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A Reply from Stephens and Colleagues

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nature and people. Strategies that serve both people and nature can broaden the political and financial support for conservation (Marvier and Wong 2012). Although we agree that economic activities are the source of many conservation problems, we do not conclude that economic growth per se is the foe of conservation.

Like our critics, we want a world with large, relatively untrammeled open spaces and a world that does not suffer the loss of species both great and small. We want a world in which people have the opportunity to enjoy the surprises and inspiration of nature. The question is how we most effectively achieve this future in which both nature and people thrive. We would place more bets than would Noss and his coauthors on working with corporations, on pursuing rights-based management (community or private) of resources rather than exclusion or no-take zones, and on making a promise that conservation do no harm to people. We are all passionate about conservation—and just as conservationists prize the diversity of plants and animals and the evolutionary processes that shape them (Soulé 1985), the field might do well to similarly advance a diversity of approaches and then let science—both natural and social science—be the arbiter of which strategies are most effective.

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The Overlooked Benefits of Wildfire

Stephens and colleagues (2012) examined the efficacy of fuel treatments in reducing susceptibility to uncharacteristically severe fires in seasonally dry US forests. They were overly optimistic in stating that the effects of thinning on wildlife have "few unintended consequences" with "very subtle effects or no measurable effects at all" and failed to recognize the ecological benefits of high-severity fires that are actually below historic levels.

Stephens and colleagues did not include studies documenting adverse effects of thinning on small mammal prey species for northern spotted owls (*Strix occidentalis caurina*; e.g., Meyer et al. 2005) or on rare species, such as black-backed woodpeckers (*Picoides arcticus*; Hutto 2008). Nor did they address "ecological trap" phenomena created by silvicultural activities without evolutionary precedent—a factor that can draw declining postfire specialists like olive-sided flycatchers (*Contopus cooperi*) into managed environments wherein they suffer poor nest success (Robertson and Hutto 2007).

Moreover, Stephens and colleagues did not fully represent the benefits of high-severity fire by limiting analysis to the earliest postfire period (0–4 years postfire), thus excluding the portions of the data sets that they used that show that more bird species increase than decrease in high-severity fire areas after several years. In addition, the impetus for thinning is overstated. Only one study from one region is cited to suggest that fire severity is increasing and that it should be mitigated via thinning, but the authors did not mention that current data show no increase in fire severity in many western US regions. Nor did Stephens and colleagues account for thinning's impacts on imperiled species dependent on high-severity fire that have already experienced a severe loss of suitable habitat from fire suppression, such as the buff-breasted flycatcher (*Empidonax fulvifrons*) in southwestern US forests (Conway and Kirkpatrick 2007).

There is an urgent need for scientists to report on the myriad ecosystem benefits of wildfires, including high-severity fires, and to effectively document the impacts of fuel treatments on wildlife, especially rare species, so that managers are fully aware of the trade-offs involved.

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A Reply from Stephens and Colleagues

In response to our paper (Stephens et al. 2012), Hanson and colleagues state, "There is an urgent need for scientists to report on the myriad ecosystem benefits of wildfires, including high-severity fires." Although we agree, the synthesis of information related to high-severity wildfire was not our objective. Despite this, we do recognize and highlight the ecological benefits of high-severity wildfire, at appropriate spatial and temporal scales.

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In particular, Hanson and colleagues question our conclusions that thinning mimics prescribed fire for wildlife and claim that we do not stress the ecological importance of high-severity fire. For their first point, they cite two papers (Meyer et al. 2005, Robertson and Hutto 2007). Although these are interesting papers, they are not germane to the meta-analysis (Fontaine and Kennedy 2012) that was used to support our findings, which included all papers published through 2008 in which one of our a priori selection criteria was that a paper had to include a *demographic response* to treated and untreated stands. Therefore, habitat papers such as Meyer and colleagues (2005) were not included, because they did not present demographic data. We made this decision because interpreting the fitness consequences of habitat modifications is difficult because wildlife can demonstrate flexibility to resource changes, and required resources are rarely identified in the literature.

Another a priori literature selection criteria in Fontaine and Kennedy (2012) was to include only papers in which thinning was specifically used as a tool to reduce fire hazards, which are "generally a lower-intensity treatment… than those implemented for other silvicultural objectives." Therefore, papers like Robertson and Hutto (2007) were not included because they compared avian (olive-sided flycatcher) densities in "selectively harvested" forests with forests burned by wildfires.

Hanson and colleagues' claim that we did not stress the ecological importance of high-severity fire to wildlife suggests that they did not carefully read our paper. We clearly state at the end of the "Wildlife" section that our "analyses demonstrate that low- to moderate-severity surface fire (and presumably its thinning surrogate) does not mimic the early successional habitat conditions created by high-intensity, patchy, stand-replacing fires." Furthermore, in the "Conclusions" section, we recommend the "expanded use of managed wildfire."

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