*In My Opinion*

# Balancing Waterfowl Hunting Opportunity and Quality to Recruit, Retain, and Reactivate

**MICHAEL L. SCHUMMER,**[1] *Department of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY 13210, USA*

**JOHN SIMPSON,** *Winous Point Marsh Conservancy, 3500 S Lattimore Road, Port Clinton, OH 43452, USA*

**J. BRIAN DAVIS,** *Department of Wildlife, Fisheries & Aquaculture, Box 9690, Mississippi State University, MS 39762, USA*

**BRENDAN SHIRKEY,** *Winous Point Marsh Conservancy, 3500 S Lattimore Road, Port Clinton, OH 43452, USA*

**KENNETH E. WALLEN,** *University of Idaho, Department of Natural Resources and Society, 975 W 6th Street, Moscow, ID 83844, USA*

**ABSTRACT** Waterfowl hunter numbers and waterfowl populations were closely correlated until the past 2 decades when hunter numbers declined despite near-record breeding population estimates for ducks in North America. As a result, efforts to recruit, retain, and reactivate (R3) waterfowl hunters have been promoted by the North American Waterfowl Management Plan community because hunters are a key source of funding for wetland-wildlife habitat conservation and management. Increasing access and opportunity for hunting appears to be the primary R3 strategy in North America. We suggest that hunt quality is an equal, if not more important, facet of waterfowl hunter R3 that is substantially overlooked and undervalued by current R3 initiatives. We contend that providing abundant access and opportunity to hunt waterfowl alone, especially if it jeopardizes hunting quality, is inadequate. We urge the R3 community to integrate principles and methods used within the human dimensions field to focus on the relationships between quality, motivation, and satisfaction across various audiences and market segments. Such an approach will help R3 initiatives establish an empirical evidence base to develop strategies specifically focused on identifying key hunt quality or opportunity factors. © 2020 The Wildlife Society.

**KEY WORDS** conservation, ducks, hunting, R3, reactivation, recruitment, retention, waterfowl.

## WATERFOWL CONSERVATION AND HUNTING IN NORTH AMERICA

The North American Model of Wildlife Conservation describes the successful interrelationship between wildlife conservation and hunting in North America (Geist 1995, Geist et al. 2001, Organ et al. 2012). The model grew from alarming population declines across numerous taxa during a period of increased settlement and land transformation in the mid- to late-1800s (Leopold 1949). The model is based upon protective laws and international treaties for migratory birds (e.g., Migratory Bird Treaty; Batt 2012), concurrent with state and federal taxes, fee stamps, and paid licensing systems that generate substantial funding for conservation and management of fish and wildlife at state and federal levels (Mahoney 2004, Organ et al. 2010). For example, during the 2016–2017 hunting season, approximately 1.04 M waterfowl hunters in the United States generated an estimated US$26 million through the mandatory purchase of federal Migratory Bird Hunting and Conservation Stamps (Raftovich et al. 2017). These numbers have decreased from the historic high of US$40.3 million (in 2018 U.S. dollars) generated by the 1970 hunting season, with an estimated 2.03 M waterfowl hunters in the United States.

Prior to 1995, waterfowl hunter numbers and associated conservation funding were tightly correlated with continental waterfowl populations estimates (Vrtiska et al. 2013). However, despite abundant waterfowl and liberal harvest regulations (USFWS 2018a, b), the number of waterfowl hunters in North America has precipitously declined (Vrtiska et al. 2013). This downward trend in hunter participation and associated revenue and conservation activity prompted wildlife professionals to develop strategies for retaining, recruiting, and reactivating waterfowl hunters, generally termed the R3 Initiative (Responsive Management/National Shooting Sports Foundation 2017, Humburg et al. 2018).

