Economic Analysis
Final Rulemaking for
Migratory Bird Hunting for the 2024-2025 Season

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U.S. Fish & Wildlife Service
July 2024

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Economic Analysis

Economic Background and Significance

The purpose of this economic analysis is to assess the potential effects of the regulation for the 2024-2025 hunting season for migratory birds.

Over harvesting at the turn of the 20th century resulted in depleted bird populations and inspired the Migratory Bird Treaties between the United States, Great Britain (Canada), Mexico, Japan, and the Soviet Union. The Migratory Bird Treaty Act (Act) implementing the treaties authorizes the Secretary of the Interior to establish national frameworks within which States may establish migratory bird hunting regulations.

The Act is permissive. Without the national frameworks, the States cannot establish hunting seasons and hunting is prohibited. The national framework indirectly regulates migratory bird hunting in the United States by setting maximums for season length and bag limits under which the States can set their own hunting regulations. The States can be more restrictive than the Federal framework but not more lenient, i.e., the States can set shorter seasons and/or lower bag limits. No public comments were received for the regulatory flexibility analysis. One public comment was received for the proposed 2024-2025 rule's economic analysis stating that "…keeping regulations in place will allow for long-term enjoyment of these recreational activities and a prosperous life cycle for these bird species."

The Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) has determined that the migratory bird hunting frameworks rulemaking constitutes a significant rule under section 3(f)(1) of Executive Order 12866, as amended by Executive Order 14094.

Baseline Characteristics of the Bird Population and Relevant Economic Conditions

The status of migratory bird populations are discussed in a series of annual reports and environmental considerations are covered under a separate Finding of No Significant Impact (FONSI). We present a summary information of the relevant bird populations and the level of hunting activities. Some of the reports and more information about Adaptive Harvest Management are available at https://www.fws.gov/project/adaptive-harvest-management.

The annual process of setting duck-hunting regulations in the U.S. is based on a system of resource monitoring, data analyses, and rule-making (Blohm 1989). Each year, monitoring activities such as aerial surveys, preseason banding, and hunter questionnaires provide information on population size, habitat conditions, and harvest levels. Data collected from these monitoring programs are analyzed each year, and proposals for duck-hunting regulations are developed.

In 1995 the U.S. Fish and Wildlife Service (USFWS) implemented the adaptive harvest management (AHM) program for setting duck hunting regulations in the United States (U.S.). The AHM approach provides a framework for making objective decisions in the face of incomplete knowledge concerning waterfowl population dynamics and regulatory impacts. This approach explicitly recognizes that the consequences of hunting regulations cannot be predicted with certainty and provides a framework for making objective decisions in the face of that uncertainty (Williams and Johnson 1995). Inherent in the adaptive approach is an awareness that management performance can be maximized only if regulatory effects can be predicted reliably. Thus, adaptive management relies on an iterative cycle of monitoring, assessment, and decision-making to clarify the relationships among hunting regulations, harvests, and waterfowl abundance (Johnson et al. 2015).

Waterfowl population models are based on the best available information and account for uncertainty in population dynamics and the impact of harvest. For each stock, key demographic parameters are updated each year with Bayesian, integrated population modeling estimation frameworks to predict mid-continent mallard, western mallard, and eastern waterfowl population dynamics. These parameters and corresponding measures of uncertainty are then used in independent optimization frameworks to derive stock-specific optimal harvest policies.

Below we present some historical information on duck harvest estimates in the United States estimated from our annual hunter surveys (Table 1). If addition, we have presented estimated harvest age sex ratios of mallards harvested in the United States, estimated from the annual Waterfowl Parts Collection Survey (Table 2). Data from these surveys provide critical information on harvest mortality, annual recruitment, and the age/sex structure of various migratory game bird populations. Such demographic data are key inputs into our models to estimate annual population changes and the impact of the hunting regulations on actual harvest. Raftovich et al. (2023) describes the annual harvest survey methodology and provides detailed, species-specific harvest information on different species or species groups of migratory game birds. Harvest and population demographic information are most useful at the species or population scale. In the future rules, we plan to provide more detailed information on these population demographic parameters and requested public comment on how that information may be provided to improve transparency. We received no public comments in regards to this request.

Table 1. Number of Total Ducks and Mallards harvested by hunters in the United States, 1961-2022. See Raftovich (2023) for more detailed harvest information on other migratory game bird species.

Hunting Season	Total Duck Harvest	Total Mallard Harvest
1961	5,338,675	2,103,239
1962	4,246,950	1,392,025
1963	7,254,845	2,421,850
1964	8,381,646	2,967,395
1965	8,832,874	2,443,809
1966	12,029,958	3,761,341
1967	12,792,370	4,196,411
1968	8,087,576	2,675,480
1969	12,999,862	3,763,229
1970	15,916,936	5,313,560
1971	13,949,385	5,021,458
1972	13,586,079	4,900,847
1973	11,892,083	4,206,399
1974	12,800,483	4,620,097
1975	15,487,193	5,037,519
1976	15,194,856	5,123,422
1977	13,470,310	4,468,027
1978	15,354,517	5,065,460
1979	14,414,775	4,815,394
1980	13,251,663	4,682,810
1981	12,194,496	4,367,003
1982	11,871,608	3,937,392
1983	12,923,295	4,448,486
1984	12,575,696	3,953,956
1985	9,544,250	3,343,801
1986	9,509,207	3,400,295
1987	9,202,878	3,231,227
1988	5,029,911	2,014,907
1989	6,238,874	2,356,375
1990	6,165,864	2,319,911
1991	6,237,646	2,374,972
1992	6,527,095	2,566,380
1993	7,002,973	2,753,095
1994	8,649,706	3,127,063
1995	12,960,244	4,444,276
1996	13,807,118	4,889,434
1997	15,903,434	5,432,597
1998	16,933,079	5,639,913
1999	16,135,318	5,895,795
2000	15,895,219	6,069,184
2001	14,065,997	5,478,655

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Hunting Season	Total Duck Harvest	Total Mallard Harvest
2002	12,374,968	4,833,747
2003	13,053,366	4,931,097
2004	12,293,603	4,531,649
2005	12,432,007	4,466,927
2006	13,716,485	4,668,411
2007	14,494,640	4,878,421
2008	13,635,654	4,554,969
2009	13,069,848	4,135,196
2010	14,796,690	4,166,254
2011	15,880,949	4,409,096
2012	15,632,512	3,935,272
2013	13,654,247	3,637,597
2014	13,212,222	3,904,063
2015	10,934,542	3,433,315
2016	11,531,461	3,719,146
2017	12,035,586	3,425,561
2018	10,713,842	3,148,069
2019	9,625,870	2,896,071
2020	11,063,066	2,801,212
2021	9,383,327	2,541,629
2022	8,241,784	2,042,668

Table 2. Age (Juveniles/Adult) and Sex (Males/Female) Ratios in the harvest of Mallards in the United States, 1961-2022. See Raftovich (2023) for more detailed harvest information on other migratory game bird species.

Hunting Season	Mallard Age Ratio (Juveniles/Adult)	Mallard Sex Ratio (Males/Female)
1961	1.05	1.63
1962	1.29	1.46
1963	1.36	1.42
1964	1.09	1.55
1965	1.6	1.53
1966	1.39	1.43
1967	1.43	1.46
1968	0.96	1.69
1969	1.62	1.57
1970	1.17	1.68
1971	1.06	1.68
1972	0.9	1.84
1973	1.12	1.77
1974	1.76	1.65
1975	1.35	1.69
1976	1.32	1.66
1977	0.86	1.76
1978	1.29	1.71
1979	1.41	1.68
1980	0.97	1.7
1981	0.81	1.82
1982	1.13	1.74
1983	1.36	1.78
1984	1.18	1.88
1985	1.11	2.2
1986	1.34	2.16
1987	1.22	2.18
1988	0.9	2.21
1989	1.16	2.19
1990	0.99	2.59
1991	0.92	2.44
1992	0.82	2.53
1993	1.17	2.54
1994	1.1	2.61
1995	0.95	2.64
1996	1.06	2.75
1997	1.2	2.18
1998	0.91	2.27
1999	0.88	2.15

Table 2. Age (Juveniles/Adult) and Sex (Males/Female) Ratios in the harvest of Mallards in the United States, 1961-2022. See Raftovich (2023) for more detailed harvest information on other migratory game bird species.		
Hunting Season	Mallard Age Ratio (Juveniles/Adult)	Mallard Sex Ratio (Males/Female)
2000	0.74	2.39
2001	1.13	2.31
2002	0.87	2.33
2003	1.29	2.37
2004	1.06	2.62
2005	1.62	2.4
2006	1.45	2.47
2007	1.2	2.6
2008	1.04	2.63
2009	1.25	2.54
2010	1.53	2.27
2011	1.85	2.24
2012	1.46	2.24
2013	1.28	2.37
2014	1.5	2.25
2015	1.16	2.63
2016	1.07	2.52
2017	1.06	2.55
2018	1	2.68
2019	1.06	2.74
2020	1.05	2.71
2021	0.79	2.96
2022	1.1	2.74

Regulatory Alternatives and Associated Uncertainties

The USFWS calculates annually the biological impacts of each regulatory alternative as part of the regulation development process and in consultation with the four Flyway Councils. This annual assessment process occurs when the USFWS obtains current year population status information and the updated expected harvest information for each alternative in August. The results from this assessment are considered each year at the Flyway Council meetings and Service Regulations Committee meetings, and results are provided for public review in the subsequent hunting season frameworks proposed rule.

