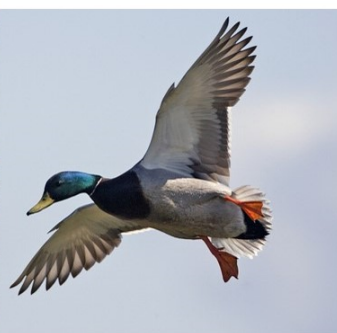


National Survey of Waterfowl Hunters: Summary Report Atlantic Flyway 2018



NATIONAL FLYWAY COUNCIL

Pacific est. 1952 - Central est. 1948 - Mississippi est. 1952 - Atlantic est. 1952



Migratory Bird
JOINT VENTURES



North American Waterfowl
Management Plan



DUCKS
UNLIMITED

A cooperative study completed by:
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
And
The Ohio State University
for the
National Flyway Council

National Survey of Waterfowl Hunters: Summary Report Atlantic Flyway 2018

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Section 1. Introduction and Overview

BACKGROUND

In cooperation with the four Flyway Councils (Atlantic, Mississippi, Central, and Pacific), the North American Waterfowl Management Plan (NAWMP) Committee, and non-governmental agencies, the National Flyway Council (NFC) initiated the formation of a Human Dimensions Working Group (HDWG) to obtain and incorporate human dimensions information and approaches into migratory bird conservation programs, policies and practices.

The 2012 NAWMP Revision *Vision Statement* provides a new conception of waterfowl management that emphasizes a growing and supportive core of waterfowl hunters and an engaged conservation community inspired by waterfowl and wetlands. The goal is to have a public supportive of waterfowl and wetlands conservation that have strong emotional and pragmatic ties to waterfowl and wetlands.

To achieve this goal, NAWMP partners must engage both the traditional waterfowl hunting community and other nontraditional stakeholder groups who are interested in waterfowl and the conservation of waterfowl and wetlands. To facilitate this engagement, the NFC's HDWG and other NAWMP partners conducted a research study using both stakeholder and general public surveys of North Americans that can inform: 1) NAWMP objectives; 2) harvest objectives and strategies; 3) habitat management; and 4) public engagement strategies.

STUDY OBJECTIVES

This study had the following key objectives:

- 1) Assess what hunters and other waterfowl conservationists (i.e., birders) most desire from their natural resource-based management and social settings to inform NAWMP objectives and select habitat and population management alternatives.
- 2) Establish baseline measures that can be repeated to inform the development of a Public Engagement Strategy and monitor trends in achieving the NAWMP goal of "growing numbers of waterfowl hunters, other conservationists, and citizens who enjoy and actively support waterfowl and wetlands conservation."

- 3) Assess waterfowl hunters' and conservationists' knowledge, preferences, levels of use and support for waterfowl and wetlands conservation.
- 4) Assess the general publics' participation in waterfowl-associated recreation and how much they support waterfowl and wetlands conservation.
- 5) Assess the general publics' awareness and their perceptions regarding the importance of the benefits and values (i.e., Ecological Goods and Services - EGS) provided by waterfowl and wetlands conservation.
- 6) Assess waterfowl professionals' perspectives on the levels of waterfowl populations and habitats needed to support hunter and viewer use opportunities.

The expected outcomes of this study include:

- 1) Quantified measures of stakeholder preferences;
- 2) NAWMP objectives and management actions that can be directly informed by waterfowl and wetland stakeholders;
- 3) A focus on harvest management actions that will provide the greatest benefits in terms of stakeholder preferences within the context of what is biologically feasible.

This study was completed by a collaborative research team at the U.S. Geological Survey's Fort Collins Science Center, the Minnesota Cooperative Research Unit located at the University of Minnesota, and the University of Alberta.

STUDY DESIGN AND METHODS

Survey Questionnaires

The project included three surveys – a general public survey, a waterfowl hunter survey, and a birdwatcher survey. The general public survey was mailed to 5,000 individuals throughout the continental United States with a completed sample size target of 1,200. A separate summary report is available for that effort (U.S. Geological Survey 2017). Throughout the rest of this report the waterfowl hunter survey is referred to as the National Survey of Waterfowl Hunters (NSWH) and the birdwatcher survey is referred to as the North American Birdwatching Survey (NABS).

The stakeholder studies involved multiple phases and research activities. A core portion of the NSW and NABS involved discrete choice experiments (DCEs). The DCEs allow identification of key attributes and levels on those attributes that most influence hunter and viewer preferences for waterfowl hunting and viewing. The attributes used in the DCEs were identified through a series of workshops with stakeholders conducted by researchers from the U.S. Geological Survey Fort Collins Science Center.

Design and implementation of the U.S. stakeholder workshops began in November 2014 and was completed in June 2015. A total of 12 workshops with hunters and 12 with birdwatchers were completed in key geographic locations across the Flyways in the U.S. to provide a diverse representation of important ecological characteristics associated with these places and the social traditions associated with waterfowl hunting and viewing opportunities. A similar approach was taken in Canada. The primary outcome of the workshops was the identification of key attributes of waterfowl hunting and birdwatching experiences. This information was used in the design of the DCE in both the NSW and NABS studies.

The NSW and NABS were designed between June 2015 and September 2016. In addition to the stakeholder workshops, the survey design involved multiple workshops, meetings, and webinars, as well as reviews and comments from representatives of key partners. The core design team for the NSW included Human Dimensions Working Group members from the Atlantic, Mississippi, Central and Pacific Flyways. This team held multiple meetings and webinars to identify appropriate sampling and questionnaire design. In addition to achieving the previously identified objectives and implementing DCE on hunting and viewing preferences, the hunter and birdwatching surveys also include questions targeting three areas identified by the HDWG as important:

1. Decisions: Individual decisions to participate in viewing, hunting, and conservation are reflected in participation patterns. This series of questions would determine baseline participation levels in viewing, hunting, and conservation and offer the potential to identify stakeholder segments based on participation levels as well as types of participation.
2. Identity: Measures of identity formation will focus on determining the degree to which hunters, viewers, and conservationists have developed personal identities associated with an activity or social role. (i.e., the individual's progression in formation of their identity as a hunter, viewer, etc.).

3. Capacity: The NAWMP suggests the long-term sustainability of waterfowl and wetlands will depend on building support among and relevancy to a broader conservation constituency. In essence, it is a matter of maintaining or increasing (where possible) waterfowl populations, protect and restore habitat, and increase and improve upon the activities people enjoy that involve waterfowl and wetlands. Social science research suggests that institutional capacity can be thought of in terms of the social, political, economic, and human capital (“capital” can be defined as the available resources that can be used to effect action and outcomes).

Additionally, the NSWH in particular was designed to replicate key questions of interest to waterfowl managers from the 2005 National Duck Hunter Survey (NDHS) (NFC 2006), and address several key management questions specific to each of the four Flyways. Appendix A contains a copy of the NSWH, and a question-by-objective matrix that summarizes which objective was addressed by each survey item and that item’s source.

Sampling Design

The target population for the NSWH included all U.S. residents 18 years of age or older who had participated in waterfowl hunting during 2015. A subset of the 2015 Migratory Bird Harvest Information Program (HIP) database was used as the sample frame. The sampling design from the 2005 National Duck Hunter Survey (NDHS; National Flyway Council 2006) was used as a guide for sampling in the NSWH. However, the NDHS sampled only individuals who hunted ducks and harvested at least one duck during the year prior to the survey (2004). In the NSWH, all HIP registrants 18 years of age or older who hunted ducks, geese, sea ducks, or brant during 2015 *whether or not they actually bagged any birds* were included when possible. However, sampling procedures varied in 5 states due to errors in coding HIP information when collected at the state level (discussed below).

The Migratory Bird HIP (<https://www.fws.gov/birds/surveys-and-data/harvest-surveys/harvest-information-program.php>) is a method state wildlife agencies use to generate reliable estimates of hunting activity and the number of all migratory game birds harvested throughout the country. These estimates give biologists the information they need to make sound decisions concerning hunting seasons, bag limits, and population management. Individuals who hunt ducks, geese, brant, or other migratory birds are required to participate in HIP in every state in which they hunt migratory birds. When signing up, individuals must provide their name, address, and date of birth. In addition, HIP registrants are asked to voluntarily answer several

questions about their experience during the previous year's hunting season, including whether they hunted waterfowl (ducks, sea ducks, geese, or brant) and how many waterfowl they bagged. Each state collects information on the more than 1 million waterfowl hunters nationwide and provide those data to the U.S. Fish and Wildlife Service (FWS). The FWS uses the HIP database to conduct surveys to develop information about overall hunter activity and harvest estimates. The robust nature of the HIP database makes it an excellent sampling frame for other studies of waterfowl hunters.

Because the HIP information is collected and managed by the states, use of the data for contacting hunters requires permission from each state. In the NSWH, all 49 states involved in the study (excludes Hawaii) provided permission to sample up to 3,000 resident waterfowl hunters, 18 years of age or older, from their state's HIP data. In consultation with FWS Migratory Bird staff, a standard sampling protocol was developed, consisting of the following steps:

1) Limited the sample frame as:

- a) Hunters \geq 18 years old
- b) In-state hunters
- c) Active waterfowl hunters:
- d) Ducks bagged 0 or more;
- e) Geese bagged 0 or more;
- f) Sea ducks bagged 0 or more;
- g) Brant bagged 0 or more.

2) Limited states with problems

- a) Georgia – No registrations before August had valid stratification information for harvest. These were identified in the data set by having all strata coded as 6. Used only hunters with valid stratification.
- b) South Dakota – invalid stratification for the entire year. Drew simple random sample of entire data set of in-state hunters older than 18 years old.

c) Idaho, Texas, and West Virginia – lumped Did Not Hunt and bagged 0 in their bag coding. Included *only* successful hunters for these 3 states.

- 3) Removed records with known undeliverable addresses.
- 4) Randomized the order of the remaining records.
- 5) Conducted a simple random sample of the remaining hunter records with sample size of 3,000. For states with fewer than 3,000 registrations, all hunters were selected.
- 6) Corrected addresses based on information from previous mailing attempts.

A total of 138,948 hunter records were initially selected from the HIP records, with 3,000 in each of the 49 states except the following, which had less than that number of registrants: AK (723), CT (2,992), NH (2,479), NM (2,902), NV (2,441), RI (650), VT (2,769), and WV (992).

Following the 2005 NDHS (NFC 2006), the sample was stratified into 12 sub-regional strata across the four Flyways (table 1.1 and Figure 1.1). The target completed sample size was $n = 400$ in each substratum which would provide estimates within $\pm 5\%$ at the 95% confidence level, given an anticipated a response rate of 20% across the study after removing undeliverable addresses. Thus, each sub-regional stratum had an initial sample of $n = 2,100$ to achieve 400 completed surveys.

Within the sub-regions, random sample was drawn generally proportional to the number of waterfowl hunters in each state based on the average number of waterfowl hunters in each state as reported by the FWS in 2014 and 2015 (Raftovich, Chandler, and Wilkins. 2015). However, to achieve a minimum number of 40 respondents from each state, the minimum sample size drawn in any state was $n = 200$, even if the proportion of waterfowl hunters in a state was less than .095 for that region ($2100 * .095 = 200$). In order to select a minimum of $n = 200$ from all states and not exceed a sample size of $n = 2100$ in each sub-region, a disproportionately small sample was selected from states with relatively large populations of waterfowl hunters. In addition, 7 states (AR, FL, IN, MO, NC, SD, WI) requested oversampling in their state to ensure a minimum of 400 respondents in their state. For these states, the sample size was increased up to 2000, which provided an initial overall nationwide sample size of $n = 35,101$ (Table 1.2). In Arkansas, Florida and North Carolina, the target sample size of $n = 400$ was not achieved after 4 contacts, so the remaining 1000 waterfowl hunters in each of those states were contacted. In addition, response rates in Alabama, Arizona, Georgia,

Louisiana, Maine, Mississippi and Tennessee were low after 4 contacts, so an additional random sample was drawn in those states from the remaining names that had not been drawn for the initial sample in those states (Table 1.2).

Data Collection

Procedures outlined in Dillman, Smyth, and Christian (2014) for mixed-mode survey implementation using a four-contact postal mail implementation were adapted for this study. Waterfowl hunters were initially contacted via the US Postal Service with a letter that provided a brief explanation of the study and invited them to participate in the study by completing a survey on line (see Appendix for copies of the contact letters). The letters were printed on University of Minnesota letterhead from the Department of Fisheries, Wildlife and Conservation Biology, and mailed in #10 University of Minnesota envelopes. These letters and envelopes also included the logo of the state wildlife management agency for each relevant state.

The individuals were provided a web address with instructions on how to enter it into their browser along with a unique 6-digit access code which was required to begin the survey. Individuals were also provided an e-mail that they could contact to receive an automated reply e-mail with the same web address included as a link that they could click on to connect to the survey. A web-based survey was used to reduce costs and to facilitate the implementation of the DCE portion of the survey. Discrete choice experiments can be cumbersome to implement in tradition paper-and-pencil surveys due to their complexity of design and the amount of space required to present questions. Data were collected using Sawtooth Software's Lighthouse Studio (<https://www.sawtoothsoftware.com>). Sawtooth Software was chosen for data collection because it allows for the design, hosting, implementation, data collection and analysis of DCE data using Choice Based Conjoint (CBC) software.

Initial contact letters were mailed November 15th, 2016. Approximately 2 weeks later, a second contact letter containing the same information was mailed to everyone in the initial sample as a reminder to complete the survey. After updating the mailing list for undeliverable addresses, a third contact letter was sent the second week of January 2017 to everyone who had not yet completed the online survey. The caption "HUNTER STUDY" was printed in 16pt. Arial black font on the lower left side of the University of Minnesota envelopes used to mail the contact letter to encourage recipients to open the envelopes. We did not include state logos, but referenced their state's participation in the study in the contact letter. Also, a \$1 incentive was

included in contact letters during the third mailing in states for which the response rate was below 12 percent after two rounds of contact.

After updating the mailing list for additional undeliverable addresses, a fourth contact letter was sent the second week of February to all individuals who had not completed the survey online. This letter was more urgent and again referenced their state wildlife agency's support and interest in the study and was mailed in University of Minnesota envelope labeled "HUNTER STUDY".

By March 1, 2017, response rates in most states were at or above 20 percent. Data from all states were collected through March 20, 2017. By that date, 1,742 individuals were identified as having undeliverable addresses or deceased. Of the 33,359 living recipients with valid contact information a total of 7,689 individuals had at least partially completed the survey nationwide (23% response rate). There was a total of 25,670 non-respondents with apparent valid addresses remaining from the original 35,101.

Response rates varied across the states. For this reason, 4,500 more individuals were sampled from the 10 states described previously (AL, AR, AZ, FL, GA, LA, ME, MS, NC, TN, Table 1.2). Individuals were contacted using the exact protocols as with the initial sample except we included a \$1 incentive in the first round of mailing. All individuals in these 10 states were contacted twice—the 3rd week of February and the 1st week of March. For Florida and North Carolina, we obtained letterhead and envelopes from the wildlife agencies in those states and contacted individuals 2 additional times. Both Florida and North Carolina requested sample sizes of $n = 400$ and these additional contacts were made to attempt to obtain the desired sample size.

To conduct a non-response assessment, a proportional random sample of 16,000 was drawn from the 25,670 non-respondents remaining in the initial sample of 35,101. This sample was drawn proportional to the number of waterfowl hunters in each state. These 16,000 individuals were sent a shortened survey questionnaire the second week of April 2017, and asked to respond by mail. Completed non-response surveys were collected through May 31, 2017, Completed non-response surveys were collected through May 31, 2017, and a total of 1,879 surveys were returned (11.7% response rate). Key questions concerning waterfowl hunting experiences, identity, and demographics were collected from non-respondents to assess if there are any substantive differences between people who completed the complete survey and those who did not respond to it.

Where appropriate we report results of statistical tests in summary tables. We use the following convention when reporting statistical significance for these tests: * $p \leq 0.05$, ** $p \leq 0.01$, and *** $p \leq 0.001$.

Table 1.1 Study stratification for sampling

Flyway	Sub-regions	States
Atlantic	Lower Atlantic	FL, GA, NC, SC
	Middle Atlantic	DE, MD, NJ, PA, VA, WV
	Upper Atlantic	CT, ME, MA, NH, NY, RI, VT
Mississippi	Lower Mississippi	AL, AR, LA, MS, TN
	Middle Mississippi	IL, IN, IA, KY, MO OH
	Upper Mississippi	MI, MN, WI
Central	Lower Central	NM, OK, TX
	Middle Central	CO, KS, NE, WY
	Upper Central	MT (ZIP 59000-59699), ND, SD
Pacific	Lower Pacific	AZ, NV, UT
	Middle Pacific	CA
	Upper Pacific	AK, ID, MT (ZIP 59700-599990), OR, WA

Figure 1.1 Flyway map



Table 1.2 Initial sample sizes for states within NSWH study

State	Initial Sample Size	Additional Sample	State	Initial Sample Size	Additional Sample	Final Sample Size
Alabama	200	100	Nevada	272		
			New			
Alaska	200		Hampshire	200		
Arizona	249	100	New Jersey	200		
Arkansas	2000	1000	New Mexico	200		
California	2000		New York	900		
			North			
Colorado	655		Carolina	2000	1000	
			North			
Connecticut	200		Dakota	1240		
Delaware	200		Ohio	321		
Florida	2000	1000	Oklahoma	342		
Georgia	433	400	Oregon	483		
Idaho	490		Pennsylvania	584		
Illinois	547		Rhode Island	200		
			South			
Indiana	2000		Carolina	462		
			South			
Iowa	265		Dakota	2000		
Kansas	719		Tennessee	200	100	
Kentucky	200		Texas	1558		
Louisiana	793	600	Utah	1578		
Maine	200	100	Vermont	200		
Maryland	523		Virginia	392		
Massachusetts	200		Washington	633		
			West			
Michigan	503		Virginia	200		
Minnesota	807		Wisconsin	2000		
Mississippi	200	100	Wyoming	200		
Missouri	2000			35101		
Montana	626					
Nebraska	526					
Total Sample				35101	4500	39601

Table 1.3 Unadjusted response rate by state

State	Initial + additional Sample Size	Response	Response Rate	State	Initial Sample Size	Response	Response Rate
Alabama	300	55	18.3%	Nevada	272	72	26.5%
Alaska	200	75	37.5%	New Hampshire	200	38	19.0%
Arizona	349	58	16.6%	New Jersey	200	49	24.5%
Arkansas	3000	438	14.6%	New Mexico	200	50	25.0%
California	2000	473	23.7%	New York	900	216	24.0%
Colorado	655	154	23.5%	North Carolina	3000	397	13.2%
Connecticut	200	55	27.5%	North Dakota	1240	259	20.9%
Delaware	200	42	21.0%	Ohio	321	97	30.2%
Florida	3000	386	12.9%	Oklahoma	342	71	20.8%
Georgia	833	91	10.9%	Oregon	483	111	23.0%
Idaho	490	117	23.9%	Pennsylvania	584	134	22.9%
Illinois	547	128	23.4%	Rhode Island	200	59	29.5%
Indiana	2000	539	27.0%	South Carolina	462	114	24.7%
Iowa	265	72	27.2%	South Dakota	2000	465	23.3%
Kansas	719	155	21.6%	Tennessee	300	50	16.7%
Kentucky	200	47	23.5%	Texas	1558	319	20.5%
Louisiana	1393	142	10.2%	Utah	1578	404	25.6%
Maine	300	26	8.7%	Vermont	200	46	23.0%
Maryland	523	110	21.0%	Virginia	392	107	27.3%
Massachusetts	200	54	27.0%	Washington	633	158	25.0%
Michigan	503	113	22.5%	West Virginia	200	44	22.0%
Minnesota	807	213	26.4%	Wisconsin	2000	503	25.2%
Mississippi	300	50	16.7%	Wyoming	200	46	23.0%
Missouri	2000	421	21.1%				
Montana	626	148	23.6%				
Nebraska	526	152	28.9%				
Total Sample					39601	8123	20.5%

Table 1.4 Non-response sample and return rate by state

State	Sample Size	Returns	Return Rate	State	Sample Size	Returns	Return Rate
Alabama	102	6	5.9%	Nevada	173	29	16.8%
Alaska	73	9	12.3%	New Hampshire	100	11	11.0%
Arizona	158	20	12.7%	New Jersey	102	13	12.7%
Arkansas	469	43	9.2%	New Mexico	62	8	12.9%
California	1334	150	11.2%	New York	647	86	13.3%
Colorado	420	57	13.6%	North Carolina	550	63	11.5%
Connecticut	100	16	16.0%	North Dakota	787	115	14.6%
Delaware	69	8	11.6%	Ohio	219	27	12.3%
Florida	215	10	4.7%	Oklahoma	230	24	10.4%
Georgia	275	20	7.3%	Oregon	319	29	9.1%
Idaho	325	35	10.8%	Pennsylvania	432	62	14.4%
Illinois	359	45	12.5%	Rhode Island	100	13	13.0%
Indiana	114	19	16.7%	South Carolina	293	20	6.8%
Iowa	178	23	12.9%	South Dakota	350	49	14.0%
Kansas	461	53	11.5%	Tennessee	92	10	10.9%
Kentucky	97	9	9.3%	Texas	1045	71	6.8%
Louisiana	542	32	5.9%	Utah	1002	117	11.7%
Maine	144	9	6.3%	Vermont	100	14	14.0%
Maryland	392	38	9.7%	Virginia	270	24	8.9%
Massachusetts	133	17	12.8%	Washington	415	51	12.3%
Michigan	319	58	18.2%	West Virginia	69	8	11.6%
Minnesota	512	100	19.5%	Wisconsin	501	80	16.0%
Mississippi	130	10	7.7%	Wyoming	114	17	14.9%
Missouri	371	33	8.9%				
Montana (P)	168	29	17.3%				
Montana (C)	229	40	17.5%				
Nebraska	339	49	14.5%				
Total Sample					16000	1879	11.7%

Section 2. Participation

HUNTING

Respondents reported on average that they began hunting waterfowl around age 20 (Table 2.1). There were no differences between the substrata, with hunters starting at age 22 on average. Respondents also indicated their typical pursuits when waterfowl hunting, with most in the Middle (77%) and Upper (81%) reporting that they hunt both geese and ducks, and significantly fewer in the Lower Atlantic indicating the same (47%; Table 2.1). Most respondents indicated hunting for waterfowl in 5 of the past 5 years (59-69%; Table 2.2) with significant but small differences between the substrata.