## BALANCING WATERFOWL HUNTING OPPORTUNITY AND QUALITY

A primary action of most state- and federal-level R3 initiatives, including U.S. Executive Order 3356 (USDOI 2017), has been to facilitate hunter participation through

increased access and opportunity. Examples include opening formerly closed National Wildlife Refuge lands to hunting, increasing hours available to hunt, adding additional public locations to hunt, and reducing restrictions on hunting methods and equipment (Devers et al. 2017, Responsive Management/National Shooting Sports Foundation 2017, USDOI 2017). These decisions follow a common assumption that increased access and opportunity to hunt will directly increase participation in hunting or indirectly increase participation through improved hunter satisfaction (Devers et al. 2017, Responsive Management/National Shooting Sports Foundation 2017, USDOI 2017). In this respect, we speculate that contemporary R3 initiatives may be undervaluing the importance of hunt quality, potentially reducing the efficacy of R3 initiatives as a result. That is, increasing access and opportunity often appears to be a default strategy without consideration that waterfowl hunters are a diverse audience who seek varied experiences, which are arguably independent of or have a complex relationship with hunting access and opportunity (Fontaine et al. 2019, Schroeder et al. 2019b).

Though presumably important to waterfowl hunter R3, hunt quality indicators like achievement-oriented motivations, which measure self-determined standards of performance such as harvest success, tend to be ignored or inconsistently used (Driver 1983, Vaske et al. 1986, Decker et al. 1987, Decker and Connelly 1989). A clearer understanding of the relationship between hunt quality indicators is essential to comprehensively inform R3 efforts. For example, among wild turkey (*Meleagris gallopavo*) hunters, Schroeder et al. (2019a) demonstrated that achievement-oriented hunting experiences were the strongest predictors of hunter satisfaction compared with appreciation or affiliation experiences. Similarly, experiences related to observing ducks and bagging ducks were important to satisfaction among Minnesota waterfowl hunters, regardless of avidity (Schroeder et al. 2019b). Hunt quality scores from surveys collected on Mississippi Wildlife Management Areas and Missouri Waterfowl Conservation Areas correlate strongly with the number of ducks bagged (Schummer et al. 2019; A. Raedeke, Missouri Department of Conservation, unpublished data). Similarly, nearly 80% of respondents to the 2017 National Survey of Waterfowl Hunters indicated that birds harvested influenced their hunt satisfaction (McFadden 1981; Adamowicz et al. 1994; Slagle and Dietsch 2018a, b, c, d). Discrete choice models from the same survey demonstrated that greatest relative desirability was achieved when the maximum daily bag limit was reached, and least in harvesting one duck for all flyways in the United States (Slagle and Dietsch 2018a, b, c, d). These examples exist within a larger body of human dimensions evidence that strongly suggests hunt quality is a key component of waterfowl hunter satisfaction, and should be more integral in directing R3 initiatives and strategies. Per the National Survey of Waterfowl Hunters, Fulton et al. (2017) framed a 'quality waterfowl hunt' as a day afield that included 1) a location <2 hours from home, 2) when a sufficient number of birds were encountered with limited competition from other hunters, and 3) when there was opportunity to harvest birds.

The potential importance of hunt quality, however, is often overlooked in current R3 implementation plans. Currently, Iowa, Georgia, California, and Kentucky are the only states in the United States that have implemented official R3 statewide plans (Georgia Department of Natural Resources 2017, Iowa Department of Natural Resources 2017, California Department of Fish and Wildlife [DFW] 2019, Kentucky Department of Fish and Wildlife Resources 2019). These plans identify increasing access and opportunity as a priority, but only Kentucky's plan explicitly recognizes the importance of quality of experience within identified R3 strategies. For example, Iowa's plan "Strategy 3" identifies 9 action items to "Increase Access and Opportunity"; Georgia's plan Strategy 4 specifically denotes, "Improve access to hunting and shooting areas"; and California's Plan Topic 1 Action 1 is to "Address opportunity barriers to make hunting and fishing more accessible." Yet none of these 3 plans address anywhere within identified strategies and action items the importance of managing for, or improving, quality of user experience. Conversely, Kentucky's Strategy 5 is to "Improve access to quality areas used for hunting, fishing, trapping, boating, recreational shooting, and other wildlife related activities." Within this strategy, Action Item 1 recognizes that public land should be high quality, Action Item 2 tasks partners with surveying user groups to determine user expectations, and finally an "Indicator of Success" includes the documentation of expectations of quality of experience for public access.

