U.S. Department of the Interior

U.S. Geological Survey
John Wesley Powell Center for Synthesis and Analysis

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Jessica Burnett, Univ. Nebraska Lincoln
Craig Allen, USGS Coop Unit UNL
Hao Ye, University of Florida
George Sugihara, UC-San Diego

Dear Jessica, Craig, Hao, and George,

We are sorry that we are not able to support your proposal "Scale mismatches in ecological research and management: consequences and solutions through data management" We want to thank you for submitting, and share comments from the reviewers below. Your proposal drew strong reactions, both positive and negative, from our panel.

Strengths: You propose to identify how research questions about global ecological change are affected by mismatches with the scale of extant datasets, develop a standardized framework for data integration to enable interoperability among multiple datasets and guidelines for model development, and create recommendations for prioritizing current and future monitoring programs and for establishing adaptive management/monitoring practices. Scale mismatches are being increasingly recognized as a problem in ecological, particularly social-ecological, research and management, making this a timely problem on which to focus. A few reviewers found this very refreshing, and suggested that while the quest for a common data standard is never-ending, you might increase the potential for others to ask if they are optimizing their monitoring for answering the questions posed.

We were pleased there was mention of social-ecological systems, particularly in management, but this part wasn't well developed. One reviewer suggested a useful reference if you elect to refine this proposal with more of a focus on the social side.

> *Guerrero, A.M., McAllister, R.R.J., Corcoran, J., Wilson, K.A., 2013. Scale mismatches, conservation planning, and the value of social-network analyses. Conserv. Biol. 27, 35-44.*

We were also pleased that you paid attention to process and documented how you plan to communicate and organize yourselves. There was a great mix of participants in all respects.

Weaknesses: Other reviewers homed in on the word "management" in your title, and interpreted this to mean that you were either a) wanting to advise managers of how to better align monitoring approaches with questions (in which you failed because none of the community of practice of monitoring professionals was represented), or b) ignoring a large existing body of literature related to monitoring for the right things to address the questions. Suggested papers from this community are found at the bottom of the letter. I interpret this to mean there was confusion among reviewers how theoretical versus how practical your proposal was.

And this feeds into questions about the motivation for this research. Though the problem was well defined, it was never placed into a clear context for investigation. For example, if missed regime shifts are the focus, then are they the most important consequence of scale mismatch and what are some examples of monitoring programs that missed capturing such a shift? If the ability to identify ecological process is the focus, then how will that take place? How will you address the mismatch between the designed purpose of a monitoring program (e.g. population trends) and the ecological process(es) to which it is being applied? In other words, what are the scale mismatches between extant monitoring and ___ (blank not filled in).

The methods were also not well defined. The proposal mentions several methods for detecting regime shifts and says that team members have "considerable experience in a variety of quantitative methodologies for detecting ecological regime shifts and nonlinear dynamics," but the focal problem is to detect scale mismatches. Techniques for analyzing monitoring programs with respect to their ability to detect specific trends (e.g. power analysis) are well-known, but these were not mentioned.

Summary: There was confusion among reviewers as to what your intentions were. Was it to illustrate scale mismatches between existing monitoring programs and their applications? Was it to develop better ways of detecting these types of mismatches and share them with decision-makers? One reviewer felt you were attacking monitoring professionals. Another felt it was an exciting step forward.

Sincerely,

Jill Baron and Marty Goldhaber, Directors

Other related work to this proposal that was not cited follows (**not nearly exhaustive**):

1. Reynolds et al. 2016. A road map for designing and implementing a biological monitoring program. EMA 188:399.
2. Smart et al. 2012 Clarity or confusion? – problems attributing large-scale ecological changes to anthropogenic drivers. Ecol Indicators 20:51-56.
3. Also, the numerous papers contributing to the "adaptive monitoring" discussion that are not in the literature cited
4. Gitzen, Millspaugh, Cooper, and Licht (2012) Design and analysis of long-term ecological monitoring studies. Cambridge Press.
5. Albert et al. 2010. Sampling in ecology and evolution- bridging the gap between theory and practice Ecography 33: 1028-1037.
6. Maas-Heber, K. G., M. J. Harte, N. Molina, R. M. Hughes, C. Schreck, & J. A. Yeakley. 2015. Combining and aggregating environmental data for status and trend assessments: challenges and approaches. Environmental Monitoring and Assessment 187:278.
7. Many more…