# EXECUTIVE SUMMARY

# Utah Waterfowl Hunting:
## 2011 Hunter Survey
## Hunter Attitudes and Economic Benefits

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**by:**

**John Duffield, Chris Neher, and David Patterson**
**Bioeconomics, Inc.**
**Missoula, MT 59812**

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# Executive Summary

## Introduction and Objectives

The Great Salt Lake (GSL), located in north-central Utah, is the largest terminal lake in North American and the namesake for Utah's largest city. It is also an important natural resource. Its wetlands and open waters are a bird and wildlife resource of hemispheric importance, and support significant fractions of the continent's total populations of a number of shorebird species. The lake is also one of the most important waterfowl breeding area remaining in the United States, with annual waterfowl use exceeding three million birds, which is about 30 percent of all waterfowl in the Pacific and Central Flyway.

Despite the hemispheric significance of this saline lake and the potentially imminent threats to the viability of ecosystem function and integrity, there has been little work to date on the value of the ecosystem services this resource provides.

The primary objective of this study was to conduct a direct use mail survey of Utah waterfowl hunters with a goal of collecting sufficient information to provide estimates of the socioeconomic importance of waterfowl hunting on and around the Great Salt Lake and the State of Utah to the economy of Utah and the Salt Lake region. A secondary objective was to gather information on GSL hunter opinions, perceptions and concerns relating to possible threats to the long term health and productivity of the GSL ecosystem. Existing data on the economics of waterfowl hunting in Utah is primarily derived from the USFWS National Survey of Fishing, Hunting and Wildlife Watching, which is conducted every five years (U.S. Fish and Wildlife Service, Division of Economics 2008). A limitation of the USFWS survey is that the results and associated estimates of economic impact are based on a very small number of survey responses from Utah Waterfowl Hunters (19 hunters in the 2006 survey). By comparison, this study utilizes survey responses from 556 Utah Waterfowl hunters and enthusiasts.

While the USFWS no longer tracks or records Federal Duck Stamp sales by state, data from the most recent year this information was published (2004), combined with estimates by USFWS of the average ratios of active waterfowl hunters in Utah to Duck Stamp sales suggest an estimated 33,000 Duck Stamps were sold in Utah in 2009.[1] Only a portion of those purchasing stamps are active hunters, and the USFWS estimates that in 2009 there were 15,000 active duck and goose hunters in the state (Raftovitch, et al. 2010). A specific focus of this study is hunting in and around the Great Salt Lake. This area received during the 2010-11 season an estimated 64% of total statewide combined duck/goose hunting trips, and 50% of statewide goose-only trips.[2] A unique aspect of Great Salt Lake waterfowl hunting relates to the large number of private waterfowl hunting clubs located on and around the lake. While no comprehensive list of club memberships exists, based on information from individual clubs, club managers, and members, it is estimated that there are approximately 750 club members, a small percentage of whom may

[1] The influence of large national retailers, such as Walmart, who sell Federal duck stamps, and the large amount of effort necessary to assign national sales to individual states led the USFWS Federal Duck Stamp Office to stop tracking sales by state in 2004. (Pers. Comm. Laurie Shaffer, Federal Duck Stamp Office. July 19, 2011.)

[2] Pers. Comm. Justin Dolling, Utah Division of Wildlife Resources, Waterfowl and Large Game Coordinator. July, 18, 2011)

hold membership in more than one club. These clubs and their membership represent the longstanding tradition of hunting in the area as well as reflect the substantial investment in hunting equipment and related land improvements, both in habitat quality and in infrastructure.

A comprehensive economic evaluation of the contribution of waterfowl hunting needs to include two accounting frameworks. One is regional economics or economic significance, focused on identifying cash expenditures that drive income and job levels in the regional economy. The other is a net economic value framework that includes all potential benefits from a broader social (usually national) perspective. The latter necessarily includes nonmarket and indirect benefits, such as the benefits wildlife viewers and hunters derive from their recreational activity, over and above their actual expenditure. Both perspectives are important for policy discussions and generally both accounting frameworks are utilized in evaluating public decisions, for example through an EIS process or in informing public opinion. The current study provides estimates for the direct regional economic importance of waterfowl hunting in the GSL region, and the net economic value of these activities over and above the actual cost to the hunters.