Hunt quality also seems to be overlooked by the waterfowl management community. For example, the Summary Workshop Report from The Future of Waterfowl II Workshop (Shepherdstown, WV, USA, 27–28 Sep 2017) notes that improving hunting access and opportunity was an important R3 strategy (NAWMP 2017). However, "Incorporating hunter satisfaction metrics into waterfowl management goals" was identified as "low" priority by 47% of respondents in the 2017 Survey of Waterfowl and Wetland Professionals (NAWMP 2017 [appendix 9]). Conversely, survey findings presented at The Future of Waterfowl II Workshop indicated that hunters are more concerned about factors that influence hunt quality compared with efforts focused on increasing opportunity, through greater bag limits and, to a lesser extent, more days (NAWMP 2018). We are encouraged that the latest NAWMP revision at least recognizes that current harvest management is perhaps disconnected from hunter desires, explicitly stating: "Waterfowl harvest management is largely based on the *assumption* that hunters desire maximum opportunity." We advocate for testing this assumption and employing adaptive-learning-based methods to understand and improve R3 programs for waterfowl hunting as they are increasingly applied nation-wide. It is also encouraging that the Mississippi and Central flyways are currently considering explicitly including hunter

objectives in adaptive management strategies (NAWMP 2018).

## QUALITY VERSUS QUANTITY AND POTENTIAL TRADE-OFFS

We contend that providing abundant opportunity to hunt waterfowl, at the expense of a quality hunting experience, will not achieve R3 objectives. Hunt opportunity, as it is generally operationalized within R3 initiatives, and hunt quality are management goals that can conflict because increased opportunity can lead to reduced quality. Too many hunters at a particular location can result in greater competition among parties, fewer birds because of excessive disturbance, or exacerbate nocturnal behavior in waterfowl; all which reduce a hunter's ability to see and harvest waterfowl (Fox and Madsen 1997, Bregnballe and Madsen 2004, Dooley et al. 2010, St. James et al. 2013). The trade-off between opportunity and quality may necessitate adaptive management of the timing and number of waterfowl hunters to sustain abundant waterfowl for hunters to see and enhance their odds of harvesting birds (Heyser 2017). Improved access and opportunity can lead to increased hunting pressure, inter-hunter competition, overcrowding, and thus limit opportunities to observe and harvest waterfowl; all of these are factors known to negatively affect waterfowl hunter satisfaction (Fulton et al. 2017; Heyser 2017; Slagle and Dietsch 2018*a*, *b*, *c*, *d*). Explicitly including hunt management strategies into wetland restoration plans may be beneficial and would be a proactive approach to concurrently provide increasing opportunity and quality while meeting R3 objectives for waterfowl hunting.

Given these latent issues, we urge the waterfowl R3 community begin to focus on hunt quality by testing potential trade-offs between opportunity and quality, and, if warranted, develop an associated research agenda that builds upon approaches and empirical evidence from the human dimensions field (Driver 1985). We suggest that waterfowl hunters are motivated by having previously harvested an acceptable number of birds at a location, observing a reasonable number of harvestable birds while scouting, hearing of a place where they have a high likelihood of successfully harvesting birds, or were invited by someone who previously had success in harvesting birds somewhere (Schroeder et al. 2011, Heyser 2017). We also suggest that a minimum number of high-quality hunting experiences are needed annually to recruit, retain, and reactivate waterfowl hunters. That is, R3 may become more effective if it were to focus on the actualization of factors empirically observed as being important to waterfowlers (i.e., observing and harvesting waterfowl). This could presumably be achieved when hunters have a place to hunt with little competition from other hunters and are provided a threshold of shooting opportunities to evoke a quality experience (Fulton et al. 2017; Heyser 2017; Slagle and Dietsch 2018*a*, *b*, *c*, *d*). Facilitating these types of quality hunting experiences during the initial years of waterfowl hunting or period of reactivation are important for hunters to develop an identity as a waterfowl hunter (e.g., Leopold 1949 [in Red-legs Kicking]; Schroeder et al. 2013). A focus on increasing hunt quality should be considered a key component of R3 initiatives, or at a minimum, included in adaptive learning models as the current NAWMP plan suggests (NAWMP 2018).

