

Making ecological monitoring count: linking monitoring design to management decisions at the farm, catchment and national levels

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A central role of ecological monitoring is to inform management aimed at continuous improvement, by iteratively updating information about the effectiveness of actions or the magnitude of their impacts. However, monitoring may be expensive and incurs an opportunity cost with respect to time and money in environmental management, making it crucial that monitoring is designed to answer important questions efficiently. Monitoring may fail to positively influence management when the link between monitoring results and management decisions is unclear, when the questions being addressed are poorly defined, or when the experimental design is inadequate for discerning relevant changes. We argue that the majority of monitoring designs fail on at least one of these criteria and that a formal approach to adaptive management, based on decision theory principles clarifies the role of monitoring, highlights the importance of good monitoring design and decreases the instances of wasteful monitoring. Using simple examples, we'll illustrate a generalized model of optimal monitoring that applies at multiple scales, whether the goal is to assess the relative performance of restoration planting strategies at the farm level, to regulate the culling of kangaroos in a national park, or to evaluate the efficiency of the State's investments in conservation programs.