## Data Collection

The 2011 Utah Waterfowl Hunter Survey was designed as an end-of-season survey targeting individuals most likely to have hunted waterfowl in Utah in general and in the Great Salt Lake vicinity in particular. This survey had two distinct target populations: 1) individuals identified through membership lists of organizations tied to use or advocacy of the Great Salt Lake ecosystem, or waterfowl preservation and habitat protection (Public Sample), and 2) individuals identified as belonging to one of a number of private duck hunting clubs located on The Great Salt Lake (Duck Club Sample). The survey utilized a standard survey research procedure of repeated contacts in order to increase the final response rate (Dillman 2000).

Table ES-1 outlines the details of the survey administration for the pretest, as well as for the public and the duck club samples. Since the duck club sample consisted of verified members of the clubs, there were no undeliverable surveys in this group. The overall response rate for the survey was 61.5%, with a Public Sample response of 64.6%. This rate is well within the range of response rates for similar surveys of recreational participants, and compares favorably to the final mail participation rate for the extremely high profile and well financed 2010 U.S. Census of Population for the state of Utah of 75%. The response rate for the duck club sample (55%) was somewhat lower due to two clubs (Bear River and Ambassador) only receiving one survey mailing. These clubs were only contacted once since the first survey contact was delayed due to late annual meeting dates (Ambassador), and delays in finalizing the logistics of distributing the surveys (Bear River).

**Table ES-1. Survey Administration Statistics and Final Response Rates.**

| Sample | Initial Mailing | Undeliverable | Delivered | Returned | Response Rate |
|---|---|---|---|---|---|
| Pretest | 81[a] | 9 | 72 | 58 | 80.6% |
| Public Sample | 448 | 27 | 421 | 272 | 64.6% |
| Duck Club | 411 | 0 | 411 | 226 | 55.0% |
| **All** | **940** | **36** | **904** | **556** | **61.5%** |

[a] The initial pretest sample was 100. Nineteen of these were club members included in the Duck Club sample. Therefore, they are included in the club sample in this accounting.

## Data Consistency and Weighting

In order to check our samples for consistency with the greater Utah waterfowl hunter population we used data provided by the US Fish and Wildlife Service (Raftovitch, et al. 2010). This document reports for the State of Utah the seasonal average duck and goose harvest per hunter as well as the average duck hunting and goose hunting days afield for Utah hunters. The 2011 Utah Waterfowl Hunting Survey was designed to gather information on the number of waterfowl bagged during the season. The responses to these questions were compared to the reported USFWS statewide averages for Utah in the most recently reported year to detect any significant differences in avidity and harvest between our samples and the statewide hunter population.

A comparison of the distributions of our sample and that of the USFWS random statewide survey of Duck Stamp (HIP number) holders showed that our public sample includes a higher percentage of more avid duck hunters than does the statewide population. In order to correct for this avidity, weights were calculated based on five ranges of reported duck harvest for the year. These weights over-weighted the responses of hunters in our sample who reported bagging either no ducks or a low number, and underweighted those reporting bagging large numbers of ducks. Our weighted Public Sample is expected to be representative of Utah waterfowl hunters and has the approximate same average per hunter duck harvest as the USFWS sample.

## Key Results – Hunter Expenditures and Economic Significance

Utah waterfowl hunters were asked a number of questions regarding the amount they spent on their most recent hunting trip, and where they spent that money. Additionally, hunters were asked to list their total investment in equipment they specifically purchased for waterfowl hunting, and to also list what equipment purchases they have made for waterfowl hunting equipment in 2010 in the Salt Lake Area. Table ES2 shows the calculation of estimated total 2010 waterfowl hunter spending in the Salt Lake City Area and in the state. The estimates in Table ES2 utilize information from both the Public and the Private Duck Club survey expenditure questions. While Private Club hunters are estimated to comprise less than 2.5% of Utah Duck Stamp holders, this group hunts on average more days per year, and spends nearly three times the amount per day as do non-club hunters. For this reason, separate expenditure estimates were generated using the Public hunter sample with no club members included, and the Private Club sample. These estimates of hunter trip and equipment spending are combined to

estimate total waterfowl hunting trip expenditures in the SLC area, and in the state, as well as total 2010 hunting-related equipment spending in the SLC area.