In regulating waterfowl harvests, managers face four fundamental sources of uncertainty (Nichols et al. 1995a, Johnson et al. 1996, Williams et al. 1996): (1) environmental variation – the temporal and spatial variation in weather conditions and other key features of waterfowl habitat; an example is the annual change in the number of ponds in the Prairie Pothole Region, where water conditions influence duck reproductive success; (2) partial controllability – the ability of managers to control harvest only within limits; the harvest resulting from a particular set of hunting regulations cannot be predicted with

certainty because of variation in weather conditions, timing of migration, hunter effort, and other factors; (3) partial observability – the ability to estimate key population attributes (e.g., population size, reproductive rate, harvest) only within the precision afforded by extant monitoring programs; and (4) structural uncertainty – an incomplete understanding of biological processes; a familiar example is the long-standing debate about whether harvest is additive to other sources of mortality or whether populations compensate for hunting losses through reduced natural mortality. Structural uncertainty increases contentiousness in the decision-making process and decreases the extent to which managers can meet long-term conservation goals. The agency recognizes the importance of considering regulatory alternatives and the associated uncertainties and undertakes rigorous modeling to ascertain important factors in determining alternatives.

Modeling

AHM was developed as a systematic process for dealing objectively with these uncertainties. The key components of AHM include (Johnson et al. 1993, Williams and Johnson 1995): (1) a limited number of regulatory alternatives, which describe Flyway-specific season lengths, bag limits, and framework dates; (2) a set of population models describing various hypotheses about the effects of harvest and environmental factors on waterfowl abundance; (3) a measure of reliability (probability or "weight") for each population model; and (4) a mathematical description of the objective(s) of harvest management (i.e., an "objective function"), by which alternative regulatory strategies can be compared. These components are used in a stochastic optimization procedure to derive a regulatory strategy.

A regulatory strategy specifies the optimal regulatory choice, with respect to the stated management objectives, for each possible combination of breeding population size, environmental conditions, and model weights (Johnson et al. 1997). The setting of annual hunting regulations then involves an iterative process: (1) each year, an optimal regulatory choice is identified based on resource and environmental conditions, and on current model weights; (2) after the regulatory decision is made, model-specific predictions for subsequent breeding population size are determined; (3) when monitoring data become available, model weights are increased to the extent that observations of population size agree with predictions, and decreased to the extent that they disagree; and (4) the new model weights are used to start another iteration of the process. By iteratively updating model weights and optimizing regulatory choices, the process should eventually identify which model is the best overall predictor of changes in population abundance. The process is optimal in the sense that it provides the regulatory choice each year necessary to maximize management performance. It is adaptive in the sense that the harvest strategy "evolves" to account for new knowledge generated by a comparison of predicted and observed population sizes. Please see Adaptive Harvest Management 2023 Hunting Season Report for more detailed description of the models. We solicited comment on how best the agency can provide this information in summary form including the discussion of model uncertainties as well as other relevant uncertainties including the presentation of year-to-year variability. We received no responses on this topic.

Data
We will be providing more detailed information that the agency collects to inform this rulemaking. We collect various information from hunters under OMB ICR 2090-0028 and any other relevant data sets. We solicited comment on how best the agency can provide this information to improve the transparency of this rulemaking process. We received no public comments on this topic.

Alternatives
These expected harvests and population level impacts under each alternative are evaluated annually and part of the formal decision-making process. The optimal regulatory alternative is derived each year based on current population status, expected harvest under each alternative, and the population and harvest management objectives adopted by the four Flyway Councils and the USFWS.[1] The annual Environmental Assessment of the migratory bird hunting regulations provides detailed descriptions of four alternative frameworks for the annual hunting season:

Alternative 1. Closed hunting seasons (baseline and no action). No migratory bird hunting would be allowed.

Alternative 2. Issue restrictive regulations allowing fewer days than those issued during the 2023-2024 season.

Alternative 3. Issue moderate regulations allowing more days than those in Alternative 2 but fewer days than those issued during the 2023-2024 season.

Alternative 4. Issue liberal regulations identical to the regulations in the 2023-2024 season.

The USFWS is issuing liberal migratory bird hunting regulations in 2024-2025 (Preferred Alternative 4). This alternative is consistent with the objectives for long-term sustained population levels and harvest objectives. The USFWS has issued liberal regulations for over 20 years.

[1] The Adaptive Harvest Management Process accounts for short-term annual changes in habitat conditions (including natural, ecological variation and anthropogenic effects) via annual monitoring programs (e.g., Waterfowl Breeding Population and Habitat Survey) therefore we do not expect these factors to affect the economic results. The Service is currently developing decision-frameworks to account for long-term system changes (i.e., climate change or socio-economic changes). Preliminary results indicate results are highly uncertain and difficult to predict changes in the abundance of waterfowl populations, hunter numbers and participation, and economic consequences.

Estimated Benefits[2]

During the 2023–2024 migratory bird hunting rulemaking and 2024-2025 proposed rulemaking, we notified the public that we were updating the economic analysis. We requested public comment to suggest possible options to estimate the economic effects (whether modeled or otherwise) of migratory bird hunting but received no public comments in regard to this request. The previous model is based upon a 1990 study that analyzed the tradeoff between season length and bag limit assuming a desired total harvest of ducks. Around the turn of the 21st century, that 1990 study was modified to estimate the impacts of the migratory bird framework alternatives. Because the USFWS has selected the same liberal framework for over 20 years, there are no current data to estimate how hunter probability changes with respect to changes in season length and bag limits. This limits the USFWS's ability to verify the accuracy of the previous model.

Consumer Surplus Literature Review
The previous model (2023-2024 and prior rulemakings) measured marginal changes in duck hunting days as a function of changes in bag limits, season length, and other factors and was not transferable to other migratory bird hunting which represents 53 percent of all migratory bird hunting days (Raftovich et al 2022).

In order to account for regional differences in consumer surplus estimates, data for estimating consumer surplus of migratory bird hunting by flyway are needed. Existing literature has only one study where sufficient data were collected to derive consumer surplus estimates by flyway. To date, Hay (1988) is the only study found that estimated values for each of the four flyways. Average consumer surplus estimates are required to evaluate the alternative hunting frameworks, which are specified by flyway. In this report, the consumer surplus is presented as a range taken from the Hay (1988) study. The daily consumer surplus estimates are used to determine the economic value of the baseline (restrictive migratory bird hunting regulations) and the estimated effects of changes brought about by different frameworks. The estimates from the Hay (1988) study provided the 95 percent confidence intervals for flyway consumer surplus per day used in this analysis. Comparing the four flyways, the estimates range from $52 to $84 (2023$) per hunting day.

While Hay (1988) is the only study that estimates consumer surplus estimates by flyway, there are other studies that estimate consumer surplus for local areas or individual states. The Recreation Use Values Database (2016) and the USGS Benefit Toolkit (2016) compile valuation studies for a variety of activities, including waterfowl hunting. The mean consumer surplus per person per day for waterfowl hunting for the entire databases' time period 1958 to 2015 averaged $70 (2023$) from 20 studies, which falls in the range of the Hay (1988) study (and the database includes the Hay study). From 1988 to 2015, the database has a total of 7 studies conducted for California, Florida, Maine, Montana, and Vermont published in 1991 (3), 1992 (1), 1993 (2), and 2003 (1), which range from

[2] "Consumers' surplus is the difference between what a consumer pays for a unit of a good or service and the maximum amount the consumer would be willing to pay for that unit" (U.S. Office of Management and Budget 2003).

$39 to $273 per day and average $156 per day (2023$). This high variation from 7 studies depicts the pitfalls in benefit transfer from a small number of localized studies for this analysis. In particular, it is unlikely a small number of studies with specific attributes are suitable for a nationwide application.