RECENT TRIP CHARACTERISTICS

Respondents were highly variable in the average number of days they reported having hunted per year in the past 5 years, with 5 days or less being the most frequent response in the Lower (34%) and Middle Atlantic (30%) and 11 to 20 days the most frequent response in the Upper Atlantic (32%; Table 2.3). Respondents also indicated the number of days they hunted for waterfowl in 2015, on average spending 11 days afield, with no differences between the flyway substrata (Table 2.4).

Most respondents reported a combination of self-planned trips and invited trips (68-72%; Table 2.5), while only 9-14% indicated that they only went if someone else invited them. Most respondents also indicated taking primarily day trips (75-90%; Table 2.6) with significant but small differences between the substrata; overnight or multi-day trips were more common in the Lower (14%) than in the Upper Atlantic (3%) or Middle Atlantic (7%).

Across the substrata, less than half of respondents said that they had taken a person who had never been waterfowl hunting before, with significant but small differences between the substrata (Table 2.7). Respondents in the Middle Atlantic were less likely to report that they took an adult in their close family waterfowl hunting for the first time (4%) when compared to the Lower (10%) or Upper Atlantic (11%; Table 2.8, 2.9). Across the substrata, children represented more than 60% of new hunters taken on a trip, and about 60% of respondents reported taking an adult friend on their first waterfowl hunting trip.

HARVEST

Respondents were highly variable in their estimates of duck harvest over the past 5 years, and differences between the substrata were significant (Table 2.10). Harvest appeared overall lower in the Upper and Middle Atlantic than in the Lower Atlantic, with 43% in the Upper and 41% in the Middle reporting 5 or less and 28% in the Lower reporting the same. Goose harvest over the past 5 years was less variable than duck harvest for the Lower Atlantic, with most respondents reporting that they harvested 5 or less per year on average (64%), however, overall reports of goose harvest was significantly higher in the Middle and Upper Atlantic than in the Lower Atlantic (Table 2.11).

Table 2.1 Age at first waterfowl hunt and general pursuits

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How old were you when you started waterfowl hunting	Mean	21.4	22.4	22.8	22.1
	SD	13.51	13.98	13.58	13.73
	Valid N	986	486	490	1963
	I hunt only ducks	36.2%	5.4%	9.0%	18.1%
Pursuits in waterfowl hunting	I hunt ducks and geese	46.6%	77.2%	80.7%	66.0%
	I hunt only geese	1.1%	9.6%	3.5%	5.1%
	I hunt neither ducks nor geese	16.2%	7.8%	6.8%	10.8%
	Valid N	986	486	490	1963
Pursuits significance:		$\chi^2 (6) = 370.54^*$		Cramer's V = .31*	
Age at start significance:		F (2, 1895) = 1.99		$\eta^2 = .00$	

Table 2.2 Years hunted waterfowl of previous 5

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How many years of the last 5 years have you hunted waterfowl?	None	6.2%	2.7%	1.6%	3.8%
	1 Year	5.9%	4.0%	1.9%	4.3%
	2 Years	8.8%	8.1%	6.5%	8.0%
	3 Years	12.4%	10.2%	11.8%	11.3%
	4 Years	8.0%	5.8%	12.3%	8.0%
	5 Years	58.7%	69.2%	65.8%	64.7%
	Valid N	826	447	457	1749
Significance:		$\chi^2 (10) = 49.81^*$		Cramer's V= .12*	

Table 2.3 Average number of days per year hunting waterfowl

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Over the last five years, about how many days did you usually hunt waterfowl in a year?	5 days or less	33.7%	30.0%	30.2%	31.3%
	6 to 10 days	23.6%	28.1%	31.7%	27.2%
	11 to 20 days	24.2%	25.2%	23.5%	24.5%
	21 to 30 days	10.5%	11.6%	7.7%	10.4%
	More than 30 days	8.1%	5.2%	6.9%	6.6%
	Valid N	766	434	444	1670
Significance:		$\chi^2 (8) = 16.39^*$		Cramer's V= .07*	

Table 2.4 Days hunted for waterfowl in 2015

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
During last year's (2015) waterfowl hunting season, how many days did you hunt for waterfowl?	Mean	10.7	10.8	10.4	10.7
	SD	11.23	10.89	10.44	10.91
	Valid N	703	398	405	1529
Significance:		F (2, 1504) = 0.16		$\eta^2 = .00$	

Table 2.5 Circumstances for hunting trip

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Under what circumstances do you typically go hunting?	When I plan the hunt myself	14.3%	18.6%	19.2%	17.2%
	When someone else invites me	13.5%	13.1%	9.3%	12.4%
	Both when I plan the hunt or someone else invites me	72.2%	68.3%	71.5%	70.4%
	Valid N	772	434	447	1676
Significance:		$\chi^2 (4) = 10.85^*$		Cramer's V = .06*	

Table 2.6 Hunting trips primarily day trips or overnight trips

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Do you primarily take day trips or overnight/multi-day trips when you waterfowl hunt?	Primarily day trips	74.5%	85.6%	89.6%	82.4%
	Primarily overnight or multi-day trips	13.5%	7.1%	2.8%	8.5%
	Both about equally	12.0%	7.4%	7.6%	9.1%
	Valid N	771	434	447	1674
Significance:		$\chi^2 (4) = 55.52^*$		Cramer's V = .13*	

Table 2.7 Recruit New Hunter Yes/No

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
During the past season did you take anyone waterfowl hunting who had never waterfowl hunted before?	Yes	48.1%	39.0%	45.5%	44.9%
	No	51.9%	61.0%	54.5%	55.1%
	Valid N	709	418	419	1579
Significance:		$\chi^2 (2) = 8.87^*$		Cramer's V = .08*	

Table 2.8 Recruit new hunter

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Who was the new hunter you took last season?	My own children	30.0%	14.7%	22.6%	22.3%
	Related children	13.4%	18.7%	12.3%	15.2%
	Other children	24.0%	25.8%	24.7%	24.9%
	Adult close family	9.7%	3.6%	11.4%	7.6%
	Adult extended family	5.4%	7.7%	6.9%	6.6%
	Adult friend	59.9%	58.6%	62.0%	59.8%
	Co-worker	17.1%	13.4%	16.2%	15.4%
	Other	6.8%	5.0%	7.1%	6.1%
	Valid N	341	163	190	687

Table 2.9 Recruit new hunter significance tests

		Chi-Square	df	Cramer's V
Who was the new hunter you took last season?	My own children	14.54*	2	.14*
	Related children	3.22	2	.07
	Other children	0.91	2	.02
	Adult close family	7.40*	2	.10*
	Adult extended family	0.75	2	.03
	Adult friend	0.34	2	.02
	Co-worker	1.00	2	.04
	Other	0.92	2	.04

*p < 0.05

Table 2.10 Average yearly duck harvest

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Over the last five years, how many ducks did you harvest in a year on average?	5 or less	27.7%	40.7%	42.8%	36.3%
	Between 6 and 10	19.3%	22.3%	20.4%	20.8%
	Between 11 and 20	23.8%	19.8%	20.9%	21.5%
	Between 21 and 50	18.9%	13.3%	10.1%	14.7%
	More than 50	10.3%	3.9%	5.8%	6.7%
	Valid N	763	389	430	1581
Significance:		χ^2 (8)= 57.90*		Cramer's V= .14*	

Table 2.11 Average yearly goose harvest

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Over the last five years, how many geese did you harvest in a year on average?	5 or less	63.5%	45.4%	47.0%	50.5%
	Between 6 and 10	18.3%	22.5%	18.7%	20.5%
	Between 11 and 20	9.5%	15.0%	19.6%	14.7%
	Between 21 and 50	5.5%	13.0%	6.7%	9.6%
	More than 50	3.2%	4.1%	8.0%	4.8%
	Valid N	449	406	404	1345
Significance:		χ^2 (8)= 61.12*		Cramer's V= .16*	

Section 3. Satisfaction

SATISFACTION WITH DUCK HUNTING

Respondents reported the highest levels of satisfaction on the number of ducks in the daily limit and the overall duck hunting experience (\bar{x} = 3.6-3.8), and the lowest levels of satisfaction on the number of ducks typically present during the hunting season (\bar{x} = 2.5-2.6; Table 3.1, 3.1a). While analyses revealed significant differences, effect sizes suggest that these are small (Table 3.1b).

Respondents in the Upper Atlantic were significantly more likely to report never shooting the limit in 2015 (57%), compared to the Lower (42%) and Middle Atlantic (46%; Table 3.2).

Respondents in the Lower Atlantic reported needing to shoot their limit significantly less frequently than the Middle or Upper Atlantic (Table 3.3). These differences were significant but small.

REQUIREMENTS FOR A SATISFYING TRIP

Across the substrata, 61-73% of responses clustered in the 0-2 categories for the minimum number of ducks hunters felt they needed to harvest per day to feel satisfied (Table 3.4). For the smallest acceptable daily bag limit of ducks, the most frequent response was any size bag limit (Lower: 35%; Middle: 36%; Upper: 35%; Table 3.5). Analyses suggested these differences were significant but small. Finally, the most frequent response to the minimum number of duck hunting days that were acceptable was that they would hunt any number of days available (Lower: 40%; Middle: 40%; Upper: 39%) and there were significant but small differences between the substrata (Table 3.6).

PERCEPTIONS RELATED TO CROWDING AND HUNTING PRESSURE

On average, respondents perceived crowding at hunting areas, hunting pressure, interference from other hunters, and lack of public places for waterfowl hunting to be slight to moderate problems (Table 3.7). Conflict with other hunters was rated as less of a problem in all regions of the Flyway. Overall, there were significant, but not substantive differences in ratings across the

Flyway regions (Table 3.7a). More than one-third of the hunters across the Flyway, reported that lack of public places for waterfowl hunting was a severe to very severe problem in the places they hunt ducks the most (Table 3.7b).

Table 3.1 Satisfaction with hunting in most hunted state

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
The number of ducks you see during the season	2.7	1.21	753	2.6	1.15	389	2.8	1.23	427	2.7	1.19	1570
The number of ducks you harvest during the season	2.8	1.13	751	2.8	1.12	388	2.9	1.12	426	2.8	1.12	1566
The number of days in the duck season	3.1	1.18	751	2.9	1.12	385	3.0	1.22	427	3.0	1.17	1562
The number of ducks in the daily limit	3.4	1.08	749	3.6	1.00	384	3.6	1.09	426	3.5	1.05	1559
The number of ducks typically present during the hunting season	2.5	1.12	753	2.5	1.09	386	2.6	1.14	423	2.5	1.11	1564
Quality of the habitat where you hunt	3.2	1.18	747	3.3	1.08	385	3.4	1.07	426	3.3	1.12	1559
Your overall duck hunting experience	3.5	1.01	752	3.5	1.03	386	3.6	1.03	428	3.5	1.02	1566

Scale from 1=Very dissatisfied to 5=Very satisfied

Table 3.1a Satisfaction with hunting response distribution

Item	Response					Valid N
	Very dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Very satisfied	
The number of ducks you see during the season	17.5%	32.0%	22.6%	20.7%	7.2%	1570
The number of ducks you harvest during the season	13.1%	27.0%	31.5%	21.2%	7.2%	1566
The number of days in the duck season	11.8%	21.9%	32.7%	22.6%	11.1%	1562
The number of ducks in the daily limit	3.4%	10.5%	39.0%	25.0%	22.1%	1559
The number of ducks typically present during the hunting season	18.2%	36.5%	22.9%	18.0%	4.4%	1564
Quality of the habitat where you hunt	6.4%	18.7%	28.6%	32.0%	14.3%	1559
Your overall duck hunting experience	3.2%	15.0%	24.4%	42.1%	15.3%	1566

Table 3.1a Satisfaction with hunting in most hunted state ANOVA tests

		Sum of Squares	Df	Mean Square	F	Sig.	η^2
The number of ducks you see during the season	Between Groups	9.00	2.00	4.50	3.13	0.04	
	Within Groups	2252.95	1565.83	1.44			
	Total	2261.95	1567.83				0.00
The number of ducks you harvest during the season	Between Groups	0.96	2.00	0.48	0.38	0.68	
	Within Groups	1977.97	1561.83	1.27			
	Total	1978.93	1563.83				0.00
The number of days in the duck season	Between Groups	9.24	2.00	4.62	3.33	0.04	
	Within Groups	2162.52	1559.93	1.39			
	Total	2171.76	1561.93				0.00
The number of ducks in the daily limit	Between Groups	7.47	2.00	3.74	3.30	0.04	
	Within Groups	1763.36	1556.28	1.13			
	Total	1770.83	1558.28				0.00
The number of ducks typically present during the hunting season	Between Groups	5.87	2.00	2.94	2.35	0.10	
	Within Groups	1951.25	1559.97	1.25			
	Total	1957.12	1561.97				0.00
Quality of the habitat where you hunt	Between Groups	5.91	2.00	2.95	2.32	0.10	
	Within Groups	1980.35	1555.83	1.27			
	Total	1986.25	1557.83				0.00
Your overall duck hunting experience	Between Groups	4.63	2.00	2.32	2.23	0.11	
	Within Groups	1624.36	1563.18	1.04			
	Total	1628.99	1565.18				0.00

Table 3.2 Number of times hunter shot daily bag limit

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How many times did you shoot a limit of ducks/geese during last year's season (2015)?	Never	42.1%	46.0%	56.5%	46.8%
	On at least one of my hunts	25.6%	24.3%	18.3%	23.5%
	Occasionally on my hunts	20.3%	20.4%	17.1%	19.7%
	Most of my hunts	7.6%	5.1%	5.9%	6.2%
	Every time I hunted	.3%	.9%	.0%	.5%
	I did not hunt in 2015	4.0%	3.3%	2.1%	3.3%
Valid N		771	433	446	1674
Significance:		$\chi^2 (10) = 32.00^*$		Cramer's V = .10*	

Table 3.3 Satisfaction and shooting daily bag limit

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How many times do you feel you need to shoot a daily bag limit of ducks/geese to have a satisfying season?	Never	46.5%	57.0%	64.5%	54.8%
	On at least one of my hunts	16.1%	13.0%	10.4%	13.6%
	Occasionally on my hunts	26.1%	23.8%	17.3%	23.3%
	Most of my hunts	10.4%	4.3%	5.6%	6.8%
	Every time I hunted	.9%	1.8%	2.2%	1.6%
	Valid N	771	432	447	1672
Significance:		$\chi^2 (8) = 54.37^*$		Cramer's V = .13*	

Table 3.4 Minimum number of ducks harvested per day to feel satisfied

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Minimum number of ducks you have to harvest in a day to feel satisfied?	0	15.9%	29.1%	23.2%	22.9%
	1	20.8%	23.1%	28.2%	23.4%
	2	23.9%	21.1%	21.6%	22.3%
	3	17.3%	13.3%	11.4%	14.4%
	4	10.6%	7.1%	7.8%	8.5%
	5	3.5%	2.8%	3.1%	3.1%
	6	5.7%	2.4%	3.8%	3.9%
	7	.7%	.7%	.4%	.6%
	>7	1.6%	.3%	.5%	.8%
	Valid N	733	380	424	1537
Significance:		$\chi^2 (16) = 55.43^*$		Cramer's V = .13*	

Table 3.5 Smallest acceptable daily bag limit of ducks

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
What is the smallest daily bag limit you would accept before you would no longer hunt?	1 duck	5.5%	5.1%	3.8%	5.0%
	2 ducks	11.8%	10.7%	10.7%	11.1%
	3 ducks	15.1%	16.0%	18.0%	16.1%
	4 ducks	13.0%	19.6%	17.3%	16.7%
	5 ducks	7.3%	5.5%	6.3%	6.4%
	6 ducks	12.70%	7.20%	8.50%	9.50%
	I'll hunt with any size daily bag limit	34.7%	35.9%	35.4%	35.3%
	Valid N	748	386	430	1564
Significance:		χ^2 (12)= 22.29*		Cramer's V= .08*	

Table 3.6 Minimum acceptable number of days for duck hunting

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
What is the minimum number of days in a waterfowl hunting season you would accept before you would no longer hunt?	10 days	2.2%	2.0%	5.5%	2.8%
	15 days	2.4%	1.6%	1.5%	1.9%
	20 days	4.2%	6.0%	8.1%	5.8%
	25 days	1.4%	1.6%	3.7%	2.0%
	30 days	13.6%	14.1%	14.8%	14.1%
	35 days	2.8%	1.8%	1.6%	2.1%
	40 days	4.2%	5.4%	5.3%	4.9%
	45 days	8.8%	10.1%	5.2%	8.5%
	50 days	5.1%	5.0%	4.5%	4.9%
	55 days	1.3%	1.0%	.2%	1.0%
	60 days	13.7%	11.8%	10.4%	12.2%
	I'll hunt with any season length	40.4%	39.5%	39.2%	39.8%
	Valid N	749	384	429	1561
Significance:		χ^2 (22)= 45.00*		Cramer's V= .12*	

Table 3.7 Perceptions of problems with crowding, hunting pressure, interference, and conflict

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Crowding at hunting areas	2.8	1.37	759	2.4	1.26	425	2.3	1.11	442	2.5	1.29	1648
Hunting pressure	2.9	1.33	759	2.7	1.19	427	2.4	1.14	440	2.7	1.24	1649
Interference from other hunters	2.6	1.30	757	2.2	1.13	427	2.1	1.05	442	2.3	1.19	1648
Conflict with other hunters in places I hunt	2.1	1.22	758	1.8	1.07	425	1.8	0.98	441	1.9	1.12	1646
Lack of public places for waterfowl hunting	2.9	1.46	759	2.9	1.42	430	2.8	1.43	444	2.9	1.43	1658

Scale from 1=Not at all a problem, 2 = Slight problem, 3 = Moderate Problem, 4 = Severe Problem, 5=Very severe problem

Table 3.7a Perceptions of problems with crowding, hunting pressure, interference, and conflict ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	η^2
Crowding at hunting areas	Between Groups	88.80	2	44.40	27.24	0.001	0.03
	Within Groups	2645.33	1623	1.63			
	Total	2734.12	1625				
Hunting pressure	Between Groups	65.27	2	32.63	21.04	0.001	0.03
	Within Groups	2517.64	1623	1.55			
	Total	2582.91	1625				
Interference from other hunters	Between Groups	81.59	2	40.80	28.87	0.001	0.03
	Within Groups	2292.43	1622	1.41			
	Total	2374.02	1624				
Conflict with other hunters in places I hunt	Between Groups	40.93	2	20.47	16.25	0.001	0.02
	Within Groups	2041.20	1621	1.26			
	Total	2082.13	1623				
Lack of public places for waterfowl hunting	Between Groups	3.60	2	1.80	0.87	0.42	0.00
	Within Groups	3380.56	1631	2.07			
	Total	3384.15	1633				

Table 3.7b Perceptions of problems with crowding, hunting pressure, interference and conflict (Flyway Level)

Item	Response					Valid N
	Not at all	Slight Problem	Moderate Problem	Severe Problem	Very Severe Problem	
Crowding at hunting areas	28.0%	22.6%	26.4%	13.2%	9.8%	1648
Hunting pressure	22.2%	20.1%	32.1%	16.1%	9.5%	1649
Interference from other hunters	31.1%	28.5%	24.5%	9.5%	6.5%	1648
Conflict with other hunters in places I hunt	49.4%	25.1%	15.4%	5.8%	4.2%	1646
Lack of public places for waterfowl hunting	24.1%	16.0%	24.6%	15.7%	19.6%	1658

Section 4. Place

PREFERENCES

Nearly all respondents reported the Atlantic Flyway as their most hunted flyway (93-99%; Table 4.1), and most respondents reported hunting states within their own substrata (Table 4.2). There were large significant differences between the substrata in the states most frequently hunted, suggesting a strong tendency among hunters to stay within their flyway substrata. Most respondents in the Upper Atlantic (54%) reported using public lands and waters for waterfowl hunting, while in the Middle Atlantic (36%) and Lower Atlantic (48%), significantly fewer respondents used public lands and waters. Notably, 32% in the Middle and 30% in the Upper reported using private property owned by a friend or another landowner who gave them permission to hunt for free (Table 4.3).