Overall, it is estimated that Utah waterfowl hunters from the public sample spent an average of $180 per trip (day) on their 2010-11 hunting trips. This estimate is similar to other studies of waterfowl hunting expenditures. In 2001 (Grado, et al.) estimated the Mississippi waterfowl hunters in 1998-99 spent $144/day ($194 in 2011 dollars). (Lewis, Leitch and Meyer 1998) found that North Dakota waterfowl hunters spent $193/day ($270 2011 dollars), and (Adams, Leifester and Herron 1997) found that Texas waterfowl hunters spent $121/day ($166 in 2011 dollars). The estimated spending per day is substantially higher than that reported by (U.S. Fish and Wildlife Service, Division of Economics 2008). However, the USFWS estimates were based on data from a very small number of Utah hunters (19 hunters). Other researchers have also noted the differences between their own higher waterfowl hunting expenditure estimates and that of USFWS (Grado, et al. 2001). It is estimated that Private Club hunters spent an average of $563 per day for their 2010 waterfowl hunting trips.

The Utah Division of Wildlife Resources estimates that Duck and Goose hunters in the state hunted approximately 210,000 days during the 2010-11 waterfowl season.[3] Overall in 2010 it is estimated that waterfowl hunters spent $26.5 million in direct hunting trip expenditures and $35.4 million in other hunting equipment expenditures in the Salt Lake City Area. The estimated 2010 total is $61.9 million in waterfowl hunting-related spending in the year in the local SLC area.

In addition to the annual spending shown in the table, Utah hunters invest in equipment. These hunters report that the total estimated value of equipment they have purchased and own specifically for waterfowl hunting (all equipment not just that purchased in 2010) cost $157 million. These estimates do not include the very substantial market values of private duck club memberships, as well as all land and improvements owned by the clubs. These later numbers may also be conservative in that they include only the estimated 15,000 active Utah hunters estimated by USFWS for the year, and not all of those (~33,000) who bought duck stamps in 2010, but may not have actively hunted in that year.

[3] Pers. Comm. Justin Dolling, Utah Division of Wildlife Resources. July 18, 2011.

**Table ES2. Estimated Utah Waterfowl Hunter Expenditures, by Location (2010 estimates)**

| Spending Area | Expenditures per day per Hunter | | Estimated Expenditures | | Total Spending |
|---|---|---|---|---|---|
| | Public Sample | Club Members | Public Sample | Club Members | |
| **A) Trip Spending** | | | | | |
| Spending per day in the SLC Area | $104 | $402 | $20,295,000 | $6,231,000 | $26,526,000 |
| Spending per day in Utah outside the SLC Area | $75 | $162 | $14,636,000 | $2,507,000 | $17,143,000 |
| Total Spending | $180 | $563 | $34,931,000 | $8,738,000 | $43,669,000 |
| **B) Equipment Spending** | | | | | |
| 2010 Equipment purchases in SLC Area | $2,287 | $3,703 | $32,590,000 | 2,777,000 | $35,367,000 |
| **C) 2010 SLC Area Spending** | | | | | |
| ***Total Estimated 2010 Waterfowl Hunting-related Spending in the SLC Area*** | | | | | ***$61,893,000*** |
| **D) Total Investment in Waterfowl Hunting Equipment** | | | | | |
| Total Investment in Waterfowl Hunting Equipment | $8,925 | $40,275 | $127,181,000 | $30,206,000 | $157,387,000 |

[a] Total active hunter numbers for Utah are for 2009, the most current year for which estimates are available. Source: (Raftovitch, et al. 2010).

Table ES3 shows the estimated total local area economic contribution associated with the 2010 trip and equipment spending of $61.9 million on waterfowl hunting in the SLC area. These estimates are based on total estimated direct spending of $61.89 million and output, income, and employment multipliers for the state of Utah reported by (U.S. Fish and Wildlife Service, Division of Economics 2008). Overall, in 2010 it is estimated that spending related to waterfowl hunting in the SLC area accounted for over $97 million in total economic output, $37 million in personal income, and 1,600 full-time equivalent jobs.