There are two studies not included in the 2016 databases. Mattson et al (2018) utilizes benefit transfer to estimate consumer surplus for the northern pintail. Mattson et al does not derive primary data and instead uses the benefit transfer toolkit (Loomis et al 2008) which was updated in 2016 to the USGS Benefit Toolkit. Loomis et al (2015) is the only relatively recent study to derive primary consumer surplus data for waterfowl hunting and surveyed 180 waterfowl hunters in North Dakota ($179 CS per day) and 181 waterfowl hunters in South Dakota ($140 CS per day). Both Loomis et al (2015) and Hyberg and English (2022) note that these estimates for the Dakotas are the upper limit of consumer surplus values compared to preceding literature which may be due the high quality of waterfowl hunting in the sample. This example of a point estimate in the upper limits represents one of the potential drawbacks of using benefit transfer when the geographic area and attributes are not similar.

Huber et al (2018) discuss the limitations and benefits of benefits transfer. They note that "…any estimates are inherently limited by the existing available data, and that when primary studies relevant to a user's context exist, they remain preferred over benefit transfer methods." Hyberg and English (2022) also state that "Benefit transfer methods can provide general indicators of an activity's value, but is no substitute for direct estimates obtained from conducting valuation studies in the geographic area and species of interest." Since the Hay (1988) study is the only primary study of consumer surplus values by flyway, it serves as the best existing study for the Migratory Bird Hunting Regulations. The paucity of recent data shows the need in the academic literature for updated consumer surplus studies for migratory bird hunting by flyway. The need for more hunting valuation literature is also identified by Huber et al (2018).

Hunter Expenditures

Waterfowl and other migratory bird hunting represent an important recreational activity allowed by this rule. While expenditures do not represent estimated benefits of this rule, they indicate clearly that this rule results in substantial contributions to society. The 2016 National Survey of Fishing, Hunting and Wildlife Associated Recreation indicates that all migratory bird hunter expenditures, exclusive of licenses, stamps, tags, permits, and special equipment totaled over $2.6 billion in 2016 (2023$).

Table 3. 2016 Expenditures by Migratory Bird Hunters

		Expenditures (million 2023$)
Category	**Percent**	**All MB Hunters[1]**
Equipment	37%	$956.9
Food	15%	$397.5
Transportation	24%	$613.9
Lodging	11%	$273.3
Other	13%	$345.8
Total	100.0%	$2,587.5

[1]Source: 2016 National Survey of National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

There were an estimated 2.4 million migratory bird hunters in the U.S. in 2016 (U.S. Department of the Interior 2016).

Benefit Estimates

For the 2024–2025 migratory bird hunting season regulations, we are limiting quantitative analysis to Alternative 1 (baseline) and Alternative 4 (preferred alternative) using existing data while qualitatively analyzing the remaining alternatives (Alternatives 2 and 3).

Under the Migratory Bird Treaty Act, migratory bird hunting is closed until opened with the National frameworks. Under Alternative 1, National frameworks would not be issued; thus, there would be no migratory bird hunting, and consumer surplus would be zero. Under Alternative 4, the 2024-2025 regulation would be similar to previous migratory bird hunting regulations. Assuming the next hunting season will have similar hunter activity, we utilize the *Migratory Bird Hunting Activity and Harvest during 2020-21 and 2021-22 Hunting Seasons* (Raftovich et al 2022) to determine the number of migratory bird hunter days. Raftovich et al (2022) presents hunter activity from the Harvest Information Program surveys and estimated 10.8 million migratory bird hunting days during the 2021 hunting season. Using migratory bird hunting days (Raftovich et al 2022) and flyway consumer surplus (Hay 1988), we estimate consumer surplus for Alternative 4. While the number of migratory bird hunting days is known for Alternatives 1 and 4, data are unavailable to estimate Alternatives 2 and 3 so we rely on qualitative analysis.

The Alternatives are on an increasing scale of hunter opportunity from zero migratory bird hunting (Alternative 1) to the most liberal hunting regulations with highest bag limits and longest season length (Alternative 4). The marginal change for the number of migratory bird hunting days as a result of changing bag limits and season length for each Alternative are unknown. However, we expect that number of hunting days would increase for each Alternative as bag limits go up and season length is extended. Therefore, total consumer surplus ranges from $0 for the baseline (Alternative 1) to increased consumer surplus for the restrictive framework (Alternative 2) to more consumer surplus for the moderate framework (Alternative 3) to the most at $729 million for the liberal framework (Alternative 4) (Table 4).

Table 4. Alternative Migratory Bird Hunting Frameworks: Total Consumer Surplus - Qualitative and Quantitative Estimate (thousand 2023$)

Flyway	Consumer Surplus Per Day (2023$)	Alternative 1 Baseline	Alternative 2 Restrictive	Alternative 3 Moderate	Alternative 4 Liberal (Preferred)
Atlantic	$52 - $75	0	+	++	$90,000 to $130,000
Mississippi	$61 - $78	0	+	++	$257,000 to $330,000
Central	$58 - $72	0	+	++	$158,000 to $198,000
Pacific	$61 - $84	0	+	++	$100,000 to $139,000
Total		0	+	++	$606,000 to $797,000

Alternative 1 This baseline alternative would not issue migratory bird hunting regulations, and migratory bird hunting would not be allowed. No consumer surplus would be accrued by hunters.

Alternative 2 This alternative includes restrictive regulations allowing fewer days than those issued in 2023-2024. Bag limits are 3 ducks below the 2023 levels and seasons are 30 to 47 days shorter. The number of hunting days under this alternative is unknown. Reducing the opportunity to hunt may reduce hunters' interest in the sport which may reduce the probability of hunting and the number of hunting days. Taken together, the restrictive framework would result in the least consumer surplus after Alternative 1.

Alternative 3 Bag limits under this alternative are the same as under the preferred alternative (Alternative 4) but season lengths are 14 to 21 days shorter. The number of hunting days under Alternative 3 is unknown. Reducing the opportunity to hunt may reduce hunters' interest in the sport which may result in fewer days afield and may decrease the probability of hunting. We estimate consumer surplus would be more than Alternative 1 and 2 but less than Alternative 4.

Alternative 4 The preferred regulations are similar to the 2023-2024 regulations and have the most positive economic effect. Estimated consumer surplus would be $606 million to $797 million. The bag limits and season lengths results in an estimated approximately 10.8 million days. This alternative is the preferred alternative and maximizes the total hunters' welfare benefits which are related to bag and days afield.

The season length and bag limits set in the National framework, for example 90 days of hunting and 5 as a bag limit per day, are higher than the typical hunter uses. Typically, hunters hunt for 9 days and bag slightly more than 2 ducks per day. Thus, any changes in the National framework are expected to have only a small impact on hunter behavior (days afield and hunter bag) and migratory bird populations. For example, in a 2020 survey of Minnesota waterfowl hunters, hunters averaged 10 hunting days and only 5 percent reported the daily bag limit as too low (Landon et al 2021).

Hinrich et al. (2021) assessed ten potential constraint factors (Rules/Regulations, Waterfowl Identification, Cost, Land Access/Permission, Hunting Skills, Travel, Other Hunters, Social, Waterfowl Populations, and Views of Others) that may limit or prohibit participation in waterfowl hunting. They concluded it was most likely a combination of these factors that limit participation, with hunting access and crowding/interference from other hunters being the most significant factors. Hunting rules/regulations did not rank highly as a potential barrier to participation based on their results. This conclusion is supported by results from the National Survey of Waterfowl Hunters (Patton 2018) where respondents did not think current regulations were difficult to understand (81% of respondents) or difficult to comply with while hunting (73% of respondents). Thus, we expect the net effect of alternative frameworks (Alternatives 2, 3, and 4) to result in relatively modest differences in consumer surplus primarily reflecting the fact that the frameworks are not severely binding on migratory bird hunters decisions on how many days to hunt. The differences between season length, days afield, and bag limits and actual harvest are large enough that only marginal changes in hunter behavior are expected from alternative frameworks.

The national regulatory frameworks safeguard the efficient use of the resource over time by imposing limits on its exploitation. Overexploitation when access to the resource was unconstrained threatened its sustainability. Limiting resource consumption ensures future hunting opportunities and the resulting ongoing benefits to hunters.

As noted above, the frameworks do not severely dictate migratory bird hunter' choices on how many days to hunt since participation trends have been relatively flat since 1991. Furthermore, the season length and bag limits set in the National framework, for example 90 days of hunting and 5 as a bag limit per day, are significantly higher than the typical hunter trends of 9 days of hunting and about 2 birds per day. Thus, the differences between Alternatives 2, 3, and 4 are expected to have only small impacts on hunter behavior (days afield and hunter bag) and, consequently, migratory bird populations. The season length under most packages (e.g., liberal package) is commonly longer than the average number of days hunters spend in the field. This situation allows hunters to pursue sport while balancing other commitments, while ensuring the total harvest or harvest rate are within biological capacity. As a result, with the exception of Alternative 1, when comparing the preferred alternative to the most restrictive alternative, the preferred alternative would have minimal impacts on migratory birds and the various ecosystem services (such as birdwatching, pest control, disease regulation, and nutrient cycling) that they provide.