Respondents also indicated how important it was to them to hunt certain species in the Atlantic Flyway: diving ducks, seaducks, mallards, wood ducks, black ducks, other ducks, snow geese, Canada geese, and Brant. Overall, mallards and wood ducks received the highest average importance ratings (\bar{x} = 3.6-4.0) and seaducks received the lowest importance rating overall (\bar{x} = 1.6-1.8; Table 4.4, 4.4a). While there were significant differences between the substrata for some species, effect size suggest these most were small, with the exception of Canada geese, which were more important in the Middle (\bar{x} = 3.9) and Upper (\bar{x} = 3.8) than they were in the Lower Atlantic (\bar{x} = 2.5; Table 4.4b).

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Overall, the highest average levels of concern were for hunting opportunities (\bar{x} = 3.6) and providing a home for wildlife (\bar{x} = 3.6), with clean air (\bar{x} = 3.4-3.5) and clean water close behind (\bar{x} = 3.5-3.6; Table 4.5, 4.5a). Respondents reported the lowest level of concern with losing storage of greenhouse gases, such as carbon (\bar{x} = 2.4-2.7), scenic places for inspiration or spiritual renewal (\bar{x} = 2.5-2.6), and wildlife viewing and birdwatching opportunities (\bar{x} = 2.7-2.8). There were significant but small differences between the substrata in their levels of concern for ecological benefits (Table 4.5b).

Though there were significant differences between the substrata for services of least concern, there was an overall consensus that storage of greenhouse gases (25-37%) or scenic places for inspiration and spiritual renewal (30-39%) were of least concern (Table 4.6). Similarly, there were significant differences between the substrata for ecological services respondents were most concerned about losing, and most respondents were concerned with losing hunting opportunities (41-46%), or providing a home for wildlife (19-23%; Table 4.7).

Table 4.1 Flyway hunted most in 2015

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
In which Flyway did you hunt most often last year (2015) or the year you last hunted?	Pacific Flyway	0.0%	0.0%	0.0%	0.0%
	Central Flyway	1.5%	.8%	.5%	1.0%
	Mississippi Flyway	5.3%	.6%	.4%	2.2%
	Atlantic Flyway	93.1%	98.6%	99.1%	96.8%
	Valid N	773	434	447	1677
Significance:		$\chi^2 (4) = 37.95^*$		Cramer's V = .11*	

Table 4.2 State hunted waterfowl most over past 5 years

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
In which state or Canadian Province have you hunted waterfowl most often over the past 5 years?*	CT	0.0%	0.0%	5.4%	1.1%
	DE	0.0%	4.9%	0.0%	2.1%
	FL	13.5%	0.0%	0.0%	4.8%
	GA	16.1%	0.0%	0.0%	5.7%
	MA	0.0%	0.0%	9.7%	2.0%
	MD	.5%	33.4%	0.0%	14.7%
	ME	0.0%	0.0%	5.2%	1.1%
	NC	37.6%	1.0%	0.0%	13.8%
	NH	.1%	0.0%	6.4%	1.4%
	NJ	0.0%	8.7%	.6%	3.9%
	NY	0.0%	.3%	62.4%	13.2%
	PA	0.0%	25.2%	0.0%	10.9%
	RI	0.0%	0.0%	2.0%	.4%
	SC	25.7%	0.0%	0.0%	9.2%
	VA	.1%	24.0%	0.0%	10.5%
	VT	0.0%	0.0%	6.8%	1.4%
	WV	0.0%	.8%	0.0%	.3%
	Valid N	773	434	447	1677
Significance:		χ^2 (70)= 3183.92*		Cramer's V= .98*	

*States within flyway reported

Table 4.3 Public vs private lands waterfowl hunting

Please indicate where you do most of your waterfowl hunting:	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Public lands or waters	48.4%	36.0%	54.4%	44.3%
Private property owned by you, your family or in partnership with someone else	15.9%	15.4%	11.0%	14.7%
Private property owned by a friend or another landowner who give you permission to hunt for free	23.6%	31.7%	29.5%	28.4%
Private property you lease or pay to hunt on	9.1%	11.2%	3.5%	8.9%
Guest on private property someone else leases or pay to hunt on	3.0%	5.6%	1.5%	3.8%
Valid N	768	434	447	1673
Significance:	$\chi^2 (8) = 58.35^*$		Cramer's V = .13*	

Table 4.4 Importance of hunting species in Atlantic

	Flyway Substrata									Flyway ID Atlantic		
	Lower Atlantic			Middle Atlantic			Upper Atlantic			Mean	SD	Valid N
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Diving ducks	2.9	1.39	696	2.6	1.38	418	2.5	1.36	433	2.7	1.39	1580
Seaducks	1.6	1.03	681	1.7	1.11	408	1.8	1.16	430	1.7	1.10	1550
Mallards	3.6	1.28	703	3.6	1.28	420	4.0	1.07	435	3.7	1.25	1591
Wood ducks	3.8	1.18	702	3.5	1.36	420	3.8	1.19	431	3.7	1.27	1586
Black ducks	2.8	1.43	673	3.2	1.42	408	3.5	1.31	431	3.1	1.43	1544
Other ducks	3.5	1.27	699	3.2	1.35	411	3.3	1.31	428	3.3	1.32	1566
Canada Geese	2.5	1.43	687	3.9	1.17	423	3.8	1.20	438	3.4	1.43	1585
Snow geese	1.7	1.15	690	2.3	1.31	414	2.4	1.38	420	2.1	1.31	1559
Brant	1.4	.95	682	1.6	1.11	407	1.7	1.09	429	1.6	1.06	1548

Scale from 1=Not at all important to 5=Extremely important

Table 4.4a Importance of hunting species in Atlantic response distribution

Item	Response					Valid N
	Not at all important	Slightly important	Moderately Important	Very important	Extremely important	
Diving ducks	28.6%	19.5%	23.2%	14.9%	13.7%	1580
Seaducks	63.7%	17.7%	9.8%	4.6%	4.2%	1550
Mallards	8.3%	9.2%	20.2%	29.4%	32.8%	1591
Wood ducks	9.2%	9.5%	20.3%	28.2%	32.8%	1586
Black ducks	19.5%	13.9%	22.4%	21.2%	23.1%	1544
Other ducks	13.3%	12.9%	25.5%	25.0%	23.2%	1566
Canada geese	16.2%	10.6%	17.4%	25.0%	30.8%	1585
Snow geese	46.7%	20.0%	16.3%	8.4%	8.6%	1559
Brant	69.9%	14.4%	7.9%	3.6%	4.1%	1548

Table 4.4b Importance of hunting species in Atlantic ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	Eta
Diving ducks	Between Groups	44.96	2.00	22.48	11.83	0.00	
	Within Groups	2935.60	1544.39	1.90			
	Total	2980.57	1546.39				0.02
Seaducks	Between Groups	11.33	2.00	5.66	4.77	0.01	
	Within Groups	1799.15	1516.79	1.19			
	Total	1810.47	1518.79				0.01
Mallards	Between Groups	52.51	2.00	26.25	17.56	0.00	
	Within Groups	2324.09	1554.86	1.49			
	Total	2376.59	1556.86				0.02
Wood ducks	Between Groups	30.16	2.00	15.08	9.90	0.00	
	Within Groups	2361.10	1549.95	1.52			
	Total	2391.26	1551.95				0.01
Black ducks	Between Groups	151.26	2.00	75.63	38.94	0.00	
	Within Groups	2930.29	1508.67	1.94			
	Total	3081.56	1510.67				0.05
Other ducks	Between Groups	26.49	2.00	13.24	7.81	0.00	
	Within Groups	2601.24	1534.48	1.70			
	Total	2627.73	1536.48				0.01
Canada Geese	Between Groups	734.41	2.00	367.21	217.87	0.00	
	Within Groups	2603.97	1545.01	1.69			
	Total	3338.38	1547.01				0.22
Snow geese	Between Groups	173.64	2.00	86.82	54.40	0.00	
	Within Groups	2428.43	1521.61	1.60			
	Total	2602.06	1523.61				0.07
Brant	Between Groups	17.45	2.00	8.72	8.16	0.00	
	Within Groups	1619.47	1515.70	1.07			
	Total	1636.92	1517.70				0.01

Table 4.5 Level of concern for ecological benefits

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Flooding Protection	3.0	.89	692	3.0	.91	413	2.9	.99	406	3.0	.92	1547
Erosion Protection	3.1	.90	691	3.2	.80	412	3.0	.91	408	3.1	.86	1546
Wildlife viewing and birdwatching	2.7	.99	689	2.8	1.01	409	2.7	1.02	407	2.7	1.01	1539
Hunting opportunities	3.6	.61	692	3.6	.62	412	3.6	.71	408	3.6	.64	1547
Storage of greenhouse gases, such as carbon	2.4	1.02	689	2.7	1.02	410	2.7	1.07	401	2.6	1.04	1536
Clean water	3.5	.73	690	3.6	.67	414	3.5	.78	409	3.5	.71	1550
Clean air	3.4	.77	691	3.5	.72	414	3.4	.82	407	3.5	.76	1548
Providing home for wildlife	3.6	.67	691	3.6	.64	412	3.6	.69	409	3.6	.66	1548
Providing a home for animals such as butterflies and bees that pollinate plants and crops	3.3	.83	690	3.4	.78	412	3.4	.85	409	3.4	.81	1546
Scenic places for inspiration or spiritual renewal	2.6	1.05	690	2.6	1.07	413	2.5	1.12	409	2.6	1.07	1547

Scale from 1=Not at all concerned to 4=Very concerned

Table 4.5a Level of concern for ecological benefits response distribution

Item	Response				Valid N
	Not at all concerned	Slightly concerned	Somewhat concerned	Very concerned	
Flooding Protection	7.0%	21.1%	36.1%	35.7%	1547
Erosion Protection	4.6%	17.4%	37.1%	40.9%	1546
Wildlife viewing and birdwatching	13.4%	27.8%	31.5%	27.4%	1539
Hunting opportunities	1.0%	5.4%	23.7%	69.9%	1547
Storage of greenhouse gases, such as carbon	18.2%	28.5%	29.9%	23.4%	1536
Clean water	1.7%	7.9%	25.8%	64.6%	1550
Clean air	2.4%	9.2%	28.8%	59.6%	1548
Providing home for wildlife	1.7%	4.8%	25.0%	68.5%	1548
Providing a home for animals such as butterflies and bees that pollinate plants and crops	3.3%	11.4%	31.9%	53.4%	1546
Scenic places for inspiration or spiritual renewal	21.1%	25.5%	29.1%	24.4%	1547

Table 4.5b Level of concern for ecological benefits ANOVA tests

		Sum of Squares	Df	Mean Square	F	Sig.	Eta
Flooding Protection	Between Groups	3.93	2.00	1.96	2.30	0.10	
	Within Groups	1290.09	1507.99	0.86			
	Total	1294.02	1509.99				0.00
Erosion Protection	Between Groups	8.50	2.00	4.25	5.53	0.00	
	Within Groups	1159.05	1507.65	0.77			
	Total	1167.55	1509.65				0.01
Wildlife viewing and birdwatching	Between Groups	0.89	2.00	0.45	0.44	0.64	
	Within Groups	1519.50	1501.80	1.01			
	Total	1520.39	1503.80				0.00
Hunting opportunities	Between Groups	1.74	2.00	0.87	2.12	0.12	
	Within Groups	619.82	1508.85	0.41			
	Total	621.56	1510.85				0.00
Storage of greenhouse gases, such as carbon	Between Groups	21.28	2.00	10.64	9.92	0.00	
	Within Groups	1605.50	1496.82	1.07			
	Total	1626.78	1498.82				0.01
Clean water	Between Groups	2.22	2.00	1.11	2.10	0.12	
	Within Groups	799.42	1509.70	0.53			
	Total	801.64	1511.70				0.00
Clean air	Between Groups	0.88	2.00	0.44	0.75	0.47	
	Within Groups	893.78	1508.07	0.59			
	Total	894.66	1510.07				0.00
Providing home for wildlife	Between Groups	0.25	2.00	0.13	0.29	0.75	
	Within Groups	672.53	1509.12	0.45			
	Total	672.78	1511.12				0.00
Providing a home for animals such as butterflies and bees that pollinate plants and crops	Between Groups	0.30	2.00	0.15	0.23	0.80	
	Within Groups	1011.14	1507.53	0.67			
	Total	1011.44	1509.53				0.00
Scenic places for inspiration or spiritual renewal	Between Groups	5.68	2.00	2.84	2.46	0.09	
	Within Groups	1743.27	1508.21	1.16			
	Total	1748.95	1510.21				0.00

Table 4.6 Ecological services least concerned about losing

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Flooding Protection	6.9%	9.7%	7.5%	8.3%
Erosion Protection	3.8%	3.0%	5.9%	3.9%
Wildlife viewing and birdwatching	10.2%	10.7%	11.5%	10.7%
Hunting opportunities	2.4%	4.9%	2.2%	3.5%
Storage of greenhouse gases	36.9%	31.7%	24.5%	32.0%
Clean water	0.0%	1.0%	1.0%	.7%
Clean air	1.3%	1.0%	2.0%	1.3%
Providing a home for wildlife	.9%	.3%	.7%	.6%
Providing a home for butterflies and bees (pollinators)	7.8%	7.3%	5.4%	7.1%
Scenic places for inspiration and spiritual renewal	29.9%	30.5%	39.2%	32.1%
Valid N	674	408	404	1524
Significance:	χ^2 (18)= 45.99*		Cramer's V= .12*	

Table 4.7 Ecological services most concerned about losing

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Flooding Protection	10.6%	7.8%	6.8%	8.6%
Erosion Protection	3.1%	8.6%	3.5%	5.7%
Wildlife viewing and birdwatching	.5%	1.2%	.9%	.9%
Hunting opportunities	43.2%	41.4%	45.7%	42.9%
Storage of greenhouse gases	.6%	.9%	.3%	.7%
Clean water	15.0%	16.8%	16.0%	16.0%
Clean air	1.0%	1.9%	1.2%	1.5%
Providing a home for wildlife	23.3%	18.9%	23.1%	21.3%
Providing a home for butterflies and bees (pollinators)	1.6%	1.7%	2.1%	1.8%
Scenic places for inspiration and spiritual renewal	1.0%	.8%	.4%	.8%
Valid N	676	411	405	1530
Significance:	$\chi^2 (18) = 34.22^*$		Cramer's V = .11*	

Section 5. Discrete Choice Modeling of Waterfowl Hunting Trips

This study included a discrete choice experiment (DCE) examining the preferences of waterfowl hunters concerning different potential combinations of hunting experiences. Choice models present hypothetical scenarios to respondents to derive individuals' preferences for alternatives composed of multiple resource and management attributes (Adamowicz, Louviere & Williams 1994; Louviere, Hensher & Swait 2000; Oh et al. 2005). The approach depends on the imperfect relationship between behavioral intention and behavior (Ajzen & Fishbein 1980), yet allows estimation of the effects of all parameters of interest independently. Individuals are assumed to be utility maximizers, and respondents' choices reflect the perceived utility of the alternatives presented (McFadden 1981). Individual respondent choices reflect the personal utility of attributes and attribute levels, and are aggregated to estimate the utility of attributes and attribute levels in a population (McFadden 1981). In an economic sense, utility is simply a measure of the perceived usefulness of something to an individual. The degree to which someone chooses one circumstance over another provides the ability to measure its perceived usefulness, or utility, to that person. In general, the utility of an attribute level may be considered a reflection of relative desirability (Orme 2014).

Alternatives presented in this DCE consisted of five hunting related attributes:

- 1) Harvest:** The number of waterfowl you are likely to harvest in a day;
- 2) Access Effort:** How easy or difficult it is to get into, out of and around an area in order to hunt;
- 3) Length of Travel:** The time you have to travel one-way in order to hunt;
- 4) Quantity of Waterfowl:** The number of ducks/geese that you see in a day when hunting even if not in shooting range; and
- 5) Potential for Interference/Competition:** Competition from other hunters who might interfere with your hunt in some way such as making you feel crowded or competing for hunting spots or birds.

Response levels varied from 3 to 5 for each attribute (Table 5.1). In order to have adequate power to conduct this experiment, we developed 10 survey versions. In each, respondents were presented with 10 different hypothetical comparisons of birdwatching experiences and

asked to choose one option. Each scenario included two hunting option choices plus a “none” (i.e., I would not go waterfowl hunting if these were my only choices). The background explanation of the DCE and an example of the choice scenarios are presented in Figures 5.1 and 5.2.

Results for the hierarchical Bayes model, including average utilities, or usefulness, for each attribute level, summarize the preferences of waterfowl hunters in Florida for different hunting experiences. The attribute importances (Table 5.2) provide a summary of how important each of the 5 attributes were in respondents’ choices.

The utilities of each level for each attribute are summarized in Table 5.3. The larger the range in the part-worth utilities (i.e. the average utilities across levels within that attribute) for an attribute, the more influential that attribute is on respondents’ choices and the greater the importance of that attribute. For example, completion/interference was the most influential attribute in the DCE, as indicated by the largest range in part-worth utilities (range in utilities = 112; Table 5.3). The set of part-worth utilities for each attribute is scaled to sum to zero, so some part-worth utilities are necessarily negative numbers for some levels. A negative part-worth utility does not mean that the level has a negative utility; but the larger the number, the higher the utility. This means that a large positive value has higher utility than a larger negative value.

