

## **No clear relationship between supplemental feeding and elk productivity in the Greater Yellowstone Ecosystem**

Brian Dugovich<sup>1</sup>, Emily Tomaszewski<sup>1</sup>, Eric Cole<sup>2</sup>, Sarah Dewey<sup>3</sup>, Dan MacNulty<sup>4</sup>, Kelly Proffitt<sup>5</sup>, Brandon Scurlock<sup>6</sup>, Daniel Stahler<sup>7</sup>, and Paul Cross<sup>1</sup>

### **Background/questions**

The widespread practice of supplemental feeding aims to boost wildlife population health during resource-scarce periods, but its benefits for ungulates like elk remain controversial. In the Greater Yellowstone Ecosystem (GYE), elk have been fed for over a century initially focused on boosting winter survival and increasing hunting opportunities. However, feeding continues primarily to help manage elk distributions away from livestock and mitigate damage to private property. We reassessed elk productivity in light of the former motivations by examining feeding in the context of bottom-up, top-down, and demographic ecological regulation.

### **Methods**

We investigated the effects of feeding on three key elk population productivity metrics (calf:cow ratio, change in winter range density, and harvestable surplus) across 13 regions in the GYE over 26 years. We incorporated count, climate (snow and rainfall), predator (wolves and grizzly bears), and harvest data into a Bayesian regression framework. To help explain mechanisms behind the detected patterns, we examined feeding interactions with these covariates through model weighting and averaging.

### **Results/conclusions**

The model results revealed surprising outcomes among elk productivity metrics in the GYE. While feeding demonstrably increased calf:cow ratio, its impacts on changes in winter range density and harvestable surplus, a crucial management target, were absent. Notably, while we identified intuitive responses to bottom-up control, we also found latent ecological trade-offs with feeding in top-down and demographic regulation. Additionally, elk productivity following harsh winters did not appear to be influenced by feeding. Collectively, our results challenge the notion of supplemental feeding as a guaranteed tool for enhancing elk populations and prompt a reevaluation of its role in the context of the GYE's complex ecological dynamics.

### **Topics:**

Boundaries: Political, Ecological, Economic, & Cultural Dimensions of Decision Making  
Human Dimensions - Impacts of Changing Visitation and Human Use

<sup>1</sup>U.S. Geological Survey, Northern Rocky Mountain Science Center, Bozeman, MT, USA

<sup>2</sup>U.S. Fish and Wildlife Service, National Elk Refuge, Jackson, WY, USA

<sup>3</sup>National Park Service, Grand Teton National Park, Jackson, WY, USA

<sup>4</sup>Utah State University, Logan, UT, USA

Brian Dugovich  
bdugovich@usgs.gov  
406-994-7544

<sup>5</sup>Montana Fish, Wildlife and Parks, Bozeman, MT, USA  
<sup>6</sup>Wyoming Game and Fish Department, Pinedale, WY, USA  
<sup>7</sup>National Park Service, Yellowstone National Park, WY, USA