Further Research on Benefits

We are undertaking work to develop an alternative estimation approach that incorporates advances in the economics literature and more current recreational use data. This analytic undertaking is a multi-year effort by the agency, and we will be providing periodic updates on the status of the project. As noted in the proposed 2024-2025 rule, this update includes reviewing the travel cost model and the 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (NSFHWAR). We have received zero public comments on methodology and data resources for many years and continue to seek comment to improve the agency's estimation of benefits of this rule. We received zero public comments regarding methodology and data resources in the proposed 2024-2025 rule.

For the final 2024-2025 economic analysis, we are including research conducted after the proposed rule was published. This new information includes the literature review of the travel cost model and the NSFHWAR.

Literature Review Introduction

Season length and bag limit for individual species are the two variables that the USFWS considers when determining the biological impact of each regulatory alternative. We already know the impact of Alternative 1 (no migratory bird hunting season and, therefore, no impacts) and Alternative 4 (the preferred liberal Alternative that has been selected for over 20 years and the effect would be similar to the previous year). However, if the USFWS were to choose Alternative 2 (restrictive) or Alternative 3 (moderate), migratory bird hunters would have shorter season lengths and lower bag limits for specified species.

Because the USFWS has selected the same liberal framework for over 20 years, there are no current data specific to this program and these regulatory alternatives to estimate how hunter probability changes with respect to changes in season length and bag limits. The current approach utilizes existing data to quantitatively estimate Alternatives 1 and 4 while qualitatively estimating Alternatives 2 and 3.

The purpose of this review is to continue researching methodology to quantitatively estimate the marginal change of Alternatives 2 and 3. Therefore, the first step in this multi-year process is to review the travel cost model and the applicability of the NSFHWAR to measure how migratory bird hunters change their demand for hunting trips as a function of changes in season length and bag limit for a given species.

Travel Cost Model and the NSFHWAR

The travel cost method is a revealed preference model developed to estimate consumer surplus for access to a recreational site or for a given activity. Essentially, the conceptual demand function for migratory bird hunters is:

$$Y_{niq} = f(P_{niq}\, S_n\, ,D_n)$$

Where Y is the number of migratory bird hunting trips taken by hunter *n* to site *i* targeting migratory bird species *q*
and is a function of
P is the trip cost (including travel cost and opportunity cost of time) for hunter *n* to reach the site *i* targeting species *q*,
S is the vector of trip costs for substitute sites for hunter *n*, and
D is the vector of characteristics (such as demographics) for hunter *n* that influence the number of hunting trips to site *i* and targeting species *q*.

The equation above would model a consumer surplus baseline for migratory bird hunting. Fortunately, travel cost models have evolved to value changes in quality such as the recreation gain for hunters associated with improved hunting access or the recreation loss for boaters associated with lower water quality at the lake. To estimate the model for Alternatives 2 and 3, it is necessary to obtain panel data that include the number of trips, the trip cost, substitute sites, and any factors that are expected to influence the demand which in addition to demographic data are season length and bag limit. One potential solution to model the marginal change between alternatives may be to model three different demand curves: a demand curve with liberal regulations (Alternative 4), another demand curve with moderate regulations (Alternative 3), and another demand curve with restrictive regulations (Alternative 2). There is no need for a fourth demand curve because Alternative 1 is a closed hunting season with zero consumer surplus. After estimating each demand curve, we would measure the area between each curve to calculate the change in consumer surplus when season lengths and bag limits change.

This is a data-intensive model that could allow updated estimates for Alternative 4 as well as new estimates for Alternatives 2 and 3. Therefore, we discuss the NSFHWAR[3] as a potential data source that could populate these models. Conducted since 1955 and one of the oldest and most comprehensive continuing recreation surveys, the NSFHWAR surveys individuals across 50 states regarding their wildlife-related recreation every 5 years. The NSFHWAR collects information on the number of anglers, hunters, and wildlife watchers, where they live, where they recreate, how often they participate, and how much they spend on their activities throughout the United States. While other surveys may collect information on participation or expenditures on a local scale, few could compare to the NSFHWAR for its breadth and magnitude. This national scope is potentially applicable to the Annual Migratory Bird Hunting Rulemaking because the national migratory bird hunting rule crosses the four flyways of North America and applies to multiple migratory bird species including, but not limited to, ducks, geese, rails, snipes, doves, coots, and woodcock.

[3] NSFHWAR datasets from 1996 to 2016 are available at https://www.census.gov/programs-surveys/fhwar/data/datasets.html. The 2016 data are available as an excel file and pre-2016 are available as text files. The 2022 NSFHWAR dataset is not yet online but the 2022 NSFHWAR report is available at https://digitalmedia.fws.gov/digital/collection/document/id/2321/rec/1.

Existing Literature Using NSFHWAR Data for Travel Cost Models

We are requesting public comment on any additional relevant research (published or in progress).

The NSFHWAR only collects residential and participation data by State (2011 NSFHWAR and earlier) or Census Division (2016 NSFHWAR and later); therefore, it is unknown exactly how far people travel to recreate. Instead, it is known if people recreate within their home State or Census Division or if people travel to recreate outside their State or Census Division. As a result, literature utilizing the NSFHWAR shows zonal travel cost models (either nationwide or regional geographic ranges). While we did not uncover studies pertaining to migratory birds, we did find some that investigated wildlife watching, angling and hunting. The lack of literature by subset of activity (such as big game hunting versus migratory bird hunting) may be due to small sample sizes for specific activities.

Using the 1991 NSFHWAR along with both truncated and untruncated estimators, Zawacki et al (2000) estimated the demand and value for wildlife watching in the United States where consumer surplus estimates ranged from $33 to $580 per trip (2023$). To estimate trip costs, the authors used two versions: (1) a full cost variable including trip related expenditures such as food, lodging, transportation, fees, and equipment rental, and (2) a reduced cost variable including only transportation and fee expenditures. Opportunity cost of time is also used in 6 different versions where both full and reduced trip costs were multiplied by three different wage multipliers (0, ¼, and ½). After running both the negative binomial model and the Poisson model, the former was chosen based on an asymptotic *t*-test which is a common finding in travel cost models (Parsons 2013). Significant variables included reduced trip cost, income, age, urban residence, race, acres of forest/rangeland per capita in State where trip occurred, an interaction term of fishing and fishing trip costs, whether the individual hunted, and whether the individual fished. Zawacki et al found that "Regardless of the statistical model, [travel cost model] results remain susceptible to large fluctuations based on relatively arbitrary assumptions" for cost variables, opportunity cost of time, and statistical model choice.

Marsinko et al (2002) used the same 1991 NSFHWAR data and a truncated binomial model, resulting in the value of consumer surplus for wildlife watching by nonhunters to be $41 to $122 per trip (2023$). Significant variables included trip cost, urban residence, race, acres of forest/rangeland per capita in State where trip occurred, and whether the individual hunted or fished.

Using 2001 NSFHWAR data, Bilgic and Florkowski (2009) investigated the impact of license regulations on the number of recreation trips taken by anglers and hunters with a two-stage nonlinear least squares (NLS) model, accounting for permit and non-permit holders for two types of implicit travel costs – transportation-only and other trip costs. A probit model was estimated to predict the probability of an individual holding a license; then a NLS model was used to estimate the effect of the license on the number of recreation trips taken, controlling for other factors. They found that those with a license

benefited more from their trips compared to those without a license. After accounting for transportation costs, the yearly consumer surplus per person with a license is estimated to be $1,767 versus $452 for those without (2023$). When not controlling whether the individual is a license holder or not, consumer surplus per trip for anglers and hunters was $110 to $833 (2023$), when transportation and non-transportation-related costs are used, respectively. Further, this study found that the number of trips demanded is more responsive to the non-transportation-related cost than to the transportation-related cost. If transportation cost increases by 1%, the number of trips decrease by 0.181%; while a 1% increase in non-transportation costs result in a decrease of trips by 0.322%.

Mingie et al (2015) expanded on previous studies by using the 2006 NSFHWAR data for a two-step sample selection model that included a probit first step and a negative binomial second step where the first step examined the variables that influenced participation in nonresidential wildlife watching, and the second step measured the number of nonresidential wildlife watching trips. Consumer surplus for wildlife-related recreation resulted in $325 to $1,117 per trip (2023$).