In summary, the order of importance of the attributes is: 1) potential for interference/competition; 2) length of travel; 3) harvest; 4) quantity of waterfowl; and 5) access effort. The individual levels on the attributes that had the highest utility were: 1) travel time of 30 minutes; 2) Harvesting 6 birds; and 3) no competition from other hunters. The lowest utilities were: 1) high competition from other hunters; 2) a travel time of 4 hours; and 3) harvesting only 1 bird.

Table 5.1 Possible trip choice characteristics in discrete choice experiment

Attribute	Possible levels
Harvest: The number of waterfowl you are likely to harvest in a day	<ul style="list-style-type: none"> - One bird - 3 birds - 6 birds
Access Effort: How easy or difficult it is to get into, out of and around an area in order to hunt	<ul style="list-style-type: none"> - Easy access that takes little effort - Moderate access that takes some effort - Difficult access that takes a lot of effort
Length of Travel: The time you have to travel one-way in order to hunt	<ul style="list-style-type: none"> - 30 minutes - 1 hour - 2 hours - 3 hours - 4 hours
Quantity of Waterfowl: The number of ducks/geese that you see in a day when hunting even if not in shooting range	<ul style="list-style-type: none"> - 25 birds or less - 50 birds - 250 birds - 500 birds - 1,000 birds or more
Potential for Interference/Competition: Competition from other hunters who might interfere with your hunt in some way such as making you feel crowded or competing for hunting spots or birds	<ul style="list-style-type: none"> - No competition - Low competition from other hunters - Moderate competition from other hunters - High competition from other hunters

Figure 5.1 Background for Discrete Choice Experiment (DCE) for waterfowl hunting

CBCIntro


WATERFOWL HUNTING CHOICES

Waterfowl hunting experiences can vary across many different areas and situations. You might hunt very near your home or drive a few hours away to hunt. You might hunt on public land for free or pay a daily or seasonal lease fee to hunt on private land. We are interested in knowing what experiences and conditions influence where you decide to hunt on a given trip. On the next few pages, we present 10 different hypothetical comparisons of waterfowl hunting trips you could choose to take. These trips vary on 5 conditions:

- 1) **Harvest:** The number of waterfowl you are likely to harvest in a day;
- 2) **Access Effort:** How easy or difficult it is to get into, out of and around an area in order to hunt;
- 3) **Length of Travel:** The time you have to travel one-way in order to hunt;
- 4) **Quantity of Waterfowl:** The number of ducks/geese that you see in a day when hunting even if not in shooting range; and
- 5) **Potential for Interference/Competition:** Competition from other hunters who might interfere with your hunt in some way such as making you feel crowded or competing for hunting spots or birds.

Some of these scenarios might seem unlikely to you, or neither option represents the places you currently hunt, but we are still interested in understanding which described hunts you would choose. Your opinions about these comparisons will help waterfowl managers better understand waterfowl hunter preferences.

For each scenario, select the one choice you would make if these were your only hunting options and assuming all other conditions were the same.




0%  100%

Figure 5.2 Example of choice scenario for waterfowl hunting DCE

HunterDC_Random1

If these were your only options for a waterfowl hunt, which would you choose?
Choose by clicking one of the buttons below:

(1 of 10)

	Option 1	Option 2	WOULD NOT GO
Harvest: Number of waterfowl you likely harvest in a day	One bird	3 birds	NONE: I would not go waterfowl hunting if these were my only choices.
Access Effort: How easy or difficult it is to get into, out of and around an area in order to hunt	Easy access that takes little effort	Moderate access that takes some effort	
Length of Travel: The time you have to travel one-way in order to hunt	3 hours	30 minutes	
Quantity of Waterfowl: The number of ducks/geese that you see in a day when hunting even if not in shooting range	50 birds	1,000 birds or more	
Potential for Interference/Competition: Competition from other hunters who might interfere with your hunt	High competition from other hunters	Moderate competition from other hunters	
Choose one option	HunterDC_Random1=1 <input type="radio"/>	HunterDC_Random1=2 <input type="radio"/>	HunterDC_Random1=3 <input type="radio"/>

▶

0% 100%

Table 5.2 Relative attribute importance derived from hierarchical Bayes estimation of utilities for waterfowl hunting DCE

Season choice attribute	Importances	SD
Harvest	24.31	12.80
Access Effort	8.89	5.88
Length of Travel	26.43	11.36
Quantity of Waterfowl	13.34	7.08
Potential for Interference/Competition	27.04	12.39

Notes: n = 871

Table 5.3 Results of the hierarchical Bayes model for waterfowl hunting DCE using zero-centered differences.

Choice attribute - level	Average utilities	SD
Harvest		
One bird	-65.22	43.28
3 birds	20.34	13.09
6 birds	44.89	37.83
Access Effort		
Easy access that takes little effort	12.01	17.11
Moderate access that takes some effort	10.60	9.28
Difficult access that takes a lot of effort	-22.62	20.84
Length of Travel		
30 minutes	56.50	34.13
1 hour	43.14	27.49
2 hours	-2.88	14.68
3 hours	-28.66	25.78
4 hours	-68.10	33.71
Quantity of Waterfowl		
25 birds or less	-28.76	20.52
50 birds	-17.36	18.67
250 birds	9.73	9.66
500 birds	8.09	16.67
1,000 birds or more	28.29	24.48
Potential for Interference/Competiton		
No competition	44.16	27.15
Low competition from other hunters	35.96	17.12
Moderate competition from other hunters	6.31	11.26
High competition from other hunters	-86.43	41.63
None	-67.57	117.98

Notes: n = 871

Section 6. Policy and Regulatory Preferences

PRIORITIES

The policy objective receiving the highest average priority rating was having the largest duck populations possible (\bar{x} = 4.1-4.3), and the lowest average rating was for having the largest bag limits possible (\bar{x} = 2.6-2.8; Table 6.1, 6.1a). Analyses revealed significant differences between the substrata but effect sizes suggest that these were small (Table 6.1b). Respondents were also asked to rank their top 3 highest priority objectives of those listed, with having the largest duck populations possible ranked first more frequently than any other objective across substrata (Table 6.2).

PERCEPTION OF EXISTING POLICY

Overall, most respondents felt that current bag limits were neither difficult to understand (71-84%) nor difficult to comply with in the field (61-73%; Table 6.3), and differences were significant but small. Respondents were also asked about their preferred scenario for bag limits of duck species with typically small bag limits, and respondents were split in their response with significant no differences between the substrata (Table 6.3).

FLYWAY-SPECIFIC REGULATORY PREFERENCES

Responses regarding the most important action to increase satisfaction was largely split between acquiring more lands for habitat and access (40-50%) and better managing existing habitats (41-52%; Table 6.4). Respondents were asked to rank the importance of several policy priorities, and the most frequent first response was having a quality place to hunt waterfowl (Tables 6.5-6.10). Responses were split on the hen mallard restriction (Table 6.11). Respondents were asked how the current species-specific duck bag limits affected their hunting activity, and responses were largely split between “does not affect my hunting activity” (54-64%) and “somewhat limits my hunting activity” (34-41%; Table 6.12); analyses indicate significant but small differences between the substrata. Responses to the question of lowering

the duck bag limit from 6 to 4 were largely split, with no significant differences between the substrata (Table 6.13).

Table 6.1 Preferred agency priorities for duck hunting regulations

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Having the largest bag limits possible	2.8	.99	732	2.6	.96	423	2.8	1.00	432	2.7	.98	1615
Having the longest seasons possible	3.4	.99	730	3.6	1.02	424	3.6	.93	431	3.5	1.00	1615
Having the largest duck populations possible	4.3	.84	727	4.1	.89	422	4.2	.78	432	4.2	.86	1610
Avoiding different season lengths for different duck species	3.4	1.09	731	3.3	1.13	424	3.4	1.11	431	3.3	1.11	1616
Providing the simplest regulations possible	3.9	1.02	730	3.9	1.02	423	3.8	1.04	429	3.9	1.02	1612
Reducing the number of species-specific bag limits	3.2	1.11	728	3.1	1.10	424	3.1	1.09	432	3.1	1.10	1615
Having the largest drake mallard bag limits possible	2.8	1.11	732	2.8	.95	424	3.0	1.08	432	2.9	1.04	1617
Scale from 1=Very low to 5=Very high												

Table 6.1a Preferred agency priorities for duck hunting regulations response distribution

Item	Response					Valid N
	Very low	Low	Moderate	High	Very high	
Having the largest bag limits possible	11.0%	27.6%	44.6%	11.5%	5.3%	1615
Having the longest seasons possible	2.8%	9.6%	37.5%	30.7%	19.4%	1615
Having the largest duck populations possible	0.8%	1.5%	19.9%	34.4%	43.4%	1610
Avoiding different season lengths for different duck species	6.1%	14.3%	36.7%	24.9%	18.0%	1616
Providing the simplest regulations possible	2.5%	6.1%	26.1%	32.5%	32.7%	1612
Reducing the number of species-specific bag limits	7.4%	19.0%	40.3%	19.7%	13.7%	1615
Having the largest drake mallard bag limits possible	10.9%	21.9%	46.1%	13.4%	7.7%	1617

Table 6.1b Preferred agency priorities for duck hunting regulations ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	Eta
Having the largest bag limits possible	Between Groups	11.94	2.00	5.97	6.15	0.00	
	Within Groups	1537.80	1584.55	0.97			
	Total	1549.74	1586.55				0.01
Having the longest seasons possible	Between Groups	17.79	2.00	8.89	9.17	0.00	
	Within Groups	1533.63	1581.82	0.97			
	Total	1551.41	1583.82				0.01
Having the largest duck populations possible	Between Groups	11.34	2.00	5.67	8.04	0.00	
	Within Groups	1113.16	1578.11	0.71			
	Total	1124.50	1580.11				0.01
Avoiding different season lengths for different duck species	Between Groups	3.47	2.00	1.73	1.41	0.24	
	Within Groups	1942.87	1583.48	1.23			
	Total	1946.34	1585.48				0.00
Providing the simplest regulations possible	Between Groups	2.83	2.00	1.41	1.35	0.26	
	Within Groups	1654.31	1579.23	1.05			
	Total	1657.14	1581.23				0.00
Reducing the number of species-specific bag limits	Between Groups	8.48	2.00	4.24	3.51	0.03	
	Within Groups	1910.91	1581.93	1.21			
	Total	1919.39	1583.93				0.00
Having the largest drake mallard bag limits possible	Between Groups	8.57	2.00	4.29	3.81	0.02	
	Within Groups	1784.32	1585.13	1.13			
	Total	1792.90	1587.13				0.00

Table 6.2 Ranked top 3 highest priority regulations

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Having the largest bag limits possible	First	19.6%	22.1%	17.6%	20.1%
	Second	29.3%	24.0%	27.8%	26.8%
	Third	51.1%	53.9%	54.6%	53.1%
	Total	224	114	139	474
Having the longest seasons possible	First	27.2%	40.7%	37.6%	35.9%
	Second	49.7%	44.5%	43.5%	45.9%
	Third	23.1%	14.8%	18.9%	18.2%
	Total	429	309	304	1090
Having the largest duck populations possible	First	73.5%	63.4%	64.9%	67.4%
	Second	18.2%	23.9%	23.3%	21.7%
	Third	8.3%	12.6%	11.7%	10.9%
	Total	589	325	323	1255
Avoiding different season lengths for different duck species	First	8.0%	5.9%	10.5%	7.7%
	Second	30.4%	28.1%	40.7%	31.8%
	Third	61.6%	66.1%	48.8%	60.4%
	Total	212	111	133	455
Providing the simplest regulations possible	First	16.2%	14.6%	16.7%	15.5%
	Second	43.8%	39.5%	36.5%	40.4%
	Third	40.0%	45.9%	46.9%	44.0%
	Total	411	252	214	908
Reducing the number of species-specific bag limits	First	11.5%	10.0%	9.8%	10.6%
	Second	26.0%	25.3%	20.3%	24.7%
	Third	62.5%	64.7%	69.9%	64.8%
	Total	163	87	76	332
Having the largest drake mallard bag limits possible	First	14.5%	11.7%	24.6%	16.0%
	Second	36.9%	42.9%	33.8%	38.3%
	Third	48.7%	45.4%	41.6%	45.7%
	Total	76	33	48	153

Table 6.3 Bag limits difficult to comply with and preferred bag limits for species with small bags

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Are rules for current species-specific bag limits difficult to understand?	Yes	28.6%	24.6%	16.4%	24.3%
	No	71.4%	75.4%	83.6%	75.8%
	Valid N	719	416	420	1585
Are the current species-specific bag limits difficult to comply with in the field	Yes	39.0%	32.1%	28.7%	33.8%
	No	61.0%	67.9%	71.3%	66.2%
	Valid N	719	417	418	1585
Preferred scenario for bag limits of duck species that typically have smaller bag limits	Maximize harvest opportunity by maintaining individual species bag limits	45.6%	47.2%	52.7%	47.8%
	Create simpler regulations by creating aggregate bag limits for a combination of certain species	54.4%	52.8%	47.3%	52.2%
	Valid N	716	414	419	1577
Rules difficult to understand significance:		$\chi^2 (2) = 21.59^*$		Cramer's V = .11*	
Limits difficult to comply with significance:		$\chi^2 (2) = 13.75^*$		Cramer's V = .09*	
Preferred scenario significance:		$\chi^2 (2) = 5.63$		Cramer's V = .06	

Table 6.4 Most important action to increase satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Single action to increase satisfaction	Acquire more lands to provide habitat and hunting access	39.5%	41.1%	49.8%	42.4%
	Better manage existing habitats	51.6%	47.8%	40.6%	47.5%
	Reduce license and/or permit fees	4.7%	8.8%	6.7%	7.0%
	Provide more educational opportunities to become a better waterfowl hunter	4.2%	2.3%	2.8%	3.1%
	Valid N	662	412	416	1531
Significance: $\chi^2 (6) = 22.68^*$		Cramer's V = .09*			

Table 6.5 Ranked importance of quality place to hunt waterfowl to respondent satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Having a quality place to hunt waterfowl	First	47.2%	45.7%	46.9%	46.5%
	Second	17.6%	23.5%	21.3%	21.0%
	Third	15.3%	12.8%	10.8%	13.2%
	Fourth	12.5%	12.0%	12.1%	12.2%
	Fifth	5.7%	5.0%	6.2%	5.5%
	Sixth	1.7%	1.0%	2.8%	1.6%
	Valid N	656	409	412	1518
Significance:		$\chi^2 (10) = 13.96$		Cramer's V = .07	

Table 6.6 Ranked importance of hunting away from others to respondent satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Hunting in an area where there is no crowding or interference	First	12.8%	12.0%	11.6%	12.2%
	Second	22.9%	23.9%	23.9%	23.5%
	Third	19.9%	20.6%	20.3%	20.3%
	Fourth	20.2%	18.1%	21.1%	19.4%
	Fifth	17.0%	21.5%	17.7%	19.2%
	Sixth	7.2%	3.8%	5.5%	5.3%
	Valid N	656	409	412	1518
Significance:		$\chi^2 (10) = 9.18$		Cramer's V = .06	

Table 6.7 Ranked importance of seeing waterfowl while hunting to respondent satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Seeing waterfowl while hunting	First	20.2%	22.9%	21.5%	21.7%
	Second	29.1%	27.4%	24.6%	27.4%
	Third	24.5%	28.7%	29.7%	27.5%
	Fourth	15.7%	12.9%	13.6%	14.0%
	Fifth	7.7%	6.3%	7.1%	6.9%
	Sixth	2.7%	1.9%	3.5%	2.5%
	Valid N	656	409	412	1518
Significance:		$\chi^2 (10) = 9.42$		Cramer's V = .06	

Table 6.8 Ranked importance of having the chance to shoot/harvest waterfowl to respondent satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Having the chance to shoot/harvest waterfowl	First	14.4%	14.8%	12.2%	14.1%
	Second	22.9%	19.0%	20.8%	20.7%
	Third	25.7%	25.8%	25.8%	25.8%
	Fourth	28.8%	36.0%	30.9%	32.5%
	Fifth	7.8%	4.1%	9.9%	6.6%
	Sixth	.3%	.3%	.4%	.3%
	Valid N	656	409	412	1518
Significance:		$\chi^2 (10) = 17.20$		Cramer's V = .08	

Table 6.9 Ranked importance of successfully harvesting a bird to respondent satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Successfully harvesting at least one bird	First	2.8%	3.9%	5.1%	3.8%
	Second	5.4%	5.7%	8.2%	6.1%
	Third	11.4%	10.3%	11.1%	10.8%
	Fourth	18.4%	18.2%	17.7%	18.1%
	Fifth	53.4%	58.5%	53.0%	55.6%
	Sixth	8.7%	3.5%	4.9%	5.5%
	Valid N	656	409	412	1518
Significance:		$\chi^2 (10) = 22.42^*$		Cramer's V = .09*	

Table 6.10 Ranked importance of attaining a full bag limit to respondent satisfaction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Attaining a full bag limit	First	2.6%	.6%	2.7%	1.7%
	Second	2.1%	.6%	1.3%	1.2%
	Third	3.2%	1.8%	2.3%	2.4%
	Fourth	4.4%	2.8%	4.6%	3.7%
	Fifth	8.4%	4.6%	6.1%	6.2%
	Sixth	79.3%	89.5%	82.9%	84.7%
	Valid N	656	409	412	1518
Significance:		$\chi^2 (10) = 22.90^*$		Cramer's V = .09*	

Table 6.11 Preferences for the hen mallard restriction

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Hen mallard restriction	Should be removed	26.2%	29.5%	38.8%	30.4%
	Should be retained	36.3%	38.1%	38.0%	37.5%
	No opinion	37.5%	32.4%	23.2%	32.1%
	Valid N	660	411	416	1526
Significance:		$\chi^2 (4) = 30.30^*$		Cramer's V = .10*	

Table 6.12 Effect of species-specific duck bag limits on hunting activity

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How do the current species-specific duck bag limits affect your hunting activity	Does not affect my hunting activity	54.1%	63.6%	61.4%	59.9%
	Somewhat limits my hunting activity	40.6%	34.1%	33.9%	36.2%
	Severely limits my hunting activity	5.0%	2.3%	4.7%	3.7%
	Prevent me from hunting	.4%	0.0%	0.0%	.1%
Valid N		656	411	416	1524
Significance:		$\chi^2 (6) = 18.02^*$		Cramer's V = .08*	

Table 6.13 Support for lowering the daily duck bag limit to 4 of any species (except black and mottled ducks)

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Support lowering daily duck bag limit from 6 to 4 ducks	Yes	54.7%	53.0%	47.5%	52.4%
	No	45.3%	47.0%	52.5%	47.6%
	Valid N	656	411	413	1522
Significance:		$\chi^2 (2) = 5.52$		Cramer's V = .06	

Section 7. Avidity

Avidity can refer to several aspects of a recreational experience (Scott and Shafer 2001)—here, it was assessed via the respondents' involvement and identification with conservation groups and the centrality or importance of hunting for the individual. Respondents described their level of involvement with Delta Waterfowl, Ducks Unlimited, and their regional or state waterfowl association, and most indicated no involvement with Delta Waterfowl (81-93%; Table 7.1). Involvement with Ducks Unlimited was higher, with more respondents across the flyway indicating at least slight involvement, and analyses suggest no significant differences (Lower: 36%; Middle: 35%; Upper: 29%; Table 7.2). Most respondents also indicated no involvement with their regional or state waterfowl association, with significant but small differences between the substrata (75-85%; Table 7.3).

