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## Symposia 12924: Has wolf reintroduction to Yellowstone provided evidence for a trophic cascade?

**Submitter's Email:** dan.macnulty@usu.edu

**Session Description:** The ability of large predators to frighten and kill other animals is increasingly characterized as an ecosystem service critical to conserving biodiversity and ecosystem function. The pathway describing these effects is known as a 'trophic cascade', and a classic example that has captivated more minds than perhaps any other is wolf reintroduction to Yellowstone National Park. The textbook story is that wolves frightened and (or) killed enough elk to allow various woody deciduous plants (e.g., willow, aspen, cottonwood, and others) to recover from decades of unchecked herbivory. Less widely known is that the community of researchers that has been measuring the interactions between wolves, elk, and woody plants is divided about whether their data backup the textbook story. Although there is no argument that the removal of wolves from Yellowstone in the 1920s provided strong evidence of a trophic cascade, there is vigorous debate on ecosystem responses to wolf restoration. Some research indicates widespread vegetative recovery of woody deciduous plants primarily due to reduced elk browsing, while other work indicates recovery is limited because changes in the physical environment and disturbance regime that occurred after wolf removal have stabilized the system such that wolf restoration has not caused it to return to conditions that prevailed before wolves were extirpated. The debate has recently attracted attention in the popular media. The purpose of this symposium is to gather the principal researchers on trophic research in Yellowstone and fully discuss the evidence from studies by different groups, strive to reach consensus, and plot a way forward with new questions. Understanding of terrestrial food webs and community structure has lagged behind marine and aquatic systems, so this is a rare opportunity to advance understanding in a seminal terrestrial system. This symposium will offer an opportunity for researchers to present their views of the scientific evidence with a follow-up discussion. Important questions to be addressed will be explanations for changes in ungulate abundance and distribution, spatial heterogeneity in plant responses to trophic effects, the importance of elk relative to other large herbivores in shaping plant community dynamics, and the relative strength of top-down vs. bottom-up forces regulating elk and plant responses.

**Session Justification:** The current controversy about the role that wolves play in modifying the behavior and dynamics of other species in Yellowstone is a classic case study of the forces that structure the dynamics of food webs and the ecosystem services they provide to the human economy. Increasingly, we are realizing that the quality of human life on the planet depends on a deep functional understanding of these forces. Our session seeks to advance this understanding by clarifying how the food web in northern Yellowstone has reacted to the restoration of a significant predatory force, wolves. Invited are the primary researchers behind most of the key publications who will be asked to present their main findings, respond to criticisms from other research groups, and plot a way forward. Finally, we ask that each presenter comment on the generality of their findings, considering whether lessons from Yellowstone have relevance beyond park boundaries.

**One-sentence Summary:** Debate about the ecological consequences of wolf reintroduction to Yellowstone is central to the resolution of broader debates about the forces that structure natural systems and deliver ecosystem services, and this session gathers leading researchers to clarify the trophic effects of wolves in the famed northern Yellowstone ecosystem.

### **Abstract ID # 63134**

Why should ecologists care about the trophic cascade debate in Yellowstone?

[Andy Dobson](#), Ecology and Evolutionary Biology, Princeton University, Princeton, NJ

### **Abstract ID # 63115**

Carnivore recovery & dynamics

**Douglas W. Smith**, Wolf Project, Yellowstone Center for Resources, Yellowstone National Park, WY

### **Abstract ID # 63117**

Ungulate dynamics & wolf-ungulate interactions

[Dan MacNulty](#), Department of Wildland Resources, Utah State University, Logan, UT

**Abstract ID # 63121**

Woody plant dynamics I

**David J. Cooper**, Graduate Degree Program in Ecology, Colorado State University, Fort Collins, CO

**Abstract ID # 63125**

Woody plant dynamics II

**Robert Beschta**, Forest Ecosystems and Society, Oregon State University, Corvallis, OR

**Abstract ID # 63127**

Synthesis & future directions

**Rolf O. Peterson**, School of Forest Resources & Environmental Science, Michigan Technological University, Houghton, MI

## Moderator(s)

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Mark Hebblewhite

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University of Montana

**Would you like to volunteer as a session presider?** No

**Would you like to volunteer to judge the Buell-Braun student award applications?** No

## Organizer(s)

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**Would you like to volunteer as a session presider?** Yes

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