Sun et al (2015) utilized the 2006 NSFHWAR and a two-step sample selection model with binary probit and negative binomial regressions to analyze wildlife watching, thereby jointly modeling participation decision and trip frequency. Similar to Zawacki et al (2000), the authors used two versions of the trip costs: (1) a full cost variable including trip related expenditures and (2) a reduced cost variable including only transportation and fee expenditures. Wage rate was calculated with the household income from the NSFWAR, and multiplied by two different wage multipliers (¼ and ½). Since substitute sites are not available in the data set, the authors used hunting and fishing activities as a proxy which was the same as Marsinko et al (2002). Significant variables included age, gender, education, resource availability, and hunting costs. Their result shows that consumer surplus of wildlife watching ranged from $675 to $1,412 per trip (2023$). Similar to Zawacki et al (2000), they also found that their results were sensitive to underlying assumptions used in calculating trip costs and wage multipliers. Furthermore, they found that fishing and hunting may be a substitute for wildlife watching depending upon time and budget constraints but could also be complementary implying that recreationists may partake in more than one activity (such as both hunting and wildlife watching) during a single trip.

Lin et al (2023) used the 2016 NSFHWAR and a Poisson regression to calculate consumer surplus for hunting, fishing, and wildlife-watching in the New England Census Division (Vermont, Rhode Island, New Hampshire, Maine, Massachusetts, and Connecticut). Compared to previous literature, the authors used higher trip expenditures that included both trip-related expenditures (lodging, food, transportation, fees, and rentals) and prorated equipment costs (off-road vehicles, rifles, etc.). For opportunity cost of time, the authors used a higher full wage multiplier compared to other literature but did use 1/3 and 2/3 wage multipliers for a sensitivity analysis. For wildlife watching, significant variables included trip cost, rural residence, race, whether recreationists resided in the Middle Atlantic or South Atlantic Census Division, and whether respondents indicated they strive to benefit wildlife. For hunting, significant variables

included trip cost and rural residence. With a wage multiplier ranging from 1/3 to 1, consumer surplus ranged from $1,276 to $3,813 per trip for wildlife watching, $480 to $320 per trip for hunting, and $2,568 to $2,201 per trip for fishing (2023$). The authors reported the downward range for hunting and fishing as a result of "the different proportions of the opportunity cost of time in the total cost for the different types of recreational activities."

Travel cost models are sensitive to assumptions about the cost of travel time and functional form (Parsons 2013). Table 1 summarizes the results across the literature for consumer surplus per trip. The studies estimated a baseline consumer surplus per trip and did not expand on potential additional changes to hunter behavior. None of these studies were used to estimate changes in consumer surplus due to regulatory changes or changes in recreation conditions.

Table 1. Literature Using NSFHWR Data in Travel Cost Models

Author	Functional Form (Demand Curve)	CS per trip Results (2023$)	Type	Data year
Zawacki et al (2000)	Negative Binomial	$33 to $580	WW in the U.S.	1991
Marsinko et al (2002)	Truncated Binomial	$41 to $122	WW by nonhunters in the U.S.	1991
Bilgic and Florkowski (2009)	2NLS (probit and nonlinear exponential models)	$110 to $883	Anglers and hunters in the U.S.	2001
Mingie et al (2015)	Two-step sample selection model with probit and negative binomial	$325 to $1,117	WW in the U.S.	2006
Sun et al (2015)	Two-step sample selection model with binary probit and negative binomial	$674 to $1,412	WW in the U.S.	2006
Lin et al (2023)	Poisson	$1,276 to $3,813	WW in New England	2016
Lin et al (2023)	Poisson	$480 to $320	Hunters in New England	2016
Lin et al (2023)	Poisson	$2,568 to $2,201	Anglers in New England	2016

Pros and Cons of Using NSFHWAR Data to Model Marginal Changes in Migratory Bird Hunter Behavior as a Function of Season Length and Bag Limit

The breadth and magnitude of the NSFHWAR is incomparable for nationwide data on how people fish, hunt, and watch wildlife in the United States. For the 2022

NSFHWAR[4], over 11,000 individuals across 50 States completed the hunter survey with responses regarding their expenditures for all hunting, responses regarding game they targeted (big game, small game, migratory bird, or other animal), and how often they hunted. The expansive data supports single year zonal travel cost models that can estimate the demand for hunting, fishing, and wildlife watching trips on a national scale. For 2016 NSFHWAR and later, zonal travel cost models are limited to census division zones.

As evident in the literature, travel cost models are sensitive to underlying assumptions and result in a large range of consumer surplus estimates. Usually, a travel cost model requires the distance between the exact location of where people recreate and their homes. Since NSFHWAR only collects location (both place of recreation and home location) based on State (pre 2016) and Census Division (2016 and later), the literature implemented a zonal method and various assumptions to measure trip expenditures (ranging from a high estimate including full-trip related expenditures and prorated equipment to only full trip-related expenditures to reduced trip-related expenditures) and to measure opportunity cost of time (ranging from the median point of stated income ranges to a national average Social Security wage, and then applying a wage fraction multiplier ranging from 0 to 1). While the calculated consumer surplus estimates may be sufficient for a baseline estimate for a recreational activity, the accuracy may be insufficient to estimate marginal changes in consumer surplus due to changes in season length and hunting.

Even with consistent assumptions to derive a hunting trip's implicit travel cost, expenditure data from the NSFHWAR are not comparable between surveys due to "significant methodological changes of previous surveys"[5] (U.S. Department of the Interior, 2022). These methodological differences affect the type of data collected. For the 2016 and earlier NSFHWAR, hunting data were collected for four groups of migratory birds including geese, ducks, doves, and other migratory birds but, as of 2022, NSFHWAR collects participation hunting data (number of hunters and days) only for all migratory birds combined. Additionally, NSFHWAR used to collect spending by trip

[4] The 2022 NSFHWAR dataset includes demographics for all respondents (i.e., age, race, education, Census division where the respondent lived, gender, marital status, income, and employment status) as well as questions regarding fishing, hunting, and wildlife-watching activities. Specific migratory bird hunting questions include: (1) "Did you hunt migratory birds in 2022?"; (2) "How many days did you hunt migratory birds in United States/Census division in 2022?"; and, (3) "How many trips lasting a single day or longer did you take to hunt migratory birds in the United States/Census division in 2022?". Each question for days or trips was asked for the United States and each Census Division (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific). Each Census Division includes three to nine States. A map of the U.S. Census Bureau's Census Divisions is available at https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf. No questions were asked for migratory bird hunting expenditures or types of migratory birds hunted.

[5] Methodological differences that drive the incompatibility include: (1) survey changes pertaining particularly to the loss of expenditures for different types of hunting, (2) increased coverage of rural areas in the sample, (3) blended sample design where the survey was previously all probability based but switched to blended probability and on-probability design, and (4) switch to primarily web-based multimode design from primarily in-person and phone (U.S. Department of the Interior, 2022).

type (i.e., big game, small game, and migratory birds), but the 2022 NSFHWAR now only collects spending for all hunting combined. As a result, the NSFHWAR does not collect practical time-series data at the species level to conduct a nationwide travel cost model that measures how migratory bird hunters would change their behavior if season length and bag limit are changed (Alternative 2 or Alternative 3).

The NSFHWAR does not capture impacts of regulatory changes and does not survey how individual's behavior would change in response to regulatory changes. Thus, to capture any changes in hunter behavior due to regulatory changes, it would be necessary to find a point in time when the year of the regulatory change (such as change in season length, bag limits, etc.) occurs in the same the year that the NSFHWAR was conducted (every 5 years). Given that the same Alternative 4 has been selected for over 20 years, there is no regulatory change (e.g., Alternative 2 or 3) to "match" to the NSFHWAR.

Literature Analyzing the Various Factors Affecting the Decision to Hunt

Hinrich et al. (2021) assessed ten potential constraint factors (Rules/Regulations, Waterfowl Identification, Cost, Land Access/Permission, Hunting Skills, Travel, Other Hunters, Social, Waterfowl Populations, and Views of Others) that may limit or prohibit participation in waterfowl hunting. They concluded it was most likely a combination of these factors that limit participation, with hunting access and crowding/interference from other hunters being the most significant factors. Hunting rules/regulations did not rank highly as a potential barrier to participation based on their results. In a study of Illinois hunters, Miller and Vakse (2003) also found that season length was not a significant predictor of hunter participation, instead finding that variables with the largest impact included perceived lack of time, not enough game, and no land available for hunting. This conclusion is supported by results from the National Survey of Waterfowl Hunters (Patton 2018) where respondents did not think current regulations were difficult to understand (81% of respondents) or difficult to comply with while hunting (73% of respondents). In a 2020 survey of Minnesota waterfowl hunters, Landon et al (2021) found only 5 percent of hunters reported the daily bag limit as too low. These authors also designed a stated choice experiment to assess preferences for a blue-winged teal season to determine hunter participation as a function of the status quo no teal season, a proposed bonus teal season, teal season length, motorized decoys, and shooting hours. They found allowing motorized decoys and increasing shooting hours were more likely to affect waterfowl hunters' choice than season length.