Social identity was assessed for 5 different identities relevant to waterfowl management, with Respondents indicated the degree to which they identify with each of 5 different identities relevant to waterfowl management (birdwatcher, duck hunter, goose hunter, other type of hunter, or conservationist). Respondents on average most identified as a conservationist (\bar{x} = 4.0-4.1) or other type of hunter (\bar{x} = 3.9-4.1) and least identified as a birdwatcher (\bar{x} = 2.5-2.7; Table 7.4, 7.4a). Analyses revealed significant differences between the substrata, but effect sizes were small. Notably, the level of identification as a goose hunter was lower in the Lower Atlantic (\bar{x} = 2.6) than in the Middle (\bar{x} = 3.7) or Upper Atlantic (\bar{x} = 3.6; Table 7.4b).

Respondents could indicate their agreement with a series of statements related to waterfowl hunting, with the highest average agreement with the statement, "Waterfowl hunting is one of the most enjoyable activities I do," (\bar{x} = 4.2; Table 7.5, 7.5a). The lowest average agreement was with the statement, "If I couldn't go waterfowl hunting I am not sure what I would do instead," (\bar{x} = 2.7-2.8). Analyses revealed significant differences between the substrata, but effect sizes suggest these were small (Table 7.5b).

Table 7.1 Involvement: Delta Waterfowl

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
No involvement	81.1%	86.8%	93.1%	86.1%
Slight involvement	14.0%	9.5%	4.3%	10.1%
Moderate involvement	4.1%	3.1%	1.8%	3.2%
High involvement	.8%	.6%	.8%	.7%
Valid N	626	364	352	1372
Significance:	$\chi^2 (6) = 29.60^*$		Cramer's V = .11*	

Table 7.2 Involvement: Ducks Unlimited

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
No involvement	41.5%	44.5%	48.1%	44.2%
Slight involvement	36.0%	34.9%	28.6%	34.0%
Moderate involvement	16.1%	16.1%	16.1%	16.1%
High involvement	6.4%	4.5%	7.2%	5.7%
Valid N	699	413	411	1557
Significance:	$\chi^2 (6) = 9.84$		Cramer's V = .06	

Table 7.3 Involvement: Regional or State Waterfowl Association

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
No involvement	74.6%	84.4%	84.5%	80.9%
Slight involvement	16.5%	12.7%	10.2%	13.6%
Moderate involvement	7.0%	2.5%	4.3%	4.5%
High involvement	2.0%	.3%	1.0%	1.0%
Valid N	630	365	353	1376
Significance:	$\chi^2 (6) = 25.97^*$		Cramer's V = .10*	

Table 7.4 Social Identity

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Identify yourself as a Birdwatcher	2.5	1.16	695	2.6	1.18	408	2.7	1.20	411	2.6	1.18	1545
Identify yourself as a Duck Hunter	3.9	1.04	703	3.7	1.15	413	3.9	1.06	417	3.8	1.10	1564
Identify yourself as Goose Hunter	2.6	1.27	697	3.7	1.12	414	3.6	1.17	417	3.3	1.30	1563
Identify yourself as an Other type of hunter	4.0	1.01	699	3.9	1.17	416	4.1	1.07	413	4.0	1.10	1563
Identify yourself as a Conservationist	4.0	.99	704	4.0	1.01	410	4.1	.96	417	4.0	.99	1559
Scale from 1=Not at all to 5=Very strongly												

Table 7.4a Level of social identification with group types response distribution

Item	Response					Valid N
	Not at all	Slightly	Moderately	Strongly	Very strongly	
Identify yourself as a Birdwatcher	21.9%	28.4%	27.6%	15.7%	6.4%	1545
Identify yourself as a Duck Hunter	2.1%	11.4%	24.1%	26.7%	35.7%	1564
Identify yourself as Goose Hunter	10.1%	19.0%	24.9%	22.1%	23.9%	1563
Identify yourself as an Other type of hunter	4.0%	6.3%	17.0%	31.1%	41.7%	1563
Identify yourself as a Conservationist	1.6%	5.7%	21.7%	31.7%	39.3%	1559

Table 7.4b Social Identity ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	Eta
Identify yourself as a Birdwatcher	Between Groups	5.94	2.00	2.97	2.15	0.12	
	Within Groups	2082.07	1510.83	1.38			
	Total	2088.01	1512.83				0.00
Identify yourself as a Duck Hunter	Between Groups	10.62	2.00	5.31	4.56	0.01	
	Within Groups	1781.67	1529.76	1.16			
	Total	1792.29	1531.76				0.01
Identify yourself as Goose Hunter	Between Groups	441.18	2.00	220.59	151.65	0.00	
	Within Groups	2219.66	1526.01	1.45			
	Total	2660.83	1528.01				0.17
Identify yourself as an Other type of hunter	Between Groups	4.88	2.00	2.44	2.13	0.12	
	Within Groups	1741.71	1524.61	1.14			
	Total	1746.59	1526.61				0.00
Identify yourself as a Conservationist	Between Groups	6.20	2.00	3.10	3.19	0.04	
	Within Groups	1484.99	1527.55	0.97			
	Total	1491.18	1529.55				0.00

Table 7.5 Centrality of waterfowl hunting

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Waterfowl hunting is one of the most enjoyable activities I do	4.2	.89	710	4.2	.91	417	4.2	.88	419	4.2	.89	1579
Most of my friends are in some way connected with waterfowl hunting	3.5	1.02	709	3.3	1.08	417	3.3	1.13	419	3.4	1.08	1577
Waterfowl hunting has a central role in my life	3.3	1.17	708	3.3	1.11	417	3.4	1.11	418	3.3	1.13	1576
A lot of my life is organized around waterfowl hunting	3.0	1.19	709	3.0	1.10	418	3.0	1.16	418	3.0	1.14	1579
If I couldn't go waterfowl hunting I am not sure what I would do instead	2.7	1.26	710	2.7	1.23	418	2.8	1.27	419	2.7	1.24	1580

Scale from 1=Strongly disagree to 5=Strongly agree

Table 7.5a Centrality of waterfowl hunting response distribution

Item	Response					Valid N
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Waterfowl hunting is one of the most enjoyable activities I do	0.8%	4.1%	15.3%	35.7%	44.1%	1579
Most of my friends are in some way connected with waterfowl hunting	4.2%	19.6%	27.3%	34.3%	14.6%	1577
Waterfowl hunting has a central role in my life	5.9%	18.9%	32.1%	26.0%	17.1%	1576
A lot of my life is organized around waterfowl hunting	8.6%	28.0%	31.3%	19.9%	12.1%	1579
If I couldn't go waterfowl hunting I am not sure what I would do instead	19.0%	30.1%	25.1%	14.9%	10.9%	1580

Table 7.5a Centrality of waterfowl hunting ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	Eta
Waterfowl hunting is one of the most enjoyable activities I do	Between Groups	.482	2	.241	.303	.738	
	Within Groups	1226.438	1543	.795			
	Total	1226.921	1545				0.00
Most of my friends are in some way connected with waterfowl hunting	Between Groups	26.114	2	13.057	11.436	.000	
	Within Groups	1760.038	1542	1.142			
	Total	1786.151	1544				0.01
Waterfowl hunting has a central role in my life	Between Groups	2.577	2	1.288	.992	.371	
	Within Groups	2000.755	1540	1.299			
	Total	2003.332	1542				0.00
A lot of my life is organized around waterfowl hunting	Between Groups	.475	2	.237	.176	.838	
	Within Groups	2074.015	1542	1.345			
	Total	2074.490	1544				0.00
If I couldn't go waterfowl hunting I am not sure what I would do instead	Between Groups	2.415	2	1.207	.772	.462	
	Within Groups	2414.927	1544	1.564			
	Total	2417.342	1546				0.00

Section 8. Engagement

PARTICIPATION IN NON-HUNTING CONSERVATION ACTIVITIES

Respondents reported most often voting for candidates or ballot issues to support wetlands or waterfowl conservation (\bar{x} = 2.3-2.4; Table 8.1, 8.1a), and least often contacting elected officials or government agencies about wetlands and waterfowl conservation (\bar{x} = 1.4). While analyses revealed significant differences between the substrata on several items, effect sizes suggest that these differences are small (Table 8.1b).

Across substrata, 90% or more respondents reported participating in backyard/at-home nature activities or fishing in the past 12 months, while over 80% reported spending time in nature away from home, viewing wildlife, and hunting any other game animals in the past 12 months (Table 8.2). Responses to hunting other migratory birds other than waterfowl in the past 12 months was significantly different between the substrata, with 85% selecting this activity in the Lower Atlantic, compared to 71% in the Middle Atlantic and 52% in the Upper Atlantic (Table 8.2a).

Most respondents in each flyway substrata reported watching birds at their home (85-91%), feeding birds at home in the past 12 months (71-77%), and watching birds away from home in the past 12 months (66-78%; Table 8.3). There were significant differences between the substrata, but these differences were small (Table 8.3a).

COMMUNITY

We used a social network approach to understand the diversity of relationships and connections that individuals have in their personal networks (Harshaw and Tindall 2005; Lin, Fu & Hsung 2001). Respondents were presented with a list of 24 avocational, occupational, and organizational structural positions and asked what relationship if any they had associated with the position through an acquaintance, close friend, relative, or self. The percentage of respondents reporting ties to the positions at each level of relationship are summarized in Tables 8.4a through 8.4f.

TRUST

Respondents rated trust highest in waterfowl hunting/conservation organizations (\bar{x} = 3.4-3.7; Table 8.5, 8.5a), and lowest for elected officials (\bar{x} = 1.8-1.9). While analyses revealed significant differences between the substrata on several items, effect sizes suggest these differences are small (Table 8.5b).

SUPPORT

Monetary support for conservation can take the form of donations, permit purchases, and fees. Respondents were asked about their previous support in the past year to wetland or waterfowl conservation, conservation of other birds, birdwatching and related issues, and waterfowl hunting. Possible responses to this item were \$0, less than \$250, \$250-\$999, \$1000-\$2499, \$2500-\$4999, \$5000-\$9999, and \$10,000 or more. Because of the non-normal distribution of donations (see Tables 8.6b-8.6e), responses were dichotomized as \$0 donation or more than \$0. Expectedly, most respondents reported having donated to waterfowl hunting (87-91%; Table 8.6), as well as wetland or waterfowl conservation (77-85%). Few reported donating to causes related to birdwatching and related issues (9-15%). Analyses revealed significant but small differences (Table 8.6a), particularly in donations to birdwatching and related issues (Lower: 9%; Middle: 9%; Upper: 15%). Respondents also indicated whether or not they had spent money on wetland management on private lands in the previous 12 months. Most indicated that they had not spent money on wetland management on private lands (Lower: 69%; Middle: 78%; Upper: 84%; Table 8.7). Money spent on wetland management on private lands averaged \$500 in the past year, and there were no significant differences between the substrata.

Table 8.1 Level of involvement in wetlands or waterfowl conservation in past 12 months

	Lower Atlantic			Flyway substrata Middle Atlantic			Upper Atlantic			Flyway ID Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
Worked on land improvement project related to wetlands or waterfowl conservation	1.9	1.09	695	1.7	1.00	405	1.6	1.02	404	1.8	1.05	1536
Attended meetings about wetlands or waterfowl conservation	1.7	1.02	691	1.6	.93	405	1.7	1.00	400	1.7	.98	1530
Volunteered my personal time and effort to conserve wetlands and waterfowl	1.8	1.03	692	1.6	1.00	404	1.7	1.07	404	1.7	1.03	1531
Contacted elected officials or government agencies about wetlands and waterfowl conservation	1.4	.84	692	1.4	.77	407	1.4	.79	399	1.4	.80	1531
Voted for candidates or ballot issues to support wetlands or waterfowl conservation	2.4	1.44	696	2.4	1.45	406	2.3	1.42	405	2.4	1.44	1538
Advocated for political action to conserve wetlands and waterfowl	1.8	1.21	690	1.8	1.20	405	1.8	1.13	398	1.8	1.19	1526

Scale from 1=Never to 5=Very often

Table 8.1a Participation in conservation activities response distribution

Item	Response				Valid often	Valid N
	Never	Rarely	Sometimes	Often		
Worked on land improvement project related to wetlands or waterfowl conservation	59.9%	13.6%	19.1%	6.0%	1.4%	1536
Attended meetings about wetlands or waterfowl conservation	62.4%	17.1%	15.3%	3.4%	1.9%	1530
Volunteered my personal time and effort to conserve wetlands and waterfowl	62.6%	15.2%	16.0%	3.7%	2.4%	1531
Contacted elected officials or government agencies about wetlands and waterfowl conservation	75.0%	12.1%	10.2%	2.3%	0.5%	1531
Voted for candidates or ballot issues to support wetlands or waterfowl conservation	45.0%	9.1%	19.3%	16.6%	10.1%	1538
Advocated for political action to conserve wetlands and waterfowl	61.9%	10.1%	16.6%	7.3%	4.1%	1526

Table 8.1b Level of involvement in wetlands or waterfowl conservation in past 12 months ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	Eta
Worked on land improvement project related to wetlands or waterfowl conservation	Between Groups	33.39	2.00	16.70	15.16	0.00	
	Within Groups	1654.03	1501.82	1.10			
	Total	1687.43	1503.82				0.02
Attended meetings about wetlands or waterfowl conservation	Between Groups	6.69	2.00	3.34	3.40	0.03	
	Within Groups	1467.66	1494.27	0.98			
	Total	1474.35	1496.27				0.00
Volunteered my personal time and effort to conserve wetlands and waterfowl	Between Groups	5.53	2.00	2.76	2.60	0.07	
	Within Groups	1594.13	1497.39	1.06			
	Total	1599.66	1499.39				0.00
Contacted elected officials or government agencies about wetlands and waterfowl conservation	Between Groups	1.00	2.00	0.50	0.76	0.47	
	Within Groups	980.16	1494.00	0.66			
	Total	981.16	1496.00				0.00
Voted for candidates or ballot issues to support wetlands or waterfowl conservation	Between Groups	4.62	2.00	2.31	1.12	0.33	
	Within Groups	3107.74	1504.71	2.07			
	Total	3112.36	1506.71				0.00
Advocated for political action to conserve wetlands and waterfowl	Between Groups	0.94	2.00	0.47	0.33	0.72	
	Within Groups	2092.89	1489.67	1.40			
	Total	2093.83	1491.67				0.00

Table 8.2 Nature Based Recreation

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Spending time in nature away from home	%	93.0%	89.4%	95.5%	91.9%
	Valid N	700	413	409	1556
Viewing wildlife	%	84.2%	82.3%	88.9%	84.3%
	Valid N	697	410	408	1548
Learning about nature	%	54.3%	59.1%	61.1%	57.8%
	Valid N	693	410	407	1544
Backyard/at home nature activities	%	91.5%	92.5%	93.7%	92.4%
	Valid N	698	413	406	1552
Fishing	%	95.6%	90.2%	91.7%	92.4%
	Valid N	702	413	409	1557
Hunting migratory birds other than waterfowl	%	85.4%	70.9%	52.3%	72.1%
	Valid N	702	413	409	1557
Hunter other game birds	%	78.6%	78.1%	87.6%	80.2%
	Valid N	696	414	411	1556
Hunting any other game animals	%	90.5%	84.1%	89.3%	87.4%
	Valid N	701	413	408	1556
Other	%	8.7%	8.0%	8.7%	8.4%
	Valid N	256	166	138	585

Table 8.2a Nature Based Recreation significance tests

		Chi-Square	df	Cramer's V
Activity	Spending time in nature away from home	12.32*	2	.09*
	Viewing wildlife	7.27*	2	.07*
	Learning about nature	5.19	2	.06
	Backyard/at home nature activities	3.22	2	.05
	Fishing	11.95*	2	.09*
	Hunting migratory birds other than waterfowl	143.51*	2	.31*
	Hunter other game birds	14.47*	2	.10*
	Hunting any other game animals	10.26*	2	.08*

Table 8.3 Wild Bird Activities

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Watching birds at my home	%	84.5%	90.9%	90.4%	88.6%
	Valid N	698	414	411	1557
Feeding birds at my home	%	71.3%	76.5%	73.3%	74.0%
	Valid N	694	412	408	1548
Watching birds away from my home	%	66.4%	73.6%	76.7%	71.7%
	Valid N	694	409	406	1543
Photographing or filming birds	%	28.7%	36.3%	35.6%	33.5%
	Valid N	685	402	400	1519
Counting/monitoring birds	%	16.8%	15.6%	13.6%	15.6%
	Valid N	680	401	392	1507
Keeping track of the birds you see on a list	%	7.4%	10.7%	14.0%	10.2%
	Valid N	680	402	395	1511
Installing or maintaining next boxes for birds	%	47.4%	45.8%	44.5%	46.1%
	Valid N	686	412	406	1540

Table 8.3a Wild bird activities significance tests

		Chi-Square	df	Cramer's V
Wild bird activities	Watching birds at my home	6.72*	2	.07*
	Feeding birds at my home	2.95	2	.04
	Watching birds away from my home	10.73*	2	.08*
	Photographing or filming birds	8.30*	2	.08*
	Counting/monitoring birds	1.94	2	.04
	Keeping track of the birds you see on a list	11.72*	2	.09*
	Installing or maintaining nest boxes for birds	1.33	2	.03

Table 8.4a Personal community: Recreation

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal Community: Birdwatcher	Acquaintance	40.8%	42.1%	44.6%	42.2%
	Close Friend	31.9%	34.9%	36.2%	34.2%
	Relative	37.0%	39.9%	39.5%	38.8%
	Myself	45.2%	51.1%	58.4%	50.7%
	Valid N	487	294	302	1108
Personal Community: Angler	Acquaintance	52.4%	55.5%	49.1%	53.1%
	Close Friend	72.2%	73.2%	75.2%	73.3%
	Relative	63.4%	65.5%	59.2%	63.5%
	Myself	85.4%	80.9%	83.6%	83.0%
	Valid N	693	407	401	1534
Personal Community: Waterfowl Hunter	Acquaintance	57.0%	58.5%	55.8%	57.4%
	Close Friend	77.7%	78.8%	76.2%	77.9%
	Relative	64.1%	61.1%	60.8%	62.1%
	Myself	90.7%	89.8%	91.9%	90.5%
	Valid N	698	414	412	1558
Personal Community: Other hunter	Acquaintance	62.0%	62.9%	62.7%	62.6%
	Close Friend	78.1%	81.2%	79.5%	79.7%
	Relative	72.7%	70.5%	68.6%	70.8%
	Myself	91.0%	85.7%	91.0%	88.7%
	Valid N	689	405	414	1537

Table 8.4b Personal community: Agencies

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal Community: State/provincial park manager/employee	Acquaintance	72.4%	72.4%	68.0%	71.5%
	Close Friend	25.0%	26.2%	26.8%	25.9%
	Relative	8.8%	10.1%	11.7%	9.9%
	Myself	2.2%	6.6%	8.2%	5.2%
	Valid N	292	141	148	578
Personal Community: National Park Manager/Employee	Acquaintance	75.3%	73.2%	69.2%	73.3%
	Close Friend	27.5%	21.9%	30.0%	25.5%
	Relative	5.0%	9.2%	8.0%	7.3%
	Myself	1.4%	.1%	0.0%	.6%
	Valid N	270	135	110	522
Personal Community: Federal wildlife agency manager/employee	Acquaintance	78.5%	81.1%	79.3%	79.7%
	Close Friend	26.0%	19.4%	27.5%	23.5%
	Relative	5.8%	11.4%	2.8%	7.6%
	Myself	2.0%	2.9%	4.1%	2.8%
	Valid N	235	114	110	460
Personal Community: State/provincial wildlife agency manager/employee	Acquaintance	74.7%	76.9%	76.7%	76.0%
	Close Friend	29.6%	24.3%	26.0%	26.8%
	Relative	9.5%	13.0%	7.8%	10.6%
	Myself	3.5%	3.9%	6.8%	4.3%
	Valid N	374	166	167	698