## MARKET SCIENCE TO UNDERSTAND QUALITY VERSUS QUANTITY

As the previous sections contend, increasing opportunity tends to be a default, one-size-fits-all solution based on the pervasive assumption that hunters desire maximum opportunity. This assumption creates imbalance and limits R3's potential. The assumption dismisses the fact that "waterfowl hunters" are a collection of stakeholders who differ in terms of motivations, behaviors, psychographics, and demographics (Larson et al. 2014, Bradshaw et al. 2019). It also contradicts R3 imperatives to identify and engage current and potential waterfowl hunters. R3 initiatives must better discern the diversity of waterfowlers to understand if and how opportunity improves recruitment, retention, and reactivation or if, as we contend, a focus on quality is warranted. We recommend that R3 better integrate market science principles and methods into their toolbox to empirically investigate quality versus quantity issues and potential trade-offs.

Market science can clarify linkages between hunt quality, opportunity, satisfaction, and R3 objectives (California DFW 2019). For example, recreation and leisure scholars have used market science methods like expectancy-value models to reveal relationships between quality and satisfaction (Burns et al. 2003). Market science research uses various models and analyses to explore influences on satisfaction and participation. These include but are not limited to the Kano model, a revised importance performance analysis (RIPA), an importance grid analysis, and a penalty–reward contrast analysis (Kano et al. 1984, Matzler et al. 2003, Deng 2007, Schroeder et al. 2019*a*, *b*). The RIPA approach, for instance, can be used to focus R3 strategies because it identifies hunt attributes or experiences that improve satisfaction or participation (Schroeder et al. 2018).

Market science provides concepts to strategically identify additional and increasingly specific waterfowl hunter segments (Schroeder et al. 2006, Kyle et al. 2007). However, many R3 efforts seem to employ undifferentiated, mass-marketing approaches based on the assumption that there is one type of waterfowl hunter, who is motivated by, and whose satisfaction is dependent on, maximum opportunity. Yet, common waterfowl R3 efforts fail to target other segments, despite, for example, an established body of evidence suggesting that various experiences and motivations related to hunt quality are significant predictors of satisfaction and participation (Vaske et al. 1986, Decker et al. 1987, Schroeder et al. 2019*a*, *b*). Like RIPA, standard factor or cluster analyses procedures can help clarify our understanding of the behavioral heterogeneity among waterfowl hunters. More recently, researchers have begun using a hyper-segmentation method called microtargeting, which

employs "markets-of-one" or "one-to-one marketing" principles, to improve the efficacy of conservation initiatives. A study by Metcalf et al. (2019) applied big data analytics (i.e., statistical and algorithmic processes that analyze large and varied data sets to reveal patterns and correlations) to identify and predict individuals who were the most likely to respond positively to certain messages or interventions aimed at recruiting conservation easement participants.

In addition to their ability to empirically disabuse R3 of the assumption that hunters desire maximum opportunity, another benefit of having market science techniques in the R3 toolbox is that they can proactively deter another assumption, that waterfowl hunters achieve satisfaction through similar experiences. Directly addressing these extant and potential assumptions with empirical methods can better balance and focus R3 efforts to maximize satisfaction, minimize conflict, and improve the waterfowl hunting experience. R3 initiatives with market science in their toolbox are better equipped to operationalize the reality that waterfowl hunters are a diverse collection of individuals. In turn, this leads to initiatives that can systematically and empirically demonstrate their need to focus on opportunity or quality.

## CONCLUSION

Is recruiting, retaining, and reactivating waterfowl hunters to maintain conservation funding a primary goal of state and federal agencies? If so, it is imperative to test assumptions and better understand the interrelationships among hunt opportunity, hunt quality, and ultimately R3. Such an approach will increasingly focus conservation and hunt management strategies to explicitly include the diversity of hunter types into the adaptive management framework. We suggest that methods from market science can refine our understanding of the relationship between quality and satisfaction, identify the experience (product) being purchased, and grow diverse and persistent participants (consumer base), and, subsequently, license sales and support for waterfowl and wetlands conservation. Among the strategies of R3 programs, campaigns, advertisements, regulations packages, and waterfowl area management designed to improve "product" quality and satisfaction are paramount. Following NAWMP (2018:17), we contend that integrating a focus on quality and perspectives from marketing into waterfowl R3 initiatives "can create pathways that provide the cumulative experiences needed to help individuals transition from potential stakeholders to active stakeholders with a vested interest in supporting waterfowl conservation."

