

ECOTYPIC VARIATION IN RECRUITMENT OF REINTRODUCED BIGHORN SHEEP

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Abstract: Prior to settlement, the North Dakota badlands were occupied by Audubon's bighorn sheep (*Ovis canadensis auduboni*). The North Dakota Game and Fish Department subsequently reintroduced California bighorn (*O. c. californiana*) descended from the Williams Lake region of British Columbia, Canada (WL ecotype), and Rocky Mountain bighorn (*O. c. canadensis*) descended from the Sun River region of Montana, USA (SR ecotype). Although California and Audubon's bighorn were recently reclassified as Rocky Mountain bighorn (*O. c. canadensis*), the native bighorn of North Dakota occupied a harsher climate than the Williams Lake region of British Columbia and were more similar to bighorn from the Sun River region. Because reintroductions still play a key role in bighorn sheep management and local adaptation may have substantial demographic consequences, we used mixed-effects logistic regression to evaluate causes of variation in lamb recruitment of bighorn sheep reintroduced in North Dakota.

During 2006–2010, SR ecotype bighorn recruited 0.54 lambs/ewe ($n = 113$ ewes), whereas the WL ecotype recruited 0.24 lambs/ewe ($n = 562$ ewes). Our most plausible candidate model (53% of model weight) attributed variation in recruitment to differences between source populations (odds ratio = 4.5; 90% CI = [1.5, 15.3]). Greater recruitment of SR bighorn (fitted mean = 0.56 lambs/ewe; 90% [0.41, 0.70]) contributed to a net gain in abundance ($r = 0.16$), whereas WL bighorn (fitted mean = 0.24 lambs/ewe; 90% CI [0.09, 0.41]) declined ($r = -0.03$). Translocations are the primary tool used to augment or restore wild sheep populations but often fail to achieve desired results. Our results are the first experimental evidence that the similarity of source stock to native bighorn may have long-term implications for population performance.

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Key words: Audubon's bighorn sheep, *Ovis canadensis auduboni*, Rocky Mountain bighorn, *Ovis canadensis Canadensis*, recruitment, reintroduced population.

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