Table 8.4c Personal community: Environmental Occupations

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal Community: Farmer/Rancher	Acquaintance	48.1%	53.6%	59.0%	52.6%
	Close Friend	58.9%	53.8%	45.9%	54.2%
	Relative	42.0%	36.5%	24.8%	36.3%
	Myself	23.7%	16.0%	16.2%	18.9%
	Valid N	633	349	321	1327
Personal Community: Outdoor Educator	Acquaintance	61.0%	72.7%	59.4%	65.3%
	Close Friend	39.1%	29.2%	34.9%	34.2%
	Relative	10.7%	8.0%	13.9%	10.3%
	Myself	14.0%	13.0%	21.1%	15.2%
	Valid N	398	198	242	831
Personal Community: Wildlife artist	Acquaintance	71.1%	69.4%	71.4%	70.4%
	Close Friend	21.7%	23.7%	23.9%	23.0%
	Relative	14.8%	20.5%	14.2%	17.3%
	Myself	6.9%	8.4%	8.1%	7.8%
	Valid N	269	152	130	565
Personal Community: Wildlife biologist	Acquaintance	73.1%	73.7%	70.4%	72.8%
	Close Friend	28.4%	30.5%	34.7%	30.6%
	Relative	7.9%	8.9%	14.4%	9.7%
	Myself	2.3%	10.4%	6.0%	6.5%
	Valid N	303	155	159	620
Personal Community: Wildlife photographer	Acquaintance	62.8%	59.5%	57.2%	60.1%
	Close Friend	31.1%	29.0%	35.1%	31.1%
	Relative	23.2%	27.8%	22.8%	25.1%
	Myself	20.2%	28.3%	24.4%	24.6%
	Valid N	338	192	204	743

Table 8.4d Personal community: Conservation organizations

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal Community: Member of fishing/conservation organizations	Acquaintance	53.4%	61.4%	53.9%	57.1%
	Close Friend	53.9%	56.1%	51.8%	54.5%
	Relative	35.0%	29.8%	30.3%	31.6%
	Myself	47.2%	42.3%	46.4%	44.8%
	Valid N	409	260	260	957
Personal Community: Member of national conservation organization	Acquaintance	63.7%	61.9%	63.5%	62.9%
	Close Friend	29.3%	29.8%	36.5%	31.0%
	Relative	22.4%	27.3%	24.7%	25.0%
	Myself	18.7%	28.2%	26.2%	24.4%
	Valid N	187	107	103	404
Personal Community: Member of local conservation organization	Acquaintance	61.7%	58.6%	59.8%	60.0%
	Close Friend	55.3%	52.3%	46.2%	52.0%
	Relative	29.2%	34.4%	24.1%	30.4%
	Myself	39.9%	51.2%	45.8%	46.0%
	Valid N	290	164	172	634
Personal Community: Member of local naturalist organization	Acquaintance	70.3%	66.4%	62.5%	67.0%
	Close Friend	31.2%	31.6%	27.5%	30.5%
	Relative	17.0%	11.4%	18.5%	15.1%
	Myself	14.3%	27.3%	20.4%	20.7%
	Valid N	146	67	82	290

Table 8.4e Personal community: Hunting organizations

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal Community: Member of Ducks Unlimited	Acquaintance	55.7%	60.5%	47.5%	56.1%
	Close Friend	72.3%	71.5%	64.8%	70.4%
	Relative	45.6%	47.7%	36.8%	44.7%
	Myself	56.0%	60.0%	60.8%	58.7%
	Valid N	624	345	349	1337
Personal Community: Member of Delta Waterfowl	Acquaintance	60.4%	51.6%	51.8%	55.4%
	Close Friend	58.4%	57.0%	42.5%	55.5%
	Relative	26.2%	26.8%	17.4%	25.1%
	Myself	25.7%	23.5%	23.7%	24.5%
	Valid N	309	138	100	549
Personal Community: Member of state waterfowl association	Acquaintance	59.0%	71.9%	53.4%	63.0%
	Close Friend	56.2%	51.9%	48.2%	53.3%
	Relative	23.2%	17.4%	10.8%	19.1%
	Myself	32.2%	28.3%	25.9%	29.7%
	Valid N	308	116	101	512
Personal Community: Member of non-waterfowl hunting organization	Acquaintance	55.2%	59.0%	53.4%	56.4%
	Close Friend	65.7%	64.7%	59.5%	64.2%
	Relative	39.9%	36.6%	32.1%	37.1%
	Myself	48.1%	51.0%	46.7%	49.0%
	Valid N	506	243	229	978

Table 8.4f Personal community: Bird groups

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal Community: Member of birding group	Acquaintance	74.8%	71.6%	64.5%	71.0%
	Close Friend	16.7%	32.9%	31.5%	27.0%
	Relative	18.7%	16.4%	19.8%	18.0%
	Myself	5.5%	4.6%	4.8%	4.9%
	Valid N	188	106	124	421
Personal Community: Member of bird conservation group	Acquaintance	64.3%	56.7%	53.8%	58.6%
	Close Friend	29.3%	32.4%	36.9%	32.5%
	Relative	24.4%	25.1%	25.9%	25.1%
	Myself	12.1%	15.0%	20.6%	15.4%
	Valid N	213	120	152	486
Personal Communication: Member of ornithological group	Acquaintance	80.2%	74.0%	69.8%	75.2%
	Close Friend	14.1%	20.3%	17.7%	17.5%
	Relative	7.6%	13.4%	12.6%	11.2%
	Myself	2.6%	2.4%	2.8%	2.6%
	Valid N	103	54	71	227

Table 8.5 Trust in state wildlife agencies

	Flyway substrata									Flyway ID		
	Lower Atlantic			Middle Atlantic			Upper Atlantic			Atlantic		
	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N	Mean	SD	Valid N
State wildlife agencies	3.2	.98	697	3.1	.98	411	3.2	1.03	412	3.2	.99	1552
Federal wildlife and land management agencies	3.0	1.02	699	3.0	1.02	412	3.1	1.01	410	3.0	1.02	1553
Elected officials	1.9	.90	697	1.9	.90	410	1.8	.89	410	1.9	.90	1550
Waterfowl hunting/conservation organizations	3.4	1.02	699	3.6	.85	412	3.7	.88	409	3.5	.92	1553
Birding/bird conservation organizations	2.6	1.13	689	2.6	1.11	404	2.9	1.12	405	2.7	1.12	1529
Other conservation organizations	2.6	1.03	684	2.7	1.01	403	2.9	1.06	409	2.7	1.03	1527
University researchers/scientists	2.9	1.09	696	2.9	1.07	411	3.0	1.12	408	2.9	1.09	1548

Scale from 1=Do not trust at all to 5=Trust completely

Table 8.5a Trust in various institutions response distribution

Item	Response					Valid N
	Do not trust at all	Trust a little	Trust somewhat	Trust a lot	Trust completely	
State wildlife agencies	5.9%	16.7%	39.4%	30.5%	7.5%	1552
Federal wildlife and land management agencies	7.9%	19.3%	40.5%	25.6%	6.7%	1553
Elected officials	41.6%	35.5%	18.5%	3.6%	0.9%	1550
Waterfowl hunting/conservation organizations	2.8%	9.0%	34.1%	41.3%	12.7%	1553
Birding/bird conservation organizations	18.8%	23.2%	34.6%	18.5%	4.9%	1529
Other conservation organizations	14.0%	24.4%	40.6%	16.9%	4.2%	1527
University researchers/scientists	12.7%	21.3%	36.6%	23.4%	6.0%	1548

Table 8.5b Trust in state wildlife agencies ANOVA tests

		Sum of Squares	df	Mean Square	F	Sig.	Eta
State wildlife agencies	Between Groups	3.00	2.00	1.50	1.52	0.22	
	Within Groups	1495.72	1516.64	0.99			
	Total	1498.72	1518.64				0.00
Federal wildlife and land management agencies	Between Groups	0.86	2.00	0.43	0.42	0.66	
	Within Groups	1566.88	1517.19	1.03			
	Total	1567.74	1519.19				0.00
Elected officials	Between Groups	4.02	2.00	2.01	2.51	0.08	
	Within Groups	1215.92	1514.38	0.80			
	Total	1219.95	1516.38				0.00
Waterfowl hunting/conservation organizations	Between Groups	32.23	2.00	16.12	18.34	0.00	
	Within Groups	1332.62	1516.57	0.88			
	Total	1364.85	1518.57				0.02
Birding/bird conservation organizations	Between Groups	18.71	2.00	9.35	7.42	0.00	
	Within Groups	1885.08	1495.01	1.26			
	Total	1903.79	1497.01				0.01
Other conservation organizations	Between Groups	18.00	2.00	9.00	8.44	0.00	
	Within Groups	1592.43	1493.02	1.07			
	Total	1610.44	1495.02				0.01
University researchers/scientists	Between Groups	5.54	2.00	2.77	2.32	0.10	
	Within Groups	1802.48	1511.76	1.19			
	Total	1808.02	1513.76				0.00

Table 8.6 Percent making donation greater than \$0 in past year

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Wetland or Waterfowl conservation	85.3%	77.3%	84.5%	81.6%
Conservation of other birds	30.9%	33.0%	31.0%	31.9%
Birdwatching and related issues	8.6%	8.7%	15.3%	10.0%
Waterfowl hunting	90.6%	90.8%	87.3%	90.0%
Valid N	988	486	493	1967

Table 8.6a Percent making donation greater than \$0 in past year significance tests

		Chi-Square	df	Cramer's V
Percent making donation greater than \$0 in past year	Wetland or Waterfowl conservation	1.11	2	.03
	Conservation of other birds	1.90	2	.04
	Birdwatching and related issues	10.91*	2	.09*
	Waterfowl hunting	3.57	2	.05

Table 8.6b Donations to wetland or waterfowl conservation response distribution

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Wetland or waterfowl conservation	\$0	35%	37%	34%	36%
	Less than \$250	46%	48%	51%	48%
	\$250 to \$999	14%	11%	11%	12%
	\$1,000 to \$2,499	3%	2%	2%	2%
	\$2,500 to \$4,999	1%	0%	1%	1%
	\$5,000 to \$9,999	0%	1%	0%	1%
	\$10,000 or more	1%	0%	1%	1%
	Valid N	694	394	408	1517

Table 8.6c Donations to conservation of other bird species response distribution

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Conservation of other bird species	\$0	75%	71%	74%	73%
	Less than \$250	21%	26%	22%	23%
	\$250 to \$999	3%	2%	3%	3%
	\$1,000 to \$2,499	1%	1%	1%	1%
	\$2,500 to \$4,999	0%	0%	0%	0%
	\$5,000 to \$9,999	0%	0%	0%	0%
	\$10,000 or more	0%	0%	0%	0%
	Valid N	644	359	377	1397

Table 8.6d Donations to birdwatching and related issues response distribution

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Birdwatching and relating issues	\$0	93%	92%	87%	91%
	Less than \$250	6%	7%	12%	8%
	\$250 to \$999	1%	1%	1%	1%
	\$1,000 to \$2,499	0%	0%	0%	0%
	\$2,500 to \$4,999	0%	0%	0%	0%
	\$5,000 to \$9,999	0%	0%	0%	0%
	\$10,000 or more	93%	92%	87%	1372
	Valid N	633	351	373	91%

Table 8.6e Donations to waterfowl hunting and hunting related issues response distribution

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Waterfowl hunting and hunting related issues	\$0	31%	27%	32%	29%
	Less than \$250	42%	51%	51%	48%
	\$250 to \$999	17%	16%	11%	15%
	\$1,000 to \$2,499	6%	5%	3%	5%
	\$2,500 to \$4,999	2%	1%	1%	1%
	\$5,000 to \$9,999	1%	0%	0%	0%
	\$10,000 or more	1%	0%	1%	1%
	Valid N	692	394	410	1519

Table 8.7 Money spent on wetlands management on private lands in past 12 months

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
In the past 12 months did you personally spend money for wetlands management on private lands?	No	69.3%	77.6%	84.2%	76.1%
	Yes	14.4%	8.2%	5.9%	9.9%
	Yes, but I'd rather not say how much	16.3%	14.2%	9.9%	14.0%
Amount?	Median	500.0	500.0	500.0	500.0
	Valid N	704	415	414	1567
Spent money-Y/N significance:		$\chi^2 (4) = 36.72^*$		Cramer's V = .11*	
Amount significance:		F (2, 151) = 0.37		$\eta^2 = .00$	

Section 9. Respondent Characteristics

Respondents answered a series of sociodemographic questions regarding race, ethnicity, gender, age, education, profession, rural land ownership, urban/rural residence, urban/rural upbringing, income, and state of residence. Respondents were largely white (99%; Tables 9.1, 9.1a), non-Hispanic (99%; Table 9.2), and male (99%; Table 9.3).

After removing any respondents under the age of 18, the average age of respondents was 48 years old, with significant but small differences between the substrata (Table 9.4). Around half of respondents reported graduate or professional-level education or a Bachelor's degree (47-51%; Table 9.5), with significant but small differences between the substrata. Most respondents indicated that a nature related profession was not their primary source of personal income across substrata (82-87%; Table 9.6). Across substrata, 47-54% made less than \$75,000 per year in personal income, while 12-19% made more than \$150,000 (Table 9.7). Analyses indicate significant but small differences between the substrata in personal income.

A majority of respondents did own rural land (51-53%), and there were no differences in rural land ownership between the substrata in rural land ownership (Table 9.8). Current rural vs. urban residence was varied across the substrata, with a significant trend to more rural residence in the Upper Atlantic (Table 9.9). Respondents also reported the population size of the area where they grew up, and responses were overall more rural than current residence, and differences in upbringing were statistically significant but small (Table 9.10).

Table 9.1 Percent reporting race

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Race	American Indian/Native American	2.0%	2.8%	3.8%	2.7%
	Asian	.8%	.5%	.4%	.6%
	Black or African American	.4%	.5%	0.0%	.4%
	Native Hawaiian or Pacific Islander	.1%	.3%	0.0%	.2%
	White	98.9%	98.8%	99.1%	98.9%
	Valid N	693	412	400	1542

Table 9.1a Race significance tests

		Chi-Square	df	Cramer's V
Race	American Indian/Native American	2.76	2	.04
	Asian	0.34	2	.02
	Black or African American	1.87	2	.04
	Native Hawaiian or Atlantic Islander	2.68	2	.04
	White	2.49	2	.04

Table 9.2 Ethnicity

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Hispanic or Latino	Yes	.8%	.9%	.7%	.8%
	No	99.2%	99.1%	99.3%	99.2%
Valid N		689	412	397	1536
Significance:		$\chi^2 (2) = 0.11$		Cramer's V = .01	

Table 9.3 Gender

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Gender	Male	97.3%	97.7%	95.8%	97.2%
	Female	2.7%	2.3%	4.2%	2.8%
	Valid N	699	416	413	1563
Significance:		$\chi^2(2) = 3.78$		Cramer's V= .05	

Table 9.4 Age

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Age	Mean	45	51	48	48
	SD	13.93	15.48	14.74	14.96
	Range	92	98	67	98
	Valid N	700	414	413	1561
Significance:		F (2, 1526)= 15.90*		$\eta^2=.02$	

Table 9.5 Education

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Level of education	Some high school or less	.8%	1.2%	2.3%	1.3%
	High school diploma or GED	11.9%	19.6%	17.7%	16.5%
	Some college (no degree)	21.8%	18.6%	18.2%	19.6%
	Associate's degree (2 years)	14.4%	12.3%	14.9%	13.5%
	Bachelors degree (4 years)	33.8%	30.2%	29.1%	31.2%
	Graduate or professional school	17.4%	18.2%	17.8%	17.8%
	Valid N	692	406	409	1537
Significance:		$\chi^2 (10) = 23.46^*$		Cramer's V = .08*	

Table 9.6 Nature-related profession

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Is a nature-related profession primary source of personal income?	Yes	18.1%	13.5%	12.8%	15.0%
	No	81.9%	86.5%	87.2%	85.0%
	Valid N	701	412	413	1559
Significance:		$\chi^2 (2) = 7.07^*$		Cramer's V = .07*	

Table 9.7 Income

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal income	Less than \$24,999	9.7%	6.8%	9.1%	8.3%
	\$25,000 to \$49,999	17.5%	16.5%	20.0%	17.6%
	\$50,000 to \$74,999	19.7%	23.4%	25.5%	22.5%
	\$75,000 to \$99,999	17.2%	15.9%	18.9%	17.0%
	\$100,000 to \$124,999	10.8%	15.0%	8.5%	12.2%
	\$125,000 to \$149,999	6.0%	4.5%	5.9%	5.3%
	\$150,000 to \$199,999	7.9%	6.1%	5.6%	6.6%
	\$200,000 to \$249,999	3.6%	4.5%	1.2%	3.5%
	\$250,000 to \$299,999	1.9%	1.1%	1.2%	1.4%
	\$300,000 or more	5.6%	6.3%	4.2%	5.6%
Valid N		646	372	371	1416
Significance:		$\chi^2 (18) = 29.99^*$		Cramer's V=.10*	

Table 9.8 Rural land ownership

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Do you own land in a rural area	Yes	52.3%	51.1%	53.3%	52.0%
	No	47.7%	48.9%	46.7%	48.0%
	Valid N	699	417	413	1564
Own land Y/N significance:		$\chi^2 (2) = 0.40$		Cramer's V = .02	

Table 9.9 Urban vs Rural Residence

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Where you live now	Large Urban area (500,000 or more)	10.8%	9.8%	7.6%	9.7%
	Medium Urban area (50,000 to 499,999)	21.5%	18.5%	10.3%	17.8%
	Small city (10,000 to 49,999)	25.0%	15.7%	20.9%	20.0%
	Small town (2,000 to 9,999)	21.2%	29.6%	37.8%	28.4%
	Rural area (less than 2,000)	21.6%	26.5%	23.4%	24.2%
	Valid N	696	417	412	1561
Significance:		$\chi^2 (8) = 61.99^*$		Cramer's V = .14*	

Table 9.10 Urban vs Rural Upbringing

		Flyway substrata			Flyway
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Where you grew up	Large Urban area (500,000 or more)	8.2%	11.1%	10.8%	10.0%
	Medium Urban area (50,000 to 499,999)	18.8%	14.2%	12.4%	15.4%
	Small city (10,000 to 49,999)	22.4%	16.9%	22.3%	19.9%
	Small town (2,000 to 9,999)	26.6%	29.5%	31.8%	29.0%
	Rural area (less than 2,000)	24.1%	28.5%	22.7%	25.7%
	Valid N	683	405	401	1524
Significance:		$\chi^2 (8) = 20.15^*$		Cramer's V = .08*	

Section 10. Non-response Survey Summary

We developed a shortened, mail-out survey to assess differences between those who completed the NWHS online and those who did not (Appendix B). We mailed the non-response survey to 3,991 individuals in the Atlantic Flyway (Upper Atlantic = 1324, Middle Atlantic = 1334, Lower Atlantic = 1333) who did complete a survey online. A total of 432 (10.8%) returned a survey in the mail by May 31, 2017 (Upper Atlantic = 166, Middle Atlantic = 153, Lower Atlantic = 113).

Non-respondents in the Mississippi Flyway reported that they were slightly younger on average (21.4) when they began waterfowl hunting than web survey respondents (22.1). Compared to web survey respondents (10.8%), a larger percentage of non-respondents indicated that they do not hunt either ducks or geese (21.8%). However, there were no substantive difference in the number of years in the past 5 or the number of days non-respondents and respondents reported waterfowl hunting each year.

Similar percentages of non-respondents and respondents shared the circumstances under which they hunted and whether they took single or multiple-day hunting trips, and a majority of respondents and non-respondents reported hunting on public lands or waters. Non-respondents and respondents rated the importance of different species very similarly, with over 60% reporting mallards as very or extremely important to them.