## ACKNOWLEDGMENTS

## LITERATURE CITED

Adamowicz, W., J. Louviere, and M. Williams. 1994. Combining revealed and stated preference methods for valuing environmental amenities. Journal of Environmental Economics and Management 26:271–292.

Batt, B. D. J. 2012. The marsh keepers journey: the story of Ducks Unlimited Canada. Ducks Unlimited Canada, Stonewall, Manitoba, Canada.

Bradshaw, L., R. H. Holsman, J. Petchenik, and T. Finger. 2019. Meeting harvest expectations is key for duck hunter satisfaction. Wildlife Society Bulletin 43:102–111.

Bregnballe, T., and J. Madsen. 2004. Tools in waterfowl reserve management: effects of intermittent hunting adjacent to a shooting-free core area. Wildlife Biology 10:261–268.

Burns, R. C., A. R. Graefe, and J. D. Absher. 2003. Alternate measurement approaches to recreational customer satisfaction: satisfaction-only versus gap scores. Leisure Sciences 25:363–380.

California Department of Fish and Wildlife. 2019. California hunting and fishing Recruitment, Retention, and Reactivation action plan. California Department of Fish and Wildlife, Sacramento, USA.

Decker, D. J., T. L. Brown, B. L. Driver, and P. J. Brown. 1987. Theoretical developments in assessing social values of wildlife: toward a comprehensive understanding of wildlife recreation involvement. Pages 76–95 in D. J. Decker and G. R. Goff, editors. Valuing wildlife: economic and social perspectives. Westview Press, Boulder, Colorado, USA.

Decker, D. J., and N. A. Connelly. 1989. Motivations for deer hunting: implications for antlerless deer harvest as a management tool. Wildlife Society Bulletin 17:455–463.

Deng, W. J. 2007. Using a revised importance-performance analysis approach: the case of Taiwanese hot springs tourism. Tourism Management 28:1274–1284.

Devers, P. K., A. J. Roberts, S. Knoche, P. I. Padding, and R. Raftovich. 2017. Incorporating human dimensions objectives into waterfowl habitat planning and delivery. Wildlife Society Bulletin 41:405–415.

Dooley, J. L., T. A. Sanders, and P. F. Doherty. 2010. Mallard response to experimental walk-in and shooting disturbance. Journal of Wildlife Management 74:1815–1824.

Driver, B. L. 1983. Master list of items for recreation experience preference scales and domains. Unpublished document. U.S. Department of Agriculture Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, USA.

Driver, B. L. 1985. Specifying what is produced by management of wildlife by public agencies. Leisure Sciences 7:281–295.

Fontaine, J. J., A. D. Fedele, L. S. Wszola, L. N. Messinger, C. J. Chizinski, J. J. Lusk, K. L. Decker, J. S. Taylor, and E. F. Stuber. 2019. Hunters and their perceptions of public access: a view from afield. Journal of Fish and Wildlife Management 10:589–601.

Fox, A. D., and J. Madsen. 1997. Behavioural and distributional effects of hunting disturbance on waterbirds in Europe: implications for refuge design. Journal of Applied Ecology 34:1–13.

Fulton, D., K. Slagle, and A. Raedeke. 2017. 2018 NAWMP hunter survey. NAWMP update: assessment/implementation summary. https://nawmp.org/sites/default/files/2018-01/1%20page%20SUMM%20NAWMP%20Hunter%20Survey%20June%20202017_0.pdf. Accessed 10 Apr 2019.

Geist, V. 1995. North American policies of wildlife conservation. Pages 75–129 in V. Geist and I. McTaggert-Cowan, editors. Wildlife conservation policy. Detselig Enterprises, Limited, Calgary, Alberta, Canada.

Geist, V., S. P. Mahoney, and J. F. Organ. 2001. Why hunting has defined the North American model of wildlife conservation. Transactions of the North American Wildlife and Natural Resources Conference 66:175–185.

