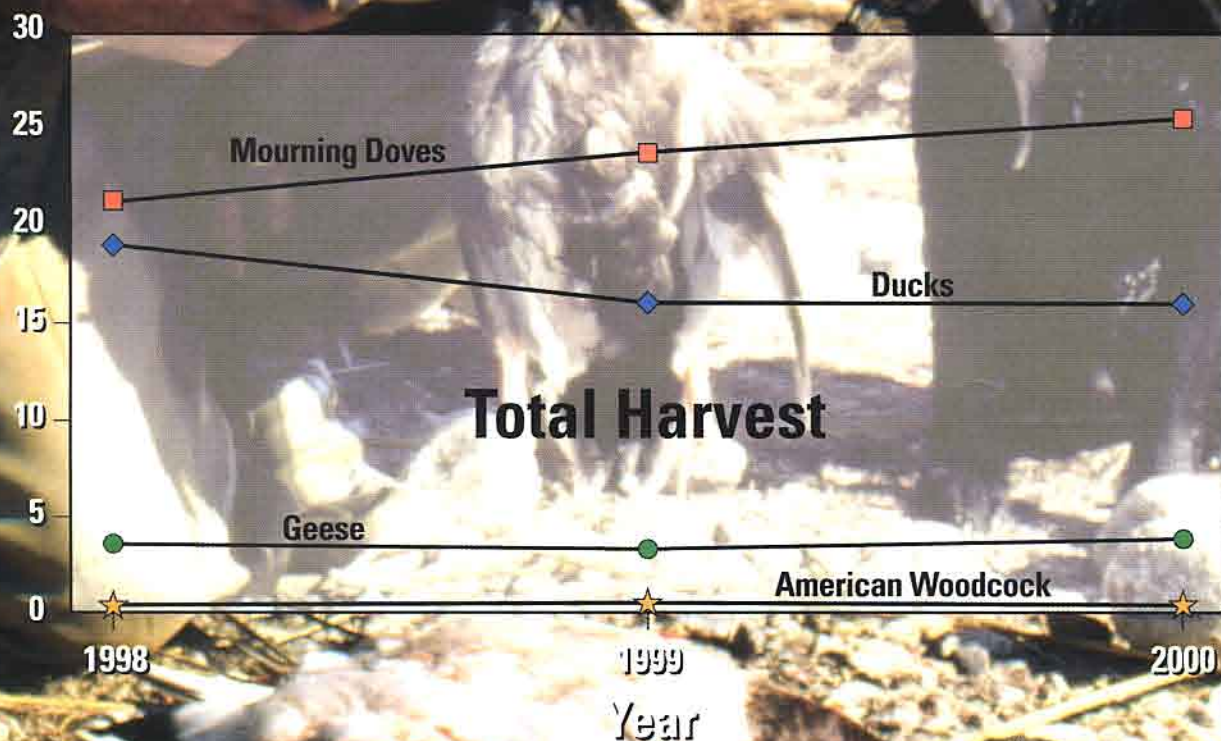


Harvest Information Program: Evaluation and Recommendations

Millions



Cover photo by David E. Sharp. Taken at Lake Helen in North Dakota, 1978.

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Harvest Information Program: Evaluation and Recommendations

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June 2002

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Harvest Information Program: Evaluation and Recommendations

EXECUTIVE SUMMARY

June 2002

HISTORICAL BACKGROUND

In 1989, William Molini, then President of IAFWA, appointed an ad hoc committee to develop a strategy for improving the overall reliability of the annual harvest estimates of migratory game birds and directed special emphasis on those species for which harvest data were the least satisfactory, e.g., doves and woodcock. In 1990, that ad hoc committee recommended to IAFWA that the Service, in cooperation with the states, establish a regulation requiring all migratory game bird hunters to obtain a nationwide permit annually. That recommendation (in *Ad Hoc Committee Report on Waterfowl Breeding Ground Surveys and Migratory Bird Harvest Surveys*) was approved at IAFWA's September 1990 business meeting and forwarded to the Service the following month. The intent to create rules for a national migratory bird harvest information program was published in the *Federal Register* in June of 1991. Today, the program is very different from the one envisioned by IAFWA and the Service in 1991. Instead of a nationwide permit, HIP consists of 49 states (Hawaii is not required to participate) supplying separate sampling frames to the Service for use in deriving national and regional estimates of migratory bird harvest. A more thorough explanation for the evolution of HIP is contained in the full report.