Next Steps

The liberal season length and bag limits set in the National framework over the last 20 years (depending on flyway, from 60 to 107 days of hunting and 6 to 7 as a bag limit per day), are higher than the typical hunter uses. Alternative 2 (depending on flyway, from 30 to 60 days of hunting and 3 to 4 as a bag limit per day) and Alternative 3 (depending on flyway, from 45 to 86 days of hunting and 6 to 7 as a bag limit per day) are also higher than the typical hunter uses. Alternative 1 is a closed migratory bird hunting season. Typically, migratory bird hunters hunt for 9 days and bag slightly more than 2 ducks per day. The literature results show that non-regulatory factors impacting hunter behavior dominate the impacts of regulations on hunter behavior. Changes in methodology in the NSFHWAR data over time present challenges to estimation (U.S. Department of Interior, 2022).

Estimating how migratory bird hunters' consumer surplus responds to changing season lengths and bag limits nationwide is a new area of research, as we continue to refine and improve our analysis. There are no current studies that examine this question at the level of detail and scope for a national regulation. While we continue to search for and review data that would be appropriate to apply to a detailed, nationwide travel cost model, we also continue to search for other appropriate models. We request public comment on relevant research and data suggestions.

Estimating Producer Surplus[6]

The estimation of producer surplus is the missing value for a complete analysis of the economic benefits generated by the migratory bird framework. Producer surplus is more difficult to quantify in the case of a natural resource. There may be some producer surplus associated with land leases for access to waterfowl hunting as well as habitat leases to provide primary constituent elements needed to allow waterfowl to reproduce. Any producer surplus associated with the sale of equipment and services to hunters is not easily estimated since the data on profit margins for all these items are not known. Also, the large numbers of suppliers of services and equipment would tend to eliminate excess profits through competition. Since most of the services and equipment have non-migratory bird hunting applications, producers cannot set a price that discriminates between migratory bird hunters, who would presumably be willing to pay more, and other customers. Therefore, they could not extract excess profits from migratory bird hunters. Data to estimate producer surplus are not available. Given competitive markets and the inability to price discriminate, producer surplus is probably minimal compared to consumer surplus.

[6] "Producers' surplus is the difference between the amount a producer is paid for a unit of a good or service and the minimum amount the producer would accept to supply that unit." (U.S. Office of Management and Budget 2003).

Estimated Costs

Administrative Costs Incurred by States
The framework regulations for migratory bird hunting impose some costs of administration and enforcement on the States. If there were no migratory bird hunting, the States could apply their resources to different ends. However, the States also derive revenue from licenses and sales taxes on hunting supplies so the net effect on State resources is uncertain. We requested public comment on whether this regulation results in a net change in license fees and taxes going to States. Also, we requested public comment on whether States would invest in waterfowl management in the absence of this regulation. We did not receive any public comments on these topics.

Costs borne by Other User Groups
The supply of natural resources such as migratory birds and their habitat are limited. As such, competing demands by recreationists (e.g., hunters, birders, bikers, hikers, or anglers) may occur. Recreationists substitute activities, locations, and timing for a variety of reasons. In some instances, birders, hikers, or anglers may choose not to participate in a preferred activity if hunting is occurring in their preferred location. Or, hunters may not be permitted to hunt in some locations/times because their preferred location/time is instead utilized by other recreationists. In the case of migratory bird hunting regulations, some recreationists may experience a lower consumer surplus if they are unable to participate at their preferred location. It is expected that they would employ strategies to ensure they can maximize their consumer surplus, whether by substituting activities, locations, or timing. Measuring the change in other recreationists and their respective consumer surplus (excluding waterfowl hunters) is beyond the scope of this analysis.

Final Regulatory Flexibility Analysis

Background

The Regulatory Flexibility Act of 1980 (Public Law 96-354) requires agencies to evaluate the potential effects of their proposed and final rules on small businesses, small organizations, and small governmental jurisdictions.

Section 604 of the Act requires agencies to prepare and make available for public comment a final regulatory flexibility analysis (FRFA) describing the impact of final rules on small entities. Section 604 of the Act specifies the content of a FRFA. Each FRFA must contain:

- A succinct statement of the need for, and objectives of, the rule;
- A statement of the significant issues raised by the public comments in response to the IRFA, a statement of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments.
- The response of the agency to any comments filed by the Chief counsel for Advocacy of the Small Business Administration in response to the proposed rule, and a detailed statement of any changes made to the proposed rule in the final rule as a result of the comments.
- A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;
- A description of the projected reporting, record keeping, and other compliance requirements of the rule including an estimate of the classes of small entities which will be the subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- A description of the steps the agency has taken to minimize the significant adverse economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each of the other significant alternatives to the rule considered by the agency was rejected; and
- For a covered agency, as defined in section 609(d)(2), a description of the steps the agency has taken to minimize any additional cost of credit for small entities.

1. Need for, and objectives of, the rule

Over harvesting at the turn of the 20th century resulted in depleted bird populations and inspired the Migratory Bird Treaties between the United States, Great Britain (Canada), Mexico, Japan, and the Soviet Union. The Migratory Bird Treaty Act (Act) implementing the treaties authorizes the Secretary of the Interior to establish national frameworks within which States may establish migratory bird hunting regulations.

The Act is permissive. Without the national frameworks, the States cannot establish hunting seasons and hunting is prohibited. The final regulation indirectly regulates migratory bird hunting in the United States by setting maximums for season length and

bag limits under which the States can set their own hunting regulations. The States can be more restrictive than the Federal framework but not more lenient, i.e., the States can set shorter seasons and/or lower bag limits.

The U.S. Fish and Wildlife Service is the Federal agency delegated the primary responsibility for managing migratory birds. This delegation is authorized by the Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703 et seq.). We implement the provisions of the MBTA through regulations in parts 10, 13, 20, 21, and 22 of title 50 of the Code of Federal Regulations (CFR).

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703–712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any * * * bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to "the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds" and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the USFWS as the lead Federal agency for managing and conserving migratory birds in the United States. However, migratory game bird management is a cooperative effort of State, Tribal, and Federal governments.

2. Statement of the significant issues raised by the public comments in response to the IRFA, a statement of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments

The USFWS did not receive any comments from the public regarding the IRFA during the public comment period.

3. Response of the agency to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration in response to the proposed rule, and a detailed statement of any changes made to the proposed rule in the final rule as a result of the comments

The USFWS did not receive any comments from the Chief Counsel for Advocacy of the Small Business Administration regarding the proposed rule.

4. Description and estimate of the number of small entities to which the rule will apply

The analysis utilizes expenditure data from the 2011 and 2016 National Survey of Fishing, Hunting and Wildlife Associated Recreation.

Major Categories of Hunter Expenditures

Waterfowl and other migratory bird hunting represent an important part of the total economic activity generated by fishing and hunting in the United States. The 2016 National Survey of Fishing, Hunting and Wildlife Associated Recreation indicates that all migratory bird hunter expenditures, exclusive of licenses, stamps, tags, permits, and special equipment totaled over $2.6 billion in 2016 (2023$).

Table 5. 2016 Expenditures by Migratory Bird Hunters

		Expenditures (million 2023$)
Category	**Percent**	**All MB Hunters[1]**
Equipment	37%	$956.9
Food	15%	$397.5
Transportation	24%	$613.9
Lodging	11%	$273.3
Other	13%	$345.8
Total	100.0%	$2,587.5

[1]Source: 2016 National Survey of National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Beneficiaries of the Rule

There were an estimated 2.4 million migratory bird hunters in the U.S. in 2016 (U.S. Department of the Interior 2016). In addition to hunters, a wide range of businesses and individuals benefit economically from the establishment of the annual migratory bird hunting regulations. A partial list of migratory bird hunter expenditure categories and the types of businesses that benefit from those expenditures are shown in Table 6.

Migratory bird hunting regulations generate significant economic activity for small businesses. Nationwide, migratory bird hunters spent $1.6 billion at small businesses in 2016. Over 800,000 small businesses will share in these sales. All but two of the States with reported sales derive, as a minimum, an excess of $2 million in small business sales from migratory bird hunting.

Table 6. Types of Expenditures by Migratory Bird Hunters

Expenditure Item	**Examples**	**Beneficiaries**
Equipment and Supplies	Guns, ammunition, boats	Sporting goods stores, department stores, boat dealers
Transportation	Gasoline, oil, repairs, air travel, vehicles	Service stations, vehicle dealers and rental agencies
Lodging		Motels, campgrounds
Food and Beverages		Restaurants, grocery stores
Lands and Leases	Club memberships, daily and seasonal hunting fees	Hunting clubs, private land owners
Clothing	Specialized clothing, waders, boots	Retail clothing stores, mail order firms

Limited information is available on the number of businesses and individuals in the various categories who benefit from migratory bird hunter expenditures. This is not surprising considering that those who provide equipment, supplies and services to migratory bird hunters often provide identical or similar items to non-hunters. For example:

1. A motel in a migratory bird hunting area may obtain a portion of its income from migratory bird hunters. Registrants are not requested to indicate the nature of their travel. The same situation prevails for food service establishments, gasoline stations, etc.