Georgia Department of Natural Resources. 2017. Georgia hunting action plan strategies for Recruiting, Retaining, and Reactivating hunters. Georgia Department of Natural Resources, Atlanta, USA.

Heyser, H. A. 2017. Want great hunting? What you need, in a word, is restraint. California Waterfowl Association (Winter):20–26.

Humburg, D. D., M. G. Anderson, M. G. Brasher, M. F. Carter, J. M. Eadie, D. C. Fulton, F. A. Johnson, M. C. Runge, and M. P. Vrtiska. 2018. Implementing the 2012 North American Waterfowl Management Plan revision: populations, habitat, and people. Journal of Wildlife Management 82:275–286.

Iowa Department of Natural Resources. 2017. Cultivating the future of outdoor recreation in Iowa. Iowa Department of Natural Resources, Des Moines, USA.

Kano, N., N. Seraku, F. Takahashi, and S. Tsuji. 1984. Attractive quality and must-be quality. Hinshitsu 14:39–48.

Kentucky Department of Fish and Wildlife Resources. 2019. R3 strategic plan—increasing participation in hunting, fishing, trapping, boating,

recreational shooting, and other wildlife-related activities. Kentucky Department of Fish and Wildlife Resources, Frankfort, USA.

Kyle, G., W. Norman, L. Jodice, A. Graefe, and A. Marsinko. 2007. Segmenting anglers using their consumptive orientation profiles. Human Dimensions of Wildlife 12:115–132.

Larson, L. R., R. C. Stedman, D. J. Decker, W. F. Siemer, and M. S. Baumer. 2014. Exploring the social habitat for hunting: toward a comprehensive framework for understanding hunter recruitment and retention. Human Dimensions of Wildlife 19:105–122.

Leopold, A. 1949. A Sand County almanac. Ballantine Books, New York, New York, USA.

Mahoney, S. P. 2004. The seven sisters: pillars of the North American wildlife conservation model. Bugle 21:5.

Matzler, K., E. Sauerwein, and K. Heischmidt. 2003. Importance-performance analysis revisited: the role of the factor structure of customer satisfaction. Service Industries Journal 23:112–129.

McFadden, D. 1981. Econometric models of probabilistic choice. Pages 198–272 in C. F. Manski and D. McFadden, editors. Structural analysis of discrete choice with econometric applications. MIT Press, Cambridge, Massachusetts, USA.

Metcalf, A. L., C. Phelan, C. Pallai, M. Norton, B. Yuhas, J. C. Finley, and A. Muth. 2019. Microtargeting for conservation. Conservation Biology 33:1141–1150.

North American Waterfowl Management Plan [NAWMP]. 2017. The Future of Waterfowl Management II workshop, summary workshop report. National Conservation Training Center, Shepherdstown, West Virginia, USA.

North American Waterfowl Management Plan [NAWMP]. 2018. North American Waterfowl Management Plan (NAWMP) update connecting people, waterfowl, and wetlands. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C., USA; and Environment Canada, Canadian Wildlife Service, Ottawa, Ontario, Canada.

Organ, J. F., V. Geist, S. P. Mahoney, S. Williams, P. R. Krausman, G. R. Batcheller, T. A. Decker, R. Carmichael, P. Nanjappa, R. Regan, R. A. Medellin, R. Cantu, R. E. McCabe, S. Craven, G. M. Vecellio, and D. J. Decker. 2012. The North American model of wildlife conservation. The Wildlife Society Technical Review 12-04. The Wildlife Society, Bethesda, Maryland, USA.

Organ, J. F., S. P. Mahoney, and V. Geist. 2010. Born in the hands of hunters. The Wildlife Professional 4:22–27.

Raftovich, R. V., S. C. Chandler, and K. K. Fleming. 2017. Migratory bird hunting activity and harvest during the 2015–16 and 2016–17 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

Responsive Management/National Shooting Sports Foundation. 2017. Hunting, fishing, sport shooting, and archery Recruitment, Retention, and Reactivation: a practitioner's guide. Responsive Management/National Shooting Sports Foundation, Harrisonburg, Virginia, USA.