NEED FOR EVALUATION

The Harvest Information Program (HIP) became fully operational in 1998, but concerns existed about its operation and usefulness. Accordingly, the Migratory Shore and Upland Game Bird (MSUGB) Subcommittee (now known as the MSUGB Working Group) of the International Association of Fish and Wildlife Agencies (IAFWA) deemed it appropriate at their September 1999 meeting to undertake a comprehensive review of the program to determine whether it was meeting its goal and objectives and whether modifications were necessary. The U.S. Fish and Wildlife Service (Service) endorsed the review wholeheartedly. Ron George, Chairman of the MSUGB Subcommittee, appointed Jeff Ver Steeg as Chairman of an Ad Hoc Committee on HIP to conduct the assessment that is summarized here and detailed in the full report.

APPROACH

We began by compiling all pertinent files and correspondence relative to the formation of HIP. Concurrently, a variety of experts were invited to undertake a multi-faceted review of the existing program. These experts were organized into 9 "Task Groups" and each group was assigned a specific aspect of HIP to evaluate. The areas of investigation are detailed in the full report; the key findings are provided in this Executive Summary. It soon became evident that much of the information to assess HIP did not exist. Therefore, we were compelled to develop a rather extensive questionnaire that was sent to each state fish and wildlife agency in the United States. All states participating in HIP responded. Results from that survey, and the analyses of existing harvest data on file with the Service, were the basis for this report.

FINDINGS

The Need for HIP

We believe that the need for HIP is no less than it was in 1990. Better harvest information is essential to the responsible management of migratory game bird populations and to the future of migratory game bird hunting. Various federal and state laws, in effect, mandate that the harvest of migratory game birds be limited to levels compatible with their ability to maintain their populations. We conclude that HIP can provide biologists with many of the facts needed to ensure that both the migratory bird resource, and the hunting tradition, will continue for future generations to enjoy. However, that is not to say that HIP is perfect; it is not. Below are listed what we perceive as some of HIP's key strengths and weaknesses, and recommendations for improvement.

Strengths of HIP

The states and the Service established HIP with the primary goal of providing a means to conduct uniform, national harvest surveys annually for all migratory game bird species. Although there are still some deficiencies in the program, the primary goal has been achieved. Most of the HIP harvest surveys are producing reliable results, at least to the extent that comparability with the results of other surveys indicate reliability. For the 1999-2000 waterfowl hunting season, the HIP waterfowl harvest survey estimated a total national duck harvest of 16,047,200 birds (+/- 4% or 641,900 birds) and a total national goose harvest of 3,325,800 birds (+/-6% or 299,500 birds). Those estimates are very similar to the results of the federal duck stamp-based Waterfowl Hunter Survey that the Service still conducts annually, which estimated 15,824,900 ducks harvested and 3,073,900 geese harvested during the 1999-2000 season. Also, the 2 surveys obtained very similar results at the flyway level.

Although HIP hunter activity and harvest estimates for doves, woodcock, and the other migratory game bird species are not identical to similar estimates derived from state surveys, the differences seem to be mainly due to differences in the sample frames, survey instruments and procedures, and analytical assumptions used. In most cases, state survey and HIP estimates of the harvest per active hunter for those species agree closely. While HIP is currently providing standard state, regional, and national hunter activity and harvest estimates as intended, there is still much room for improvement.

Weaknesses of HIP

There are several areas where HIP can be improved and many of the weaknesses are interrelated. For example, vendor compliance