2. The number of sporting goods stores in the United States is obtainable. However, such stores may cater to fishermen, bowlers, skiers, joggers, etc., in addition to hunters. Without knowledge of their specialty, knowing the number of sporting goods stores is not sufficient.

3. Considerable leasing of lands for hunting and other purposes is accomplished informally without record keeping, and the payment is often in cash or otherwise undocumented.

Methods

This analysis combines information from the 2011 and 2016 National Surveys of Fishing, Hunting, and Wildlife-Associated Recreation (Survey) and the U.S. Department of Commerce County Business Patterns 2017 database to develop estimates of migratory bird hunters' expenditures at small businesses. The Survey provides information about hunters and anglers expenditures for sporting trips and equipment. Trip expenditures are

categorized as food, lodging, transportation, and other travel items (e.g., guide fees, access fees, and rentals). Equipment expenditures include guns, ammunition, and decoys.

The Surveys do not collect information about vendors. Therefore, another method is necessary to find the proportion of total expenditures that can be attributed to small businesses. The U.S. Department of Commerce publishes the County Business Patterns database that includes the number of enterprises by county and North American Industrial Classification System (NAICS). To assess the effects of the rule on small entities, this analysis focuses on retail establishments. The U.S. Small Business Administration (SBA) defines a small business as one with annual revenue or employment that meets or is below an established size standard (Table 7).

Table 7. Small Business Size Standards

Industry Code	Description	Small Business Size Standard (millions)	Percentage of Businesses that are Small[1]
722511	Full-Service Restaurants	$11.5	99%
722513	Limited-Service Restaurants	$13.5	98%
445110	Supermarkets and Other Grocery (except Convenience) Stores	$40.0	98%
721110	Hotels (except Casino Hotels) and Motels	$40.0	99%
457110	Gasoline Stations with Convenience Stores	$36.5	98%
457120	Other Gasoline Stations	$33.5	92%
459110	Sporting Goods Stores	$26.5	99%

[1]US Census Bureau, 2017 Economic Census

As shown in Table 7, the majority of businesses qualify as small businesses. The County Business Patterns information permits calculation of small business' share of businesses but not their share of sales. An alternative method was used to allocate sales to small businesses from establishment information for each State. If all businesses sell about the same amount, the share of expenditures spent at small businesses will be the proportion small businesses are to the total number of firms. This proportion probably overstates small business' share. A large discount department store probably sells more guns and ammunition than a small neighborhood gun shop. Using this method generates estimates of expenditures by migratory bird hunters at small businesses. To illustrate the State level of benefits, the following tables have been developed based on the 2011 and 2016 National Surveys.

Table 8, Estimated Migratory Bird Hunters' Expenditures on Food, illustrates the calculations for each of the expenditure categories shown on Tables 8 through 11. All expenditures in this section are reported in thousands of 2023 dollars. The first column contains State totals of the amounts respondents to the Survey reported they spent for food while on trips whose primary purpose was to hunt migratory birds. Food may be bought at a full service restaurant (NAICS 722511), limited service restaurant (NAICS 722513), or grocery store (NAICS 445110) so all types of firms were combined. The second column shows the number of establishments in for the NAICS category in each State. The third column shows the number of establishments categorized as small businesses in each State. The proportion small business establishments are of the total is the method used to allocate expenditures to small businesses. This allocation is shown in the fifth column.

Although more than 25,000 hunters and anglers were interviewed for the Survey, these expenditure estimates are based on only those who actually hunted during 2011 and 2016 and stated that the primary purpose of their trip or equipment purchase was hunting migratory birds – a sample of about 485 individuals. Only a small subset of hunters in each State meets both criteria so the expenditures are quite sensitive to individual responses. Zero totals may be based on small sample sizes. Small samples may also inflate expenditure estimates. Lodging observations were sparse so state lodging estimates are spotty and unreliable. A zero estimate for a state indicates a small sample size and no estimate was attempted.

County business pattern information may also introduce errors. To avoid disclosure of private information, the Census Bureau withholds employment information when there are few establishments in a geographic area. Exclusion of a single large employer can greatly affect the proportion attributed to small business. In addition, entry of enough firms into an area results in all of the establishments appearing in the statistics. This exacerbates the instability of the published series. No effort was made to compensate for unreported firms in this analysis.

Surveys of a wide range of businesses would be required to obtain the necessary detailed data. The Small Entity Analysis included in this section spreads expenditures across all beneficiary businesses in proportion to the number of establishments.

The direct expenditures described above cycle through the economy generating additional income and sales. Analysis of this multiplier effect is beyond the scope of this report but clearly $2.6 billion is the minimum stimulus from the migratory bird regulations.

Results

Migratory bird hunting generates considerable revenue for small businesses. In Arkansas, California, and Minnesota, migratory bird hunting generates over $100 million in expenditures in each state. Nationwide, migratory bird hunters spent approximately $2.6 billion at thousands of small businesses in 2016 (2023$). Some of this economic activity would occur without the annual promulgation of hunting regulations. Since much of the equipment and services used in migratory bird hunting can be used for other purposes, some of the annual sales would continue even if migratory bird hunting were prohibited.

5. Description of the projected reporting, record keeping, and other compliance requirements for small entities

The rule will establish national frameworks within which States may establish migratory bird hunting regulations. No reporting, record keeping, or other compliance requirements are necessary.

6. Description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes

The rule has a significant *beneficial* economic impact on small entities. Without the national frameworks, the States cannot establish hunting seasons and hunting is prohibited. A wide range of businesses and individuals benefit economically from the establishment of the annual migratory bird hunting regulations. This rule has the most positive economic effect compared to the other Alternatives.

6. For a covered agency, as defined in section 609(d)(2), a description of the steps the agency has taken to minimize any additional cost of credit for small entities

This rule does not impact any additional cost of credit for small entities.

Table 8. Estimated Migratory Bird Hunters' Expenditures on Food
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Food	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Alabama	8,430	9,105	8,140	7,538
Alaska	594	1,925	1,806	557
Arizona	3,573	12,786	11,254	3,144
Arkansas	22,942	5,673	5,162	20,876
California	40,987	93,154	84,762	37,294
Colorado	1,925	13,409	12,078	1,734
Connecticut	2,971	9,488	8,804	2,756
Delaware	383	2,226	1,970	340
Florida	1,899	44,550	38,987	1,662
Georgia	3,939	22,138	19,697	3,505
Hawaii	16	3,961	3,523	15
Idaho	1,140	3,662	3,378	1,053
Illinois	4,548	30,593	27,895	4,146
Indiana	5,572	13,537	12,059	4,964
Iowa	336	7,068	6,480	308
Kansas	2,177	6,100	5,477	1,954
Kentucky	2,946	8,368	7,404	2,607
Louisiana	19,162	10,221	9,140	17,135
Maine	3,198	3,831	3,569	2,980
Maryland	1,191	13,296	11,833	1,059
Massachusetts	3,547	19,700	18,032	3,246
Michigan	7,188	21,416	19,444	6,526
Minnesota	36,441	11,730	10,545	32,759
Mississippi	6,051	5,517	4,941	5,419
Missouri	15,274	12,814	11,453	13,652
Montana	6,519	3,090	2,883	6,081
Nebraska	2,313	4,555	4,208	2,138
Nevada	1,749	6,785	6,063	1,563
New Hampshire	179	3,642	3,356	165
New Jersey	972	24,177	22,585	907
New Mexico	4,892	3,908	3,435	4,299
New York	299	64,352	60,777	282
North Carolina	39,036	21,945	19,299	34,330
North Dakota	1,396	1,879	1,716	1,274

Table 8. Estimated Migratory Bird Hunters' Expenditures on Food
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Food	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Ohio	3,223	25,907	23,290	2,897
Oklahoma	1,792	8,085	7,343	1,627
Oregon	1,990	11,972	11,320	1,881
Pennsylvania	244	30,679	27,940	222
Rhode Island	362	3,275	3,077	340
South Carolina	1,959	10,923	9,614	1,724
South Dakota	10,918	2,098	1,947	10,132
Tennessee	5,887	13,319	11,829	5,229
Texas	25,936	57,299	50,569	22,889
Utah	3,257	5,637	5,053	2,919
Vermont	279	1,848	1,743	263
Virginia	27,051	19,085	17,084	24,215
Washington	6,750	18,167	16,955	6,299
West Virginia	47	3,640	3,316	43
Wisconsin	7,086	14,440	13,256	6,505
Wyoming	982	1,438	1,346	919