**Table ES3. Estimated Economic Impact in the Salt Lake City Area of Waterfowl Hunting-related Expenditures, 2010**

| Total Estimated 2010 Waterfowl Hunting-related Spending in the SLC Area | Total Output[a] | Total Job Income | Total Full-time Equivalent Jobs |
|---|---|---|---|
| $61,893,000 | $97,100,000 | $36,800,000 | 1,600 |

[a] Output, Income, and Job multipliers are based on data presented for Utah in (U.S. Fish and Wildlife Service, Division of Economics 2008).

## Key Results – Hunter Net Economic Value (NEV)

The contingent valuation method (CVM) uses survey techniques to determine the values which people would place on traditionally nonmarket goods and services if markets did exist for these commodities. In this study, the value of a day spent waterfowl hunting in Utah is measured through the use of contingent valuation. This is the value, or benefit, that a hunter derives from hunting that is over and above what they must actually spend on their hunting trip.

The essence of the CVM approach is to ask individuals their willingness to pay (WTP) for a given service or commodity contingent on their acceptance of a hypothetical but plausible and realistic payment situation that could range from a vote in a referendum to a decision to make a donation. In the 2011 Utah Waterfowl Hunter Survey, respondents were asked the specific contingent valuation question of how they valued their most recent Utah waterfowl hunting trip.

A feature of all CVM applications is the method by which the resource value is elicited from respondents. There are several basic genres of CVM elicitation techniques including payment card CVM questions and dichotomous choice CVM questions (Champ, Boyle and Brown 2004). In the payment card CVM respondents are asked to identify the maximum amount they would be willing to pay for a good or resource from a list of amounts presented to them in the survey (Duffield and Patterson 1992). This study utilized the payment card CVM in the current trip valuation question.[4]

The waterfowl hunting trip contingent valuation question included in the Utah survey asked respondents their willingness to pay an additional amount in expenses to have made their trip to hunt waterfowl in Utah. The text of the CV question reads:

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The costs of going hunting change over time. For example, gas prices and other travel costs and equipment rise and fall. Was your recent waterfowl hunting trip **worth more to you than what you actually spent**?

□ Yes □ No

**If YES**, If your total trip costs were to increase, **what is the maximum extra amount** you would be willing to pay and still take this trip? (please choose one)

| | | |
|---|---|---|
| □ $10 | □ $250 | □ $1,500 |
| □ $ 25 | □ $500 | □ $2,000 |
| □ $50 | □ $750 | □ Other $_____ |
| □ $100 | □ $1,000 | |

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[4] The payment card question format was chosen as it generally results in a conservative estimate of WTP compared to the dichotomous choice CV format (Champ, Boyle and Brown 2004).

Table ES4 shows the estimated group willingness to pay estimates derived from use of the increased travel cost payment vehicle. The interval model of willingness to pay, which was estimated using the SAS LIFEREG procedure, resulted in a good model fit.

Table ES4 shows the median WTP to take the hunters' most recent trip for both the Public Sample and for the Private Duck Club Sample. It is important to note that almost all of the trips in our sample were day trips to hunt. Accordingly, these per–trip values are also per-day values. The median WTP, which is the amount at which 50% of individual's WTP are above and 50% below, for the Public Hunter Sample is estimated at about $76 per trip (day). For the Private Duck Club Member Sample the Median WTP is $131 per day. The median WTP is a conservative estimate of WTP as it is often less than the mean WTP because of the influence of a relatively low percentage of individuals who are willing to spend quite high amounts for their trips.

The estimated $76/day NEV for this study of Public Sample hunters is in the same range as other studies findings (adjusted to 2010 dollars). A study of Alberta waterfowl (Adamowicz, Phillips and Pattison 1986) estimates the mean NEV of a day of Alberta duck hunting (for U.S. residents) at $82/day (2010 dollars). In a study of Montana Waterfowl hunting (Duffield and Neher 1991) the authors estimated median WTP per day of waterfowl hunting (in 2010 dollars) at $61 for Montana residents and $72 for all Montana hunters. In 2005, a study for the U.S. Fish and Wildlife Service estimated NEV/day of waterfowl hunting in Minnesota at $42/day (again, 2010 dollars). Given the estimated 210,000 waterfowl hunting trips in Utah in 2010, the median WTP estimates for waterfowl hunting trips implies that total annual WTP is on the order of $16.8 million. This value is over and above the amount actually spent for hunting in the state. Utah Division of Wildlife resources estimated that in the 2010-11 waterfowl season, approximately 57% of statewide duck and goose hunting days occur in the vicinity of the Great Salt Lake.[5] Based on this allocation it is estimated that the total NEV to hunters associated with hunting waterfowl in the vicinity of the GSL during the 2010-11 season is approximately $9.5 million. This estimate is likely conservative in two respects. First, the measure of central tendency used is median WTP, which often is less than the estimated overall mean WTP. Secondly, the estimate assumes that Club Members spend the same proportion of their days hunting in the GSL area as do non-club members. Since club membership is specifically tied to the GSL, this likely understates that actual percentage of total Utah trips by this group taken to the GSL area.

