies were best conducted in the wilderness, far from the influence of humans, for it was only in such pristine places that ecological systems were still sufficiently intact that their intricate natures could be unravelled and understood. I was, and still am, fascinated by birds, and I wanted to know why there were fewer bird species on islands than on nearby mainlands, and what consequences this difference in diversity had on the evolution and behavior of birds. The introductory sentence in my Ph.D. dissertation states that my research was an "attempt to test current theories about the differences in morphology, distribution, and behavior of island and mainland birds." To test these theories, I went off to Trinidad, Jamaica, and Costa Rica in search of pristine nature.

I was still in graduate school at the time of the first Earth Day in 1970, and so was part of a generation of ecology students who were trying to reconcile their esoteric research with their growing awareness that all was not well with the Earth's ecology. But I was told not to worry about this, because the relationship of ecology to resource management was much like that of physics to engineering: ecologists should figure out how nature works, and leave it to the natural resource managers to apply that knowledge in the real world. I was convinced that, if I could test MacArthur's "compression theorem" and Van Valen's "niche-variation model" on the Yellow-faced Grassquit, the resulting scientific knowledge would be used by someone else to manage and protect birds and other species around the world.

I was surprised when I couldn't find any pristine habitat in Trinidad, Jamaica, or Costa Rica. And I pretty soon discovered that the primary force influencing the distribution, abundance, and evolution of grassquits was not interspecific competition, as predicted by the compression hypothesis, but rather was human-caused habitat degradation and land use change. I still work on birds, and I am still genuinely curious about what determines their distribution, abundance, and diversity. I even still harbor some hope that there will be general ecological theories that apply to organisms and ecosystems everywhere, but I now conduct my research in abandoned agricultural fields and heavily managed woodlots and pine plantations. I also work very closely with land managers, because I am convinced that changes in land use are the predominant factors causing changes in bird populations, and that it is how land is used and managed that will determine the fate of birds and other organisms.

My own research, like that of many contemporary ecologists, is now much more oriented toward understanding organisms on human-dominated landscapes and at spatial and temporal scales relevant to resource management. However, my optimism for the future comes not from observing the shift in the research focus of my generation of ecologists, but rather from observing what contemporary graduate students in ecology are doing compared to what was popular when I was a student. Most of the students in my research group in recent years have worked on how land use changes at the landscape scale influence animal population dynamics. My students not only work on heavily managed land but, in several instances, work directly with land managers and are interested in using their research in an adaptive management framework. For example, one of my students, Nick Haddad,

convinced U.S. Forest Service managers at the Savannah River Site in South Carolina to harvest trees on large, replicated tracts according to a specified experimental design, so that he could test theories about the importance of corridors to animal movement and population viability. It is studies like this that will either validate or refute our current theories and lead to better land use practices.

Perhaps the pace of change in ecological research is far too slow, but change is definitely happening. The nature of ecological research being done today is far more relevant to resource management than what was being done 20–30 years ago. Perhaps, if we are lucky and we continue to work more closely with resource managers, our research can make a difference.

RESPONSES TO THIS ARTICLE

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[↑ Return to Forum Table of Contents](#) [← Return to Table of Contents for Volume 1, Issue 1](#)

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