Table 9. Estimated Migratory Bird Hunters' Expenditures on Lodging
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Lodging	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Alabama	-	853	814	-
Alaska	232	284	261	213
Arkansas	1,385	721	694	1,334
Arizona	-	1,080	932	-
California	10,923	5,735	4,899	9,331
Colorado	-	1,353	1,199	-
Connecticut	-	382	326	-
Delaware	-	180	164	-
Florida	-	3,388	2,791	-
Georgia	955	1,996	1,855	887
Hawaii	1	293	178	1
Iowa	-	759	713	-
Idaho	-	373	351	-
Illinois	-	1,489	1,270	-
Indiana	-	991	931	-
Kansas	-	607	582	-
Kentucky	-	745	707	-
Louisiana	88	909	839	81
Massachusetts	-	778	633	-
Maryland	-	700	603	-
Maine	1,885	516	484	1,768
Michigan	-	1,343	1,225	-
Minnesota	-	931	815	-
Missouri	4,569	1,074	976	4,152
Mississippi	-	679	657	-
Montana	359	530	497	336
North Carolina	686	1,801	1,661	632
North Dakota	1,196	318	301	1,132
Nebraska	954	456	427	893
New Hampshire	-	332	297	-
New Jersey	-	1,041	934	-
New Mexico	524	631	582	484
Nevada	240	457	404	211
New York	69	2,340	1,965	58

Table 9. Estimated Migratory Bird Hunters' Expenditures on Lodging
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Lodging	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Ohio	17,915	1,419	1,302	16,437
Oklahoma	-	862	820	-
Oregon	882	967	878	801
Pennsylvania	-	1,479	1,309	-
Rhode Island	44	140	112	35
South Carolina	-	1,118	1,001	-
South Dakota	11,705	439	419	11,172
Tennessee	-	1,391	1,286	-
Texas	21	5,259	4,882	20
Utah	-	612	536	-
Virginia	1,939	1,523	1,349	1,717
Vermont	-	236	203	-
Washington	4,795	1,221	1,081	4,245
Wisconsin	396	1,097	995	359
West Virginia	-	320	300	-
Wyoming	-	397	365	-

Note: A hyphen (-) denotes that sample sizes are too small to report data.

Table 10. Estimated Migratory Bird Hunters' Expenditures on Transportation
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Transportation	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Alabama	179	3,217	3,202	178
Alaska	5,196	182	182	5,196
Arkansas	24,207	1,529	1,520	24,066
Arizona	5,367	1,604	1,584	5,300
California	54,662	7,488	7,424	54,196
Colorado	1,439	1,555	1,540	1,426
Connecticut	1,786	1,066	1,062	1,779
Delaware	290	247	246	289
Florida	14,904	6,336	6,312	14,848
Georgia	3,652	5,063	5,038	3,634
Hawaii	1	244	243	1
Iowa	1,139	1,745	1,733	1,131
Idaho	2,186	657	652	2,169
Illinois	12,353	3,816	3,787	12,258
Indiana	3,822	2,737	2,712	3,787
Kansas	2,068	1,072	1,056	2,038
Kentucky	5,348	2,024	2,014	5,321
Louisiana	24,935	2,419	2,399	24,729
Massachusetts	4,549	1,970	1,968	4,544
Maryland	766	1,480	1,474	762
Maine	6,429	773	772	6,421
Michigan	15,023	3,562	3,547	14,960
Minnesota	53,685	2,134	2,118	53,283
Missouri	32,089	2,669	2,636	31,692
Mississippi	5,418	2,022	2,016	5,402
Montana	2,566	505	499	2,535
North Carolina	26,794	4,491	4,475	26,698
North Dakota	3,067	459	449	3,000
Nebraska	4,107	968	961	4,077
New Hampshire	1,812	563	562	1,808
New Jersey	1,210	2,346	2,263	1,167
New Mexico	12,434	837	820	12,181
Nevada	14,669	800	784	14,376
New York	686	4,974	4,941	680

Table 10. Estimated Migratory Bird Hunters' Expenditures on Transportation
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Transportation	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Ohio	5,580	3,904	3,871	5,533
Oklahoma	9,110	1,858	1,849	9,066
Oregon	2,833	928	914	2,790
Pennsylvania	3,659	3,943	3,908	3,627
Rhode Island	690	306	306	690
South Carolina	1,835	2,609	2,590	1,822
South Dakota	36,431	617	615	36,311
Tennessee	6,290	3,466	3,444	6,251
Texas	36,995	11,397	11,300	36,680
Utah	15,123	746	733	14,860
Virginia	22,695	3,107	3,084	22,526
Vermont	371	416	415	370
Washington	5,161	1,896	1,885	5,131
Wisconsin	14,638	2,575	2,563	14,569
West Virginia	150	937	927	147
Wyoming	2,404	323	315	2,345

Table 11. Estimated Migratory Bird Hunters' Expenditures on Equipment
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Equipment	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Alabama	6,707	248	225	6,085
Alaska	972	77	73	921
Arizona	16,401	440	423	15,768
Arkansas	270,474	190	177	251,968
California	67,100	2,250	2,183	65,102
Colorado	6,216	780	745	5,937
Connecticut	36,153	276	267	34,973
Delaware	4,849	78	74	4,600
Florida	7,171	1,563	1,522	6,983
Georgia	45,736	494	456	42,217
Hawaii	-	121	121	-
Idaho	1,451	215	205	1,383
Illinois	38,462	640	605	36,359
Indiana	5,798	420	402	5,549
Iowa	16,709	221	210	15,877
Kansas	2,990	166	152	2,737
Kentucky	13,210	266	254	12,614
Louisiana	49,535	225	202	44,471
Maine	852	151	146	824
Maryland	585	291	279	561
Massachusetts	13,776	502	481	13,199
Michigan	76,879	735	713	74,578
Minnesota	89,374	512	482	84,137
Mississippi	16,447	129	120	15,300
Missouri	31,857	346	326	30,015
Montana	22,781	195	183	21,379
Nebraska	1,756	120	111	1,625
Nevada	3,032	159	153	2,917
New Hampshire	-	195	193	-
New Jersey	4,849	510	489	4,650
New Mexico	6,824	159	156	6,694
New York	164	1,189	1,143	157
North Carolina	9,096	676	644	8,665
North Dakota	2,724	53	48	2,467

Table 11. Estimated Migratory Bird Hunters' Expenditures on Equipment
(Expenditures in thousands of 2023 dollars)

State	Total MB Hunter Expenditures on Equipment	Total Number of Firms	Number of Small Businesses	Estimated MB Hunters' Expenditures at Small Businesses
Ohio	19,059	674	641	18,126
Oklahoma	4,092	215	199	3,787
Oregon	88	435	417	84
Pennsylvania	-	814	766	-
Rhode Island	1,282	76	76	1,282
South Carolina	8,141	277	257	7,553
South Dakota	11,237	86	82	10,715
Tennessee	12,951	371	351	12,253
Texas	20,071	1,167	1,017	17,491
Utah	10,329	334	321	9,927
Vermont	20,406	121	118	19,900
Virginia	16,439	492	465	15,537
Washington	7,389	559	534	7,059
West Virginia	-	116	112	-
Wisconsin	26,823	476	459	25,866
Wyoming	670	92	90	656

Note: A hyphen (-) denotes that sample sizes are too small to report data reliably.

Potential Future Research

The USFWS is examining potential research topics to expand the robustness of subsequent Regulatory Impact Analyses and created this preliminary list of research areas for the migratory bird hunting rule. The analysis already accurately quantifies the baseline and preferred alternative because the liberal frameworks have been selected over 20 years. The analysis currently qualitatively analyzes the remaining two alternatives. Therefore, the purpose of this research is to determine if there are existing methodologies and data to quantify economic impacts of the other alternatives.

The following is an outline of the data collection or analysis that would contribute to the quantification or monetization of different alternatives under this migratory bird hunting rule:

1. States' fiscal impacts related to the rule, including States' expenditures administering and enforcing their migratory bird hunting regulations and States' revenues from licenses and sales taxes.
2. Estimates of migratory bird hunters' consumer surplus by flyway.
3. Data to support analyzing the consumer surplus related to hunting for migratory birds other than ducks.
4. Analysis of welfare effects for non-hunters that may receive benefits or disbenefits from the Framework; for example, birdwatchers' use-values and the general public's existence value for managed bird populations.
5. Estimates of producer surplus for firms supporting migratory bird hunting (e.g., firms providing goods and services related to waterfowl hunting).
6. Data on the range of businesses surveyed by the Census Bureau in order to cover all necessary data and gathering more robust State-level data on lodging.
7. Research on the degree to which migratory bird hunter expenditures differ by species targeted.

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