Schroeder, S. A., L. Cornicelli, D. C. Fulton, and S. S. Merchant. 2018. Explicit versus implicit motivations: clarifying how experiences affect turkey hunter satisfaction using revised importance-performance, importance grid, and penalty–reward–contrast analyses. Human Dimensions of Wildlife 23:1–20.

Schroeder, S. A., L. Cornicelli, D. C. Fulton, and S. S. Merchant. 2019a. The influence of motivation versus experience on recreation satisfaction: how appreciative- versus achievement-oriented recreation experience preferences relate to hunter satisfaction. Journal of Leisure Research 50:1–25.

Schroeder, S. A., D. C. Fulton, L. Cornicelli, S. Cordts, and J. S. Lawrence. 2019b. Clarifying how hunt-specific experiences affect satisfaction among more avid and less avid waterfowl hunters. Wildlife Society Bulletin 43:455–467.

Schroeder, S. A., D. C. Fulton, and J. S. Lawrence. 2006. Managing for preferred hunting experiences: a typology of Minnesota waterfowl hunters. Wildlife Society Bulletin 34:380–387.

Schroeder, S. A., D. C. Fulton, J. S. Lawrence, and S. D. Cordts. 2013. Identity and specialization as a waterfowl hunter. Leisure Sciences 35:218–234.

Schroeder, S. A., J. S. Lawrence, and S. D. Cordts. 2011. Waterfowl hunting in Minnesota: a study of lapsed waterfowl hunters. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology, St. Paul, USA.

Schummer, M. L., A. M. Smith, R. M. Kaminski, K. M. Hunt, E. A. St. James, and H. Havens. 2019. Achievement-oriented effects on waterfowl-hunt quality at Mississippi Wildlife Management Areas. Journal of the Southeastern Association of Fish and Wildlife Agencies 6:129–135.

Slagle, K., and A. Dietsch. 2018a. National survey of waterfowl hunters: summary report Atlantic Flyway. Report to the National Flyway Council from the Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota and The Ohio State University, St. Paul, USA.

Slagle, K., and A. Dietsch. 2018b. National survey of waterfowl hunters: summary report Mississippi Flyway. Report to the National Flyway Council from the Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota and The Ohio State University, St. Paul, USA.

Slagle, K., and A. Dietsch. 2018c. National survey of waterfowl hunters: summary report Central Flyway. Report to the National Flyway Council from the Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota and The Ohio State University, St. Paul, USA.

Slagle, K., and A. Dietsch. 2018d. National survey of waterfowl hunters: summary report Pacific Flyway. Report to the National Flyway Council from the Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota and The Ohio State University, St. Paul, USA.

St. James, E. A., M. L. Schummer, R. M. Kaminski, E. J. Penny, and L. W. Burger. 2013. Effect of weekly hunting frequency on duck abundances in Mississippi Wildlife Management Areas. Journal of Fish and Wildlife Management 4:144–150.

U.S. Department of the Interior [USDOI]. 2017. ORDER NO. 3356 Subject: hunting, fishing, recreational shooting, and wildlife conservation opportunities and coordination with States, Tribes, and Territories, Washington, D.C. U.S. Department of the Interior. https://www.doi.gov/sites/doi.gov/files/uploads/signed_so_3356.pdf. Accessed 10 Aug 2018.

U.S. Fish and Wildlife Service [USFWS]. 2018a. Waterfowl population status, 2018. U.S. Department of the Interior, Washington, D.C., USA.

U.S. Fish and Wildlife Service [USFWS]. 2018b. Adaptive harvest management: 2019 hunting season. U.S. Department of Interior, Washington, D.C., USA. http://www.fws.gov/birds/management/adaptive-harvest-management/publications-and-reports.php. Accessed 8 Aug 2018.

Vaske, J. J., A. J. Fedler, and A. R. Graefe. 1986. Multiple determinants of satisfaction from a specific waterfowl hunting trip. Leisure Sciences 8:149–166.

Vrtiska, M. P., J. H. Gammonley, L. W. Naylor, and A. H. Raedeke. 2013. Economic and conservation ramifications from the decline of waterfowl hunters. Wildlife Society Bulletin 37:380–388.

*Associate Editor: Davis.*