Although, less than 10% of hunters who responded to the web survey indicated that would need to harvest 5 or more ducks a day to feel satisfied, about 17% of non-respondents reported they needed to harvest 5 or more ducks to feel satisfied. However, respondents and non-respondents reported similar levels of acceptability of daily bag limits season lengths.

Slightly larger percentages of non-respondents perceived crowding, hunting pressure, interference from other hunters, conflict with other hunters and lack of public place to hunt to be severe or very severe problems. However, non-respondents and respondents reported very similar ratings of satisfaction with different characteristics of their hunting experiences and similar rating of priority for duck hunting regulations.

Non-respondents had similar mean scores as respondents on items measuring the centrality of waterfowl hunting to their personal lives. The gender, age, and ethnicity of respondents and non-respondents also were very similar, but non-respondents had slightly lower average education and income levels and tended to be more rural.

Table 10.1 Age at first waterfowl hunt and general pursuits

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How old were you when you started waterfowl hunting	Mean	19.5	21.9	21.4	21.2
	Median	16.0	16.0	16.0	16.0
	SD	10.58	12.71	11.79	10.30
	Valid N	69	126	146	342
	I hunt only ducks	25.2%	8.6%	10.3%	14.8%
Pursuits in waterfowl hunting	I hunt ducks and geese	35.1%	68.2%	72.1%	58.5%
	I hunt only geese	0.0%	9.3%	5.5%	4.9%
	I hunt neither ducks nor geese	39.6%	13.9%	12.1%	21.8%
	Valid N	111	151	165	427
Pursuits significance:		$\chi^2 (6) = 71.58^{***}$		Cramer's V = .29***	

Table 10.2 Years hunted waterfowl of previous 5

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
How many years of the last 5 years have you hunted waterfowl?	None	13.2%	2.4%	3.4%	5.4%
	1 Year	4.4%	3.2%	4.1%	3.9%
	2 Years	10.3%	10.3%	8.3%	9.7%
	3 Years	2.9%	18.3%	11.0%	11.5%
	4 Years	8.8%	8.7%	9.0%	9.1%
	5 Years	60.3%	57.1%	64.1%	60.4%
Valid N		68	126	145	339
Significance:		$\chi^2 (10) = 21.57^*$		Cramer's V= .18*	

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Table 10.3 Average number of days per year hunting waterfowl

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Over the last five years, about how many days did you usually hunt waterfowl in a year?	5 days or less	29.3%	27.3%	26.4%	27.5%
	6 to 10 days	29.3%	39.1%	30.0%	33.2%
	11 to 20 days	25.9%	20.3%	20.0%	21.5%
	21 to 30 days	12.1%	7.0%	14.3%	10.8%
	More than 30 days	3.4%	6.3%	9.3%	7.0%
Valid N		58	128	140	326
Significance:		$\chi^2 (8) = 8.29$		Cramer's V= .11	

Table 10.4 Circumstances for hunting trip

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Under what circumstances do you typically go hunting?	When I plan the hunt myself	16.9%	15.7%	24.1%	18.9%
	When someone else invites me	20.3%	18.9%	10.6%	16.1%
	Both when I plan the hunt or someone else invites me	62.7%	65.4%	65.2%	65.0%
	Valid N	59	127	141	327
Significance:		$\chi^2 (4) = 6.65$		Cramer's V= .10	

Table 10.5 Hunting trips primarily day trips or overnight trips

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Do you primarily take day trips or overnight/multi-day trips when you waterfowl hunt?	Primarily day trips	67.8%	86.4%	87.1%	82.4%
	Primarily overnight or multi-day trips	16.9%	7.2%	4.3%	8.3%
	Both about equally	15.3%	6.4%	8.6%	9.3%
	Valid N	59	125	139	323
Significance:		$\chi^2 (4) = 14.23^{**}$		Cramer's V= .15**	

Table 10.6 Public vs private lands waterfowl hunting

Please indicate where you do most of your waterfowl hunting:	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Public lands or waters	41.8%	32.2%	52.7%	42.5%
Private property owned by you, your family or in partnership with someone else	14.5%	20.0%	8.5%	14.4%
Private property owned by a friend or another landowner who give you permission to hunt for free	38.2%	34.8%	33.3%	34.9%
Private property you lease or pay to hunt on	5.5%	13.0%	5.4%	8.2%
Valid N	55	115	129	299
Significance:	$\chi^2 (8) = 16.88^{**}$		Cramer's V = .17**	

Table 10.7 Minimum number of ducks harvested per day to feel satisfied

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Minimum number of ducks you have to harvest in a day to feel satisfied?	0	12.1%	23.0%	19.0%	18.6%
	1	6.9%	9.8%	14.6%	10.8%
	2	29.3%	27.0%	18.2%	24.2%
	3	13.8%	15.6%	16.8%	15.7%
	4	13.8%	9.0%	16.8%	13.4%
	5	10.3%	5.7%	8.0%	7.8%
	6	12.1%	8.2%	3.6%	7.2%
	7	0.0%	0.8%	1.5%	1.0%
	>7	1.7%	0.8%	1.5%	1.3%
Valid N		58	122	137	317
Significance:		$\chi^2 (16) = 18.29$		Cramer's V = .17	

Table 10.8. Smallest acceptable daily bag limit of ducks

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
What is the smallest daily bag limit you would accept before you would no longer hunt?	1 duck	3.3%	9.1%	10.4%	7.9%
	2 ducks	6.7%	22.3%	13.3%	15.1%
	3 ducks	13.3%	9.1%	11.9%	11.1%
	4 ducks	13.3%	14.0%	13.3%	13.8%
	5 ducks	8.3%	3.3%	5.2%	5.2%
	6 ducks	11.7%	3.3%	6.7%	6.6%
	I'll hunt with any size daily bag limit	43.3%	38.8%	39.3%	40.3%
	Valid N	60	121	135	316
Significance:		$\chi^2 (12) = 17.04$		Cramer's V = .16	

Table 10.9 Minimum acceptable number of days for duck hunting

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
What is the minimum number of days in a waterfowl hunting season you would accept before you would no longer hunt?	10 days	3.5%	7.0%	3.7%	5.0%
	15 days	1.8%	0.9%	5.2%	2.7%
	20 days	7.0%	7.0%	7.4%	7.0%
	25 days	7.0%	3.5%	2.2%	3.7%
	30 days	12.3%	7.8%	12.6%	11.1%
	35 days	3.5%	1.7%	1.5%	2.0%
	40 days	0.0%	4.3%	4.4%	3.0%
	45 days	3.5%	5.2%	3.7%	4.4%
	50 days	5.3%	3.5%	2.2%	3.4%
	55 days	1.8%	0.9%	0.0%	1.0%
	60 days	5.3%	4.3%	7.4%	5.7%
	I'll hunt with any season length	49.1%	53.9%	49.6%	51.0%
	Valid N	57	115	135	307
Significance:		χ^2 (22)= 18.28		Cramer's V= .17	

Table 10.10 Importance of hunting species in Atlantic

	Upper Atlantic			Flyway substrata Middle Atlantic			Lower Atlantic			Flyway ID Atlantic		
	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD
Diving ducks	2.28	127	1.357	2.38	118	1.317	2.93	58	1.273	2.44	303	1.344
Mallards	3.84	137	1.224	3.60	120	1.180	3.83	59	1.139	3.75	315	1.194
Pintails	2.53	125	1.397	2.62	117	1.314	3.25	58	1.260	2.70	299	1.362
Other dabbling ducks	3.65	130	1.264	3.34	120	1.292	3.87	59	1.179	3.57	309	1.271
Geese	3.74	139	1.244	3.78	127	1.199	2.53	60	1.194	3.54	325	1.305

Scale from 1=Not at all important to 5=Extremely important

Table 10.10a Importance of hunting species in Atlantic Flyway (response distribution)

Item	Response					Valid N
	Not at all important	Slightly important	Moderately Important	Very important	Extremely important	
Diving ducks	32.9%	20.3%	22.7%	13.9%	10.2%	303
Mallards	7.5%	7.5%	19.5%	34.2%	31.3%	315
Pintails	26.0%	17.8%	24.7%	18.8%	12.7%	299
Other dabbling ducks	10.0%	9.6%	20.9%	30.9%	28.6%	309
Geese	12.3%	10.8%	22.5%	27.2%	27.2%	325

Table 10.11 Perceptions of problems with crowding, hunting pressure, interference, and conflict

	Upper Atlantic			Flyway substrata Middle Atlantic			Lower Atlantic			Flyway ID Atlantic		
	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD
Crowding at hunting areas	2.42	134	1.258	2.49	114	1.410	3.08	55	1.341	2.57	302	1.350
Hunting pressure	2.55	134	1.308	2.64	118	1.341	3.09	56	1.275	2.68	307	1.325
Interference from other hunters	2.32	132	1.202	2.27	119	1.303	2.64	57	1.295	2.36	308	1.262
Conflict with other hunters in places I hunt	2.03	134	1.228	1.90	120	1.126	2.01	58	1.160	1.98	312	1.175
Lack of public places for waterfowl hunting	2.99	132	1.493	2.93	111	1.481	3.30	55	1.354	3.03	298	1.466

Scale from 1=Not at all a problem, 2 = Slight problem, 3 = Moderate Problem, 4 = Severe Problem, 5=Very severe problem

Table 10.11a Perceptions of problems with crowding, hunting pressure, interference and conflict (Flyway Level)

Item	Response					Valid N
	Not at all	Slight Problem	Moderate Problem	Severe Problem	Very Severe Problem	
Crowding at hunting areas	30.5%	16.1%	28.1%	13.4%	12.0%	302
Hunting pressure	25.2%	18.5%	29.2%	14.4%	12.8%	307
Interference from other hunters	31.1%	28.1%	22.7%	8.7%	9.4%	308
Conflict with other hunters in places I hunt	46.4%	26.8%	16.6%	3.6%	6.6%	312
Lack of public places for waterfowl hunting	22.2%	14.9%	21.5%	18.8%	22.6%	298

Table 10.12 Satisfaction with hunting in most hunted state

	Upper Atlantic			Flyway substrata Middle Atlantic			Lower Atlantic			Flyway ID Atlantic		
	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD
The number of ducks you see during the season	3.07	137	1.205	2.91	122	1.113	2.72	60	1.381	2.94	318	1.209
The number of ducks you harvest during the season	2.97	133	1.219	2.77	117	1.086	2.71	60	1.301	2.84	310	1.188
The number of days in the duck season	3.01	131	1.256	2.98	117	1.016	3.43	57	1.121	3.08	306	1.152
The number of ducks in the daily limit	3.57	129	1.111	3.39	117	1.001	3.63	59	1.107	3.51	305	1.070
Your overall hunting experience	3.78	133	1.098	3.60	116	1.085	3.50	58	1.076	3.66	307	1.091
The number of ducks typically present during the hunting season	2.85	132	1.175	2.73	119	1.111	2.90	58	1.142	2.81	309	1.143
Quality of the habitat where you hunt	3.42	133	1.128	3.31	119	1.146	3.58	60	1.057	3.41	312	1.123

Scale from 1=Very dissatisfied to 5=Very satisfied

Table 10.12a Satisfaction with hunting response distribution (Flyway level)

Item	Response					Valid N
	Very dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Very satisfied	
The number of ducks you see during the season	14.6%	25.6%	22.0%	28.8%	9.1%	318
The number of ducks you harvest during the season	14.6%	27.6%	27.2%	20.9%	9.6%	310
The number of days in the duck season	10.1%	19.1%	33.9%	24.8%	12.1%	306
The number of ducks in the daily limit	4.4%	9.1%	38.5%	25.7%	22.3%	305
The number of ducks typically present during the hunting season	12.0%	32.7%	23.3%	25.3%	6.7%	307
Quality of the habitat where you hunt	4.3%	18.8%	26.6%	31.9%	18.4%	309
Your overall duck hunting experience	4.0%	13.1%	20.1%	39.9%	22.8%	312

Table 10.13 Preferred agency priorities for duck hunting regulations

	Upper Atlantic			Flyway substrata Middle Atlantic			Lower Atlantic			Flyway ID Atlantic		
	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD	Mean	Valid N	SD
Having the largest bag limits possible	2.64	138	.959	2.64	119	1.007	2.87	58	.915	2.68	314	.971
Having the longest seasons possible	3.45	136	.942	3.22	120	1.052	3.39	60	1.041	3.35	316	1.006
Avoiding different season lengths for different duck species	3.46	135	.965	3.38	117	1.089	3.19	60	1.148	3.38	311	1.050
Reducing the number of species-specific bag limits	2.90	137	.967	2.98	118	1.064	3.02	60	.912	2.96	314	.993
Having the largest drake mallard bag limits possible	3.03	138	.977	2.96	120	.983	3.07	60	.986	3.01	317	.979
Scale from 1=very low, 2 = low, 3 = moderate, 4 = high, 5=very high priority												

Table 10.13a Preferred agency priorities for duck hunting regulations response distribution (Flyway level)

Item	Response					Valid N
	Very low	Low	Moderate	High	Very high	
Having the largest bag limits possible	12.1%	25.5%	46.4%	11.8%	4.2%	314
Having the longest seasons possible	5.2%	11.1%	39.7%	31.3%	12.7%	316
Avoiding different season lengths for different duck species	5.0%	12.3%	40.7%	25.2%	16.9%	311
Reducing the number of species-specific bag limits	7.8%	19.6%	48.4%	16.7%	7.5%	314
Having the largest drake mallard bag limits possible	7.2%	17.6%	48.9%	18.9%	7.5%	317

Table 10.14 Centrality of waterfowl hunting

	Upper Atlantic			Flyway substrata Middle Atlantic			Lower Atlantic			Flyway ID Atlantic		
	Mean	Valid N	SD	Mean	Valid N	SD	Mean	SD	Valid N	Mean	Valid N	SD
Waterfowl hunting is one of the most enjoyable activities I do	4.04	139	.969	4.02	127	.887	4.10	60	.936	4.04	325	.929
Most of my friends are in some way connected with waterfowl hunting	3.11	138	1.12 8	3.47	127	1.04 8	3.55	60	.955	3.33	324	1.08 1
Waterfowl hunting has a central role in my life	3.11	137	1.14 6	3.15	126	1.12 0	3.17	58	.907	3.14	321	1.09 3
A lot of my life is organized around waterfowl hunting	2.78	137	1.20 2	2.83	127	1.14 4	2.82	59	.902	2.80	322	1.12 7
If I couldn't go waterfowl hunting I am not sure what I would do instead	2.59	138	1.37 1	2.54	127	1.22 0	2.81	60	1.107	2.61	324	1.26 7

Scale from 1=Strongly disagree to 5=Strongly agree

Table 10.15 Nature Based Recreation

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Spending time in nature away from home	%	84.5%	83.3%	92.1%	86.6%
	Valid N	110	150	164	424
Viewing wildlife	%	70.9%	76.5%	82.0%	76.5%
	Valid N	110	150	164	424
Learning about nature	%	42.7%	42.3%	49.7%	44.8
	Valid N	110	150	164	424
Backyard/at home nature activities	%	90.1%	89.9%	93.3%	91.0%
	Valid N	110	150	164	424
Fishing	%	94.6%	88.0%	90.2%	91.0%
	Valid N	110	150	164	424
Hunting migratory birds other than waterfowl	%	62.7%	56.7%	40.7%	53.4%
	Valid N	110	150	164	424
Hunter other game birds	%	26.4%	47.3%	71.8%	48.7%
	Valid N	110	150	164	424
Hunting any other game animals	%	87.3%	87.2%	87.6%	87.4%
	Valid N	110	150	164	424

Table 10.16 Wild Bird Activities

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Watching birds at my home	%	70.6%	75.2%	81.7%	76.0%
	Valid N	109	149	164	422
Feeding birds at my home	%	68.2%	67.1%	66.9%	67.4%
	Valid N	109	149	164	422
Watching birds away from my home	%	50.0%	50.3%	57.8%	52.7%
	Valid N	109	149	164	422
Photographing or filming birds	%	15.5%	12.7%	24.4%	17.5%
	Valid N	109	149	164	422
Counting/monitoring birds	%	8.2%	10.1%	14.1%	10.9%
	Valid N	109	149	164	422
Keeping track of the birds you see on a list	%	1.8%	2.0%	8.1%	4.0%
	Valid N	109	149	164	422
Installing or maintaining next boxes for birds	%	44.0%	32.9%	40.2%	39.1%
	Valid N	109	149	164	422

Table 10.17 Gender

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Gender	Male	95.5%	99.3%	95.1%	96.7%
	Female	4.5%	0.7%	4.9%	3.3%
	Valid N	110	150	163	423
Significance:		$\chi^2(2) = 14.28^{**}$		Cramer's V= .17***	

Table 10.18 Age

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Mean		51.9	53.9	52.4	52.8
Median		54.0	57.0	55.0	56.0
SD		14.89	18.35	16.57	16.80
Valid N		110	150	162	422

Table 10.19 Education

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Level of education	Some high school or less	0.9%	3.4%	2.5%	2.1%
	High school diploma or GED	22.0%	33.8%	28.4%	28.0%
	Some college (no degree)	26.6%	24.3%	19.8%	23.8%
	Associate's degree (2 years)	19.3%	9.5%	13.0%	13.8%
	Bachelor's degree (4 years)	22.0%	14.2%	23.5%	20.0%
	Graduate or professional school	9.2%	14.9%	13.0%	12.4%
	Valid N	109	148	162	419
Significance:		$\chi^2(10) = 15.99$		Cramer's V= .14	

Table 10.20 Urban vs Rural Residence

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Where you live now	Large Urban area (500,000 or more)	8.3%	3.4%	4.3%	5.5%
	Medium Urban area (50,000 to 499,999)	23.1%	16.9%	10.5%	16.7%
	Small city (10,000 to 49,999)	16.7%	15.5%	16.7%	16.5%
	Small town (2,000 to 9,999)	22.2%	33.1%	52.5%	35.9%
	Rural area (less than 2,000)	29.6%	31.1%	16.0%	25.4%
	Valid N	108	148	162	418
Significance:		$\chi^2 (8) = 35.33^{***}$		Cramer's V = .21 ^{***}	

Table 10.21 Rural land ownership

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Do you own land in a rural area	Yes	57.8%	50.3%	62.2%	56.9%
	No	44.4%	41.6%	44.0%	43.1%
	Valid N	109	147	164	420
Own land Y/N significance:		$\chi^2 (2) = 4.49$		Cramer's V = .10	

Table 10.22 Income

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Personal income	Less than \$24,999	14.0%	13.5%	11.6%	13.4%
	\$25,000 to \$49,999	24.0%	19.5%	27.2%	23.6%
	\$50,000 to \$74,999	29.0%	24.1%	17.7%	23.6%
	\$75,000 to \$99,999	8.0%	10.5%	17.7%	12.0%
	\$100,000 to \$149,999	13.0%	13.5%	13.6%	13.4%
	\$150,000 to \$199,999	4.0%	9.8%	6.8%	6.8%
	\$200,000 to \$249,999	3.0%	3.8%	2.7%	3.1%
	\$250,000 to \$299,999	0.0%	1.5%	0.0%	0.5%
	\$300,000 or more	4.6%	3.8%	2.7%	3.7%
Valid N		100	133	147	380
Significance:		$\chi^2 (18) = 18.20$		Cramer's V=.16	

Table 10.23 Percent reporting race

		Flyway substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Race	American Indian/Native American	4.4%	1.3%	3.0%	2.8%
	Asian	0.0%	0.7%	1.2%	0.7%
	Black or African American	2.7%	2.0%	0.6%	1.6%
	Native Hawaiian or Pacific Islander	0.0%	0.7%	0.6%	0.5%
	White	93.8%	96.1%	97.0%	95.6%
	Valid N	113	153	166	432

Table 10.24 Ethnicity

		Flyway Substrata			Flyway ID
		Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
Hispanic or Latino	Yes	0.0%	0.0%	1.3%	0.5%
	No	100.0%	100.0%	98.7%	99.5%
	Valid N	106	145	158	409
Significance:		$\chi^2 (2) = 3.19$		Cramer's V=.09	

Table 10.25 Percent reporting reason for not completing survey online

	Flyway substrata			Flyway ID
	Lower Atlantic	Middle Atlantic	Upper Atlantic	Atlantic
I didn't receive the invitation in the mail	6.2%	5.2%	2.4%	4.6%
I don't have access to the internet	14.2%	19.0%	17.5%	16.7%
I have internet access, but couldn't open the website	11.5%	12.4%	12.7%	12.3%
I didn't have time to complete the study earlier	38.1%	38.6%	36.7%	37.7%
I don't like to answer questions online	24.8%	20.9%	32.5%	26.2%
I don't hunt ducks or geese	23.9%	5.2%	6.0%	11.8%
I didn't think the survey applied to me	15.0%	10.5%	6.6%	10.6%
Valid N	113	153	166	432

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Appendices

Appendix A. Survey Instrument

Please Refer to separate appendix document.

