



## Outfitter use as a constraint negotiation mechanism in snow goose hunting

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Beginning in the 1970s, mid-continent snow goose (*Chen caerulescens caerulescens* and *C. rossii*) populations have grown rapidly, resulting in extensive damage to tundra breeding habitats (Batt, 1997; Conklin & Alisauskas, 2017; Kerbes, Kotanen & Jefferies, 1990). The U.S. Fish and Wildlife Service responded to this population increase by enacting the Light Goose Conservation Order (LGCO) in 1999. Under the order, U.S. hunters are allowed to take snow geese during a special season during the spring migration. During the hunt, hunters do not observe any bag limits, are allowed to hunt from sunrise to one half-hour after sunset, and can use electronic calls and unplugged shotguns. These methods, plus the timing of the season, would be unlawful under regulations adopted following the Migratory Bird Treaty Act of 1918 (Miller, 2000). Despite liberalized hunting methods, spring snow goose hunting is an expensive, equipment-intensive endeavor that often requires access to private agricultural lands where snow geese feed on waste grains and sprouted crops. The high number of decoys needed, use of specialized equipment, and time required for site preparation present substantial constraints for the activity. Hunters' participation and harvest, however, are critical to the success of the LGCO.

Reported use of outfitter services among Illinois snow goose hunters increased during the four years prior to this study (2014–2017). Given this reported increase and the substantial constraints to participation, we suspected that Illinois hunters may be using outfitters to negotiate constraints. We hypothesized that hunters who perceived constraints to participation would be more likely to use outfitters than less constrained hunters. Understanding differences in outfitter use and constraints can facilitate participation and further snow goose conservation efforts.

Data were collected through repeat mail surveys of randomly selected waterfowl hunters during 2016 and 2017 who reported hunting snow geese during the previous LGCO season in Illinois (Sears, Williams, Miller, & Conat, 2018). Participants received three survey packets with a self-addressed postage paid return envelope, and three reminder postcards in an alternating order. Three questions measured hunters' perceived constraints: (a) lack of access, (b) lack of adequate snow goose populations near their home, and (c) the costs of equipment. Constraints items were operationalized as dichotomous variables where 1 = hunter experienced that constraint and 0 = hunter did not experience that constraint. Use of an outfitter was also operationalized as a dichotomous variable where 1 = hunter used an outfitter and 0 = hunter did not use an outfitter. Chi-square was used to test for differences at  $p < .05$ . Effect size was examined using Cramer's  $V$ .

**Table 1.** Perceived constraints by use of an outfitter by year.

Experienced Constraint		Used outfitter		$\chi^2$	Cramer's <i>V</i>
		Yes	No		
<b>2016</b>					
No place to hunt snow geese	Yes	33%	13%	33.54***	.196
	No	67%	87%		
No snow geese where I live/hunt	Yes	36%	8%	82.07***	.307
	No	65%	92%		
Equipment is too much money	Yes	39%	23%	15.44***	.133
	No	61%	77%		
<b>2017</b>					
No place to hunt snow geese	Yes	23%	10%	17.04***	.175
	No	77%	90%		
No snow geese where I live/hunt	Yes	16%	8%	7.74**	.118
	No	84%	92%		
Equipment is too much money	Yes	31%	19%	8.88**	.127
	No	69%	81%		

\*\* $p < .01$ , \*\*\*  $p < .001$ .

As hypothesized, hunters who experienced constraints for access, costs, and snow geese near their home were more likely to use an outfitter (Table 1). Effect sizes (Cramer's *V*) ranged from .12 (minimal relationship) to .31 (typical relationship). The same pattern was observed among hunters in both 2016 and 2017 seasons. More hunters in 2016 reported that lack of access (no place to hunt geese) used an outfitter (33%) than hunters who did not experience that constraint (13%). A similar pattern was observed in 2017 where 23% of hunters who reported lack of access used an outfitter, versus 10% who did not report experiencing that constraint. Thirty-five percent of hunters during 2016 who were constrained by the availability of snow geese near their home used an outfitter, compared to 8% who did not experience that constraint. This same pattern was observed during 2017, albeit with a smaller effect. Finally, hunters who were constrained by the costs of snow goose hunting equipment were more likely to use an outfitter than were hunters who were not constrained by costs (Table 1).

Overall, hunters used outfitter services to overcome constraints such as land access, equipment cost, and snow goose numbers. With Illinois snow goose hunter numbers stabilizing over time (Sears et al., 2018), outfitter services may enable greater participation and harvest by assisting hunters in the constraints negotiation process. Further research is required to understand snow goose hunter motivations and satisfactions related to the use of outfitters. Future work should characterize the various constraints that snow goose hunters face and the factors that facilitate their negotiation of constraints.

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