It should also be noted, however, that the annual NEV estimate of $9.5 million only reflects the additional value hunters place on a specific use (waterfowl hunting) of this resource. Non-hunter values which are not represented in the estimate are potentially large, and are a subject for future research.

[5] Utah Division of Wildlife Resources estimates that 64% of duck and combined duck-goose days are in the GSL vicinity, and 50% of goose-only days are in the GSL vicinity. The weighted average for all duck and goose hunting in 2010-11 is 57% of total days.

**Table ES4. Estimated Net Willingness to Pay per Person for a Utah Waterfowl Hunting Trip: Public Hunter Sample and Private Duck Club Member Sample.**

| Statistic | Public Hunter Sample | Private Duck Club Member Sample | Total |
|---|---|---|---|
| Sample Size | 138 | 206 | 344 |
| Estimated Median WTP per | $75.76 | $130.90 | -- |
| Estimated Days Hunted 2010- | 194,500 | 15,500 | 210,000 |
| Total Estimated NEV-Utah Waterfowl Hunting 2010-11 | $14,735,000 | $2,029,000 | $16,764,000 |
| Total Estimated NEV-Great Salt Lake Area | $8,420,000 | $1,159,000 | $9,579,000 |

## Key Results – Hunter and Trip Characteristics and Opinions

A consistent result of the survey was that both the public hunter sample and the duck club member sample of Utah waterfowl hunters are engaged recreational populations with very high levels of participation and enthusiasm for their activity. The average public hunter had been hunting waterfowl for nearly 29 years and the average Duck Club member 38 years. Of those in the samples who reported hunting waterfowl in Utah in 2010-11, the average public hunter hunted waterfowl for 12.5 days while the average duck club member hunted 20.7 days. Further, nearly 80% or more of both groups stated that waterfowl hunting was either their favorite or one of their favorite outdoor recreational activities (Table ES5).

**Table ES5. Comparison of Duck Club Member and Public Hunter Sample, General Hunter Characteristics.**

| Hunter Characteristic | Statistic | |
|---|---|---|
| | Duck Club | Public Hunter |
| **(A) All Respondents** | | |
| Mean number of years waterfowl hunting | 37.6 years | 28.7 years |
| Percentage of sample hunting waterfowl in Utah in 2010-11 | 98.8% | 59.7% |
| **(B) Respondents who Hunted in 2010-11** | | |
| Average Number of Days Hunted in 2010-11 Season | 20.7 Days | 12.5 Days |
| Average number of Ducks Bagged in 2010-11 Season | 60.6 Ducks | 15.5 Ducks |
| Average number of Geese Bagged in 2010-11 Season | 5.6 Geese | 2.7 Geese |
| Percent saying Waterfowl Hunting is either their Favorite, or one of their Favorite Outdoor Recreation Activities | 87.8% | 79.5% |

The survey also asked hunters to rate the importance of a number of possible reasons for them choosing a particular location to hunt waterfowl. Table ES6 shows the percentage of respondents in each sample who rated each of the potential reasons either "important" or "very important" to them in choosing a waterfowl hunting site. The most important reasons for both sample groups were hunting in an uncongested location, hunting in a relatively natural setting, and seeing abundant waterfowl. The least important among the reasons presented were bagging limits of ducks and geese, and the area having good "jump" or "pass" shooting.

**Table ES6. Comparison of Duck Club Member and Public Hunter Sample, Responses to Reasons for Choosing an Area to Waterfowl Hunt.**

| **Reason for Choosing A Waterfowl Hunting Area** | **Percent responding that the Reason was either "Very Important" or "Important."** | |
|---|---|---|
| | **Duck Club Sample** | **Public Hunter Sample** |
| Bagging a limit of ducks | 64.8% | 49.7% |
| Bagging a limit of geese | 47.7% | 43.1% |
| Seeing abundant waterfowl | 98.8% | 94.6% |
| A relatively natural setting | 98.8% | 95.5% |
| Close to home | 73.3% | 71.4% |
| Hunting over decoys | 95.5% | 84.4% |
| Good pass shooting | 46.7% | 47.1% |
| Good jump shooting | 15.8% | 34.3% |
| Uncongested with good distance between parties | 98.0% | 98.2% |
| Available boat launch | 49.8% | 72.4% |
| Hunting with a dog | 77.1% | 58.7% |

Both Public Sample hunters and Duck Club Member Sample hunters were asked about their level of concern regarding a number of current or potential environmental conditions that have the potential to impact the quality of waterfowl hunting on The Great Salt Lake. Overall, there was a high level of concern regarding all the presented environmental conditions (Table ES7). The highest level of concern was associated with invasive phragmites vegetation (94.7% and 96.8% either concerned or very concerned), and reallocation of waterflows from wetlands to residential or industrial development (91.1% and 92.5% reporting concern).

**Table ES7. Comparison of Duck Club Member and Public Hunter Sample Reported Levels of Concern over Environmental Issues Potentially Affecting GSL Hunting**

| Issues Affecting Waterfowl Hunting | Percent of Sample Hunters Saying they were either "Concerned" or "Very Concerned" | |
|---|---|---|
| | Duck Club Sample | Public Hunter Sample |
| Water levels in the Great Salt Lake | 85.3% | 85.5% |
| Invasive phragmites vegetation | 94.7% | 96.8% |
| Absence of the native marsh vegetation that attracts and feeds waterfowl | 89.8% | 91.5% |
| Loss of waterfowl habitat due to expansion of the mineral salt industry | 82.5% | 86.2% |
| Reallocation of waterflows from wetlands to residential or industrial developments | 91.1% | 92.5% |
| Algae mats due to nutrients from sewage, farm, or city runoff | 78.4% | 83.3% |
| Risk associated with sewage-related toxins such as *e coli* or cyanobacteria (blue-green algae) | 70.2% | 74.7% |

## Key Results – Conjoint (Choice) Question Analysis

Many recreational activities, such as waterfowl hunting, are best characterized as multi-attribute. That is, decisions on whether or not to take a certain trip or engage in a specific activity at a certain time in a specific location may be influenced by many factors. The decision to hunt waterfowl may be influenced, for instance, by the expected success level of the hunt, the expected congestion to be encountered at the hunting location, the natural setting of the hunt, and, of course, the personal cost of the hunting trip. For members of the Duck Club sample, there is also a "sunk cost" factor in their choice of a hunting location in that they have a membership or hunting rights for a specific hunting location.

The results of the contingent valuation question and analysis reported above asks hunters to remember their most recent hunting trip and to assume that everything about that trip remained the same but only the cost of the trip increased. They are asked whether they would, in retrospect, have still taken that trip at that increased cost. This contingent valuation method using the payment card vehicle is an effective way to elicit willingness to pay for an overall trip experience.

An extension of this type of contingent valuation method is the choice (or conjoint) question format which recognizes that a number of trip attributes in addition to the cost of the trip may play a role in trip decisions. The specific design of the choice question, which asks respondents to choose between two hunting trips with different characteristics and costs, allows the researcher to estimate the marginal value of each specific attribute to the overall net economic value of a waterfowl hunting trip. This type of question formulation therefore moves beyond the question of what the net economic value of the entire trip is to the more refined and specific question of which attributes of a hunting trip either enhance its net economic value or detract

from that value for an individual. For example, this study investigates the marginal value of the number of ducks or geese bagged, crowding, presence of toxins and invasive plant species, and the availability of a boat launch. Figure ES1 shows a version of the choice question that was presented to Utah hunters.

**Which do you prefer—Trip A, Trip B, or "Not Hunt"?**

**Please check ONE box at the bottom of the table to indicate whether you prefer Trip A, Trip B, or Not Hunt. (**Note that some trip characteristics conditions may be the same for Trip A and Trip B.)

| **Trip Characteristic** | | **Trip A** | **Trip B** | **Not Hunt** |
|---|---|---|---|---|
| **Conditions during trip** | Ducks Bagged per day | 1 Duck | 3 Ducks | **I would not choose to take a waterfowl hunting trip if these were my only choices** |
| | Geese Bagged per day | No Geese | No Geese | |
| | Closest other hunting party | 200 Yards | 50 Yards | |
| | Feasibility of hunting over water or decoys | Yes | No | |
| | Natural marsh setting | No, mostly vegetated with phragmites | Yes, mostly bull rush, salicornia, and cattails | |
| | Water quality | No sewage-related toxins | No sewage-related toxins | |
| | Availability of dock or boat launch | Yes | Yes | |
| | Your individual trip costs | $50 | $100 | |
| **I would choose (check one only)** | | **Trip A** □ | **Trip B** □ | **Not Hunt** □ |

**Figure ES1. Sample Utah Waterfowl Hunting Survey Choice Question Format.**

Many of the estimated coefficients in the estimated multinomial logit models for both the Public and Duck Club samples are statistically significant. As was expected, price has negative effect so that the higher the cost of a given trip, the less likely it will be chosen, other things equal. Bagging additional ducks and geese has a positive effect, hunting in an area of natural marsh vegetation has a positive effect, the presence of sewage-related toxins or algae has a negative

effect, and (for the Public Hunter Sample) the availability of a boat launch or dock has a positive effect on trip value. The coefficients for distance between hunting parties and the feasibility of hunting over water and decoys were not statistically significant for either sample.

Table ES6 shows the estimated marginal utility (change in WTP per trip) associated with the statistically significant attributes for the choice model estimation. The model predicts that on average an additional bagged duck is worth $44.63 for public hunters and $113.49 for club members, and an additional goose $113.49 for the public sample and $161.90 for club members. It is estimated that it is worth $108 to Public sample hunters (and $92.20 to Club members) to hunt in an area of natural vegetation, and that the presence of sewage-related toxins detracts substantially from the value of a trip (-$363 for public sample and -$558 for club members). Another way to interpret this latter value is that since the negative effect of poor water quality (-$363 to -$558) is so large, and substantially exceeds the average value of a trip (~$75 to $131), very few, if any, hunters would choose such a trip. Finally, the model predicts that it is worth $157 to the average Public Sample hunter to hunt in an area where a dock or boat launch is available.

**Table 1. Comparison of Estimated Utility Associated with Marginal Changes in Choice Question Trip Attribute Levels: Duck Club Members and Public Hunter Sample.**

| **Trip Attribute** | **Marginal Utility** | |
|---|---|---|
| | **Duck Club Sample** | **Public Hunter Sample** |
| Ducks bagged | $ 77.44 | $ 44.63 |
| Geese bagged | $ 161.90 | $ 113.49 |
| Distance to next party | n/a | n/a |
| Hunting over water or decoys | n/a | n/a |
| Natural marsh vegetation | $ 92.20 | $ 108.10 |
| Presence of sewage-related toxins | $(558.19) | $(363.59) |
| Available Boat launch or dock | n/a | $ 157.22 |

## Conclusions

The results highlighted in this Executive Summary focus on the primary objectives of the study: 1) estimation of the economic contribution of waterfowl hunter spending to the Utah and SLC economy, 2) estimation of the Net Economic Value (over and above actual trip spending) associated with Utah waterfowl hunting trips, and 3) estimation of the relative economic importance (in terms of NEV) of different characteristics of Utah waterfowl hunting trips.

Key results include a total annual economic significance in the GSL area associated with waterfowl hunting expenditures of $97.1 million and 1,600 full-time equivalent jobs, total cumulative hunting-related equipment purchases of $157 million, and annual net economic benefits over and above expenditures of $9.5 million.

Key attributes associated with higher valued waterfowl hunting trips were increased ducks and geese bagged, natural marsh vegetation (no invasive phragmites), the absence of sewage-related water toxins, and the availability of a boat launch.

The tables and discussion above compare and contrast the "Public Sample" and "Private Duck Club Sample" results. Additional information on hunters' trips, preferences, and opinions are detailed in the results sections and Appendix C of the main report.

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