Appendix B. Non-response Survey

<IDNUM>

National Waterfowl Hunter Survey

1. Which of the following statements best describes your pursuits in waterfowl hunting? (Check only one)

- ☐ I hunt only ducks
☐ I hunt ducks and geese
☐ I hunt only geese
☐ I hunt neither ducks nor geese → **GO TO QUESTION 17**

2. How old were you when you started waterfowl hunting? _____ Age (write in number)

3. How many of the last 5 years have you hunted WATERFOWL? (Circle one number below or check the box for "0")

1 2 3 4 5 Years ☐ 0 (None) → **GO TO QUESTION 17**

4. Over the last five years, about how many days did you usually hunt WATERFOWL in a year? (Check only one)

- ☐ 5 days or less
☐ 6 to 10 days
☐ 11 to 20 days
☐ 21 to 30 days
☐ More than 30 days

5. Under what circumstances do you typically go hunting? (Check only one).

- ☐ When I plan the hunt myself
☐ When someone else invites me
☐ Both when I plan the hunt or someone else invites me

6. In which state/province have you hunted ducks most over the last 5 years? _____

7. How important is it to you to hunt the following: (Check one box for each)

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Diving ducks (scaup/bluebills, canvasback, redheads, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mallards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pintails	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other dabbling ducks (teal, wood ducks, gadwall, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Geese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Please indicate how much of a problem the following are in the state where you hunt ducks most. (Check one box for each)

	Not at all	Slight Problem	Moderate Problem	Severe Problem	Very Severe Problem	Don't Know
a. Crowding at hunting areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Hunting pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Interference from other hunters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Conflict with other hunters in places I hunt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Lack of public places for waterfowl hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. In the state where you hunt ducks most often, how satisfied or dissatisfied are you with: (Check one box for each)

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied
a. The number of ducks you see during the season	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Number of ducks you harvest during the season	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. The number of days in the duck season	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. The number of ducks in the daily limit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Your overall hunting experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. The number of ducks typically present during the hunting season	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Quality of habitat where you hunt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. What is the minimum number of ducks you have to harvest in a day to feel satisfied with the hunt? (Circle one number)

0 1 2 3 4 5 6 7 More than 7 DUCKS

11. What is the smallest daily bag limit you would accept before you would no longer hunt ducks? (Circle one or check the box)

1 2 3 4 5 6 DUCKS or ☐ I'll hunt with any size daily bag limit

12. What is the minimum number of days in a waterfowl hunting season you would accept before you would no longer hunt ducks? (Circle one below or check the box)

10 15 20 25 30 35 40 45 50 55 60 Days

or ☐ I'll hunt with any season length

13. Do you primarily take day trips or overnight/multi-day trips when you waterfowl hunt? (Check only one)

☐ Primarily day trips ☐ Primarily overnight or multi-day trips ☐ Both about equally

14. Please indicate where you do most of your waterfowl hunting? (Check only one).

- ☐ Public land or waters
- ☐ Private property owned by you, your family or in partnership with someone else
- ☐ Private property owned by a friend or another landowner who gives you permission to hunt for free
- ☐ Private property you lease or pay to hunt on

15. How much priority should state and federal agencies give the following when setting annual duck hunting regulations? (Please rate the priority of each by checking a box).

	Very Low	Low	Moderate	High	Very High
Having the largest bag limits possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having the longest seasons possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avoiding different season lengths for different duck species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintaining unique hunting traditions (e.g., diving duck hunting)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing the number of species-specific bag limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having as large of mallard drake bag limits as possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. We are interested in knowing how much waterfowl hunting means to you. Please indicate how much you disagree or agree with the following statements about your involvement in waterfowl hunting. (Check one for each)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a. Waterfowl hunting is one of the most enjoyable activities I do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Most of my friends are in some way connected with waterfowl hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Waterfowl hunting has a central role in my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. A lot of my life is organized around waterfowl hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. If I couldn't go waterfowl hunting I am not sure what I would do instead	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. A person can think of themselves in a variety of ways. On a scale of "1" to "7", where "1" is "not at all" and "7" is "completely", how much would you identify yourself as the following?

	Not at all			Moderately			Completely
Birdwatcher	1	2	3	4	5	6	7
Duck Hunter	1	2	3	4	5	6	7
Goose Hunter	1	2	3	4	5	6	7
Other hunter	1	2	3	4	5	6	7
Conservationist	1	2	3	4	5	6	7

18. In the last 12 months, have you participated in the following nature-based activities? *Please check Yes or No for each.*

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Spending time in nature away from home (e.g., picnicking, relaxing in nature, camping, hiking)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Viewing wildlife (e.g., wildlife watching, bird watching, bird feeding, wildlife photography)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Learning about nature (e.g., attending festivals or lectures, visiting a nature center)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Backyard/at-home nature activities (e.g., gardening, landscaping)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fishing
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hunting other migratory birds (doves, woodcock, rail, etc.)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hunting other game birds (grouse, pheasants)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hunting all other game animals (deer, elk, rabbit, etc.)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Watching birds at my home
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Feeding birds at my home
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Watching birds away from my home
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Photographing or filming birds
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Counting/monitoring birds (e.g. Christmas or Backyard Bird Count)
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Recording the birds you see on a list, online or on paper
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Installing or maintaining nest boxes for birds

About You To help us compare your responses to those of others, we have some questions about you. Please be assured that all of your answers will remain completely confidential.

19. In what year were you born? 19_____

20. Are you...? ☐ Male ☐ Female

21. What is the highest level of education you have completed? (*Check one*).

- | | |
|---|--|
| <input type="checkbox"/> Some high school or less | <input type="checkbox"/> Associate's degree (2 years) |
| <input type="checkbox"/> High school diploma or GED | <input type="checkbox"/> Bachelor's degree (4 years) |
| <input type="checkbox"/> Some college (no degree) | <input type="checkbox"/> Graduate or professional school |

22. Do you own land in a rural area (outside of an urban or suburban area)?

- ☐ No ☐ Yes → If YES how many acres do you own in total _____ ACRES

23. Which of these categories best describes the place where you live now? (*Check one*)

- ☐ Large urban area (population of 500,000 or more)
- ☐ Medium urban area (population between 50,000 and 499,999)
- ☐ Small city (population between 10,000 and 49,999)
- ☐ Small town (population between 2,000 and 9,999)
- ☐ Rural area (population less than 2,000)

24. Please indicate which of the following categories applies to your personal income for the last 12 months? (*Check one*).

- | | | |
|---|--|--|
| <input type="checkbox"/> Less than \$24,999 | <input type="checkbox"/> \$75,000-\$99,999 | <input type="checkbox"/> \$200,000-\$249,999 |
| <input type="checkbox"/> \$25,000-\$49,999 | <input type="checkbox"/> \$100,000-\$149,999 | <input type="checkbox"/> \$250,000-\$299,999 |
| <input type="checkbox"/> \$50,000-\$74,999 | <input type="checkbox"/> \$150,000-\$199,999 | <input type="checkbox"/> \$300,000 or more |

25. What ethnicity do you consider yourself? (*Check one*).

- ☐ Hispanic or Latino
- ☐ Not Hispanic or Latino

26. From what racial origin(s) do you consider yourself? (*Please check all that apply*).

- ☐ American Indian or Alaskan Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White

27. Please let us know why you chose not to complete the survey online earlier? (*Check all that apply*)

- | | |
|--|--|
| <input type="checkbox"/> I didn't receive the invitation in the mail | <input type="checkbox"/> I don't like to answer questions online |
| <input type="checkbox"/> I don't have access to the internet | <input type="checkbox"/> I don't hunt ducks or geese |
| <input type="checkbox"/> I have internet access, but couldn't open the website | <input type="checkbox"/> I didn't think the survey applied to me |
| <input type="checkbox"/> I didn't have time to complete the study earlier | |

Appendix C. Contact Letters

November , 2016

<FirstName> <LastName>
<Address>
<City> <State> <Zip>

Dear <Name>,

We are contacting you to participate in a national study about waterfowl hunting and management. We are working in close collaboration with the <Agency> to complete this study. We are coordinating the study at the University of Minnesota for your state and the National Flyway Council (NFC). We are contacting you because you purchased a license to hunt migratory waterfowl in <Homestate>, and we believe you have a very important point-of-view to share about waterfowl hunting and management.

To simplify the survey process, the survey is designed to be completed online. To complete the survey, please go to the secure website: **<https://duckhuntersurvey.org/login.html>**

Because it is a secure website, you will need to enter the survey website address in your web browser (Internet Explorer, Mozilla Firefox, Safari, Chrome). Typically you will enter this address in the web address bar located in the upper left corner of your web browser screen. You CANNOT get to the survey website by searching for it on a search engine such as Google or Yahoo.

To start the survey, enter the following **Access Code: «Password»**

It is important to note that your survey code is unique and cannot be used more than once. If you have trouble getting to the web address please e-mail us at: **umn.duckhunter@gmail.com** and we will forward a link to the survey website.

The survey will take about 20 minutes to complete and we greatly appreciate your time and effort. Your participation and responses are very important because they will help guide waterfowl management into the future. Participation in this study is voluntary. If you decide to participate, you are free to not answer any question on the survey. We will treat your involvement in this study with confidentiality, and the records of this study will be kept private and secure.

Please contact us if you have any questions after reading this letter. Please e-mail us at **umn.duckhunter@gmail.com** or call **612-625-3718** if you have any questions. Thank you very much for helping us with this important study!

Regards,

State Logos in Text Box Here

December, 2016

<FirstName> <LastName>
<Address>
<City> <State> <Zip>

2nd ltr

Dear <Name>,

We contacted you about 10 days ago to participate in a national study of waterfowl hunters. We are working in close collaboration with the <Agency> to complete this study and contacting you because you purchased a license to hunt migratory waterfowl in <Homestate>. We believe you have a very important point-of-view to share about waterfowl hunting and management. If you have not already completed the survey, we ask that you do so now.

To simplify the survey process, the survey is designed to be completed online. To complete the survey, please go to the secure website: **<https://duckhuntersurvey.org/login.html>**

Because it is a secure website, you will need to enter the survey website address in your web browser (Internet Explorer, Mozilla Firefox, Safari, Chrome). Typically you will enter this address in the web address bar located in the upper left corner of your web browser screen. You CANNOT get to the survey website by searching for it on a search engine such as Google or Yahoo.

To start the survey, enter the following **Access Code: «Password»**

It is important to note that your survey code is unique and cannot be used more than once. If you have trouble getting to the web address please e-mail us at: **umn.duckhunter@gmail.com** and we will forward a link to the survey website.

The survey will take about 20 minutes to complete and we greatly appreciate your time and effort. Your participation and responses are very important because they will help guide waterfowl management into the future. Participation in this study is voluntary. We will treat your involvement in this study with confidentiality, and the records of this study will be kept private and secure.

Please contact us if you have any questions after reading this letter. Please e-mail us at **umn.duckhunter@gmail.com** or call **612-625-3718** if you have any questions. Thank you very much for helping us with this important study!

Regards,

Insert State Logos in Text Box
Here

January, 2017

<FirstName> <LastName>
<Address>
<City> <State> <Zip>

3RD ltr

Dear <Name>,

About one month ago, we sent you a request to participate in a web-based nationwide study of waterfowl hunters. To the best of our knowledge we have not yet received a response from you. We are working in close collaboration with the <Agency> to complete this study. If you have not already completed the survey, we ask that you do so now.

The survey is designed to be completed online, and you can use a computer, tablet or smartphone. The following address should take you to a secure website:

<https://duckhuntersurvey.org/login.html>

Because it is a secure website, you will need to enter the survey website address in your web browser (Internet Explorer, Mozilla Firefox, Safari, Chrome). Typically you will enter this address in the web address bar located in the upper left corner of your web browser screen. You CANNOT get to the survey website by searching for it on a search engine such as Google or Yahoo.

To start the survey, enter the following **Access Code: «Password»**

It is important to note that your survey code is unique and cannot be used more than once. If you have trouble getting to the web address please e-mail us at: **umn.duckhunter@gmail.com** and we will forward a link to the survey website.

The survey will take about 20 minutes to complete and we greatly appreciate your time and effort. Your participation and responses are very important because they will help guide waterfowl management into the future. Participation in this study is voluntary. We will treat your involvement in this study with confidentiality, and the records of this study will be kept private and secure.

Please contact us if you have any questions after reading this letter. Please e-mail us at **umn.duckhunter@gmail.com** or call **612-625-3718** if you have any questions. Thank you very much for helping us with this important study!

Regards,

February 10, 2017

<FirstName> <LastName>
<Address>
<City> <State> <Zip>

Dear <Name>,

During the past couple of months, we contacted you to participate in a web-based nationwide study of waterfowl hunters. We are working in close collaboration with the **<Agency>** to complete this study. To the best of our knowledge we have not yet received a response from you. If you have not already completed the survey online, we ask that you do so now if at all possible.

We really want to include you in the online study if possible and are interested in your responses even if you have not hunted in a few years.

The survey is designed to be completed online, and you can use a computer, tablet or smartphone. The following address **<https://duckhuntersurvey.org/login.html>** will take you to the website.

To start the survey, enter the following **Access Code: <PASSWORD>**

You will need to enter the survey website address in your web browser (Internet Explorer, Mozilla Firefox, Safari, Chrome). Typically you will enter this address in the web address bar located in the upper left corner of your web browser screen. You CANNOT get to the survey website by searching for it on a search engine such as Google or Yahoo.

If you have trouble getting to the web address please e-mail us at: umnwild1@umn.edu and we will forward a link to the survey website.

The survey will take about 20 minutes to complete and we greatly appreciate your time and effort. Thank you so much for helping us with this important study!

Regards,

PS: If you cannot get access to the internet, we will be following up with a short mail survey in about 1 month.

March 31, 2017

<FirstName> <LastName>
<Address>
<City> <State> <Zip>

<idcode>

Dear <FirstName>,

During the past winter, we contacted you to participate in a web-based nationwide study of waterfowl hunters. We are working in close collaboration with the **<Agency>** to complete this study.

To the best of our knowledge you did not complete the survey online. We really want to include you in the study if possible. We have enclosed a shortened copy of the survey that you can complete and mail back to us in the enclosed postage paid envelope. We are interested in your responses regardless of how much you waterfowl hunt or even if you have not hunted in a few years.

The findings from this study will be used to help plan and manage for waterfowl across North America. Hearing from hunters like you is important to helping improve hunter experiences in the future.

The survey will take about 10 minutes to complete and we greatly appreciate your time and effort. The study is voluntary and all your responses will be kept confidential.

Thank you so much for helping us with this important study!

Regards,

A handwritten signature in cursive script, appearing to read 'Sue Schroeder'.

Sue Schroeder, Research Associate

Appendix D. Institutional Review Board Determination

DETERMINATION OF HUMAN SUBJECT RESEARCH

Version 1.2

Updated June 2014, check <http://www.irb.umn.edu> for the latest version

Route this form to:

See instructions below.

U Wide Form:

UM 1571

June 2014

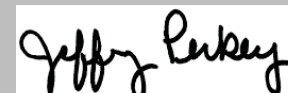
This form is used to help researchers determine if a project requires IRB review. It also provided documentation that the IRB has reviewed the project description and issued a determination.

Additional information that may assist you in determining whether or not to submit an application can be found on the IRB website. See [Does My Research Need IRB Review?](#) and Guidance and FAQs [IRB Review of Exempt Research](#).

Please allow up to five (5) business days for review and response.

Email completed form to irb@umn.edu

Based on the information provided, this project does not meet the regulatory definition of human subjects research. Additional IRB review is NOT required.


Project Title

Provide the grant title below if the project is funded.

Assessing the preferences of stakeholders and waterfowl management professionals to inform the implementation of the North American Waterfowl Management Plan

Section 1 Contact Information

Name (last name, First name MI)

Fulton, David C.

Highest Earned Degree:

PhD

Preferred contact information: dcfulton@umn.edu

Preferred email at which you may be contacted by IRB staff.

Affiliation and contact information

☒ University of Minnesota



Fairview



Gillette

U of M Required Contact information

U of M Internet ID (x.500):

dcfulton

University Department:

FWCB

Section 2 Summary of Activities

2.1 Provide a brief description of your project. Include a description of what any participants will be asked to do and a description of the data accessed and/or collected (1,000 character limit).

Individuals will be asked to complete an online survey focused on waterfowl hunting regulations, conditions that influence the choice of waterfowl hunting or bird viewing recreational trips, importance of hunting and viewing, beliefs about wetland conservation, and some demographics including income within broad categories. We are targeting 10,000 completed surveys nationwide. The data will be aggregated at the regional and national levels and market analysis will be conducted to better understand the preferences for hunting and viewing experiences among different segments of the study population. This information will be used to help set objectives for national level management plans of waterfowl, wetlands, and other bird species related to wetlands.

2.2 Are all of the data used in this project publicly available, e.g. blog, aggregate data, etc.?

Yes ☒ No

Section 3 Is this Project Human Subjects Research as Defined by Federal Regulations?

Research is defined in the [Code of Federal Regulations, 45CFR46.102\(d\)](#), as *a systematic investigation designed to develop or contribute to generalizable knowledge*

The Belmont report states "...the term 'research' designates an activity designed to test a hypothesis or answer a research question(s) [and] permit conclusions to be drawn... Research is usually described in a formal protocol that sets forth an objective and a set of procedures to reach that objective."

Research generally does **not** include operational activities such as routine outbreak investigations and disease monitoring and studies for internal management purposes such as program evaluation, quality assurance, quality improvement, fiscal or program audits, marketing studies or contracted-for services.

Generalizable knowledge is information where the intended use of the research findings can be applied to populations or situations beyond that studied. Note that publishing the results of a project does not automatically meet the definition of generalizable knowledge.

3.1 Do you have a specific research question or hypothesis?

☒ Yes No

3.2 Is your primary intent to generate knowledge that can be applied broadly to the group/condition under study?

☒ Yes No

Human subject is defined in the Code of Federal Regulations, 45CFR46.102(f)(1or2), as a living individual *about whom* an investigator obtains data through intervention or interaction or identifiable private information.

The specimen(s)/data/information must be collected from or be **about** live subjects. Research on cadavers, autopsy specimens or specimens/information from subjects now deceased is not human subjects research.

3.3 Does this project involve intervention or interaction with a living individual or group of individuals? (e.g. confidential surveys, interviews, medical or educational testing)

☒ Yes No

3.4 Does this project involve access to identifiable private data or specimens from living individuals?

Yes ☒ No

3.5 Does this project consist exclusively of interviewing or surveying subjects about his/her area of expertise, with a focus on policies, practices, and/or procedures (e.g. the collected data does not focus on personal opinion or private information)?

☒ Yes No

3.6 Is the project meant to record the stories, knowledge or experiences of individuals? Oral histories typically do not intend to answer a research question or hypothesis.

☐ Yes ☒ No

If a protocol exists for this project it must be submitted for review. Submit this request along with any supplemental documents that may aid in review of your project to the University of Minnesota IRB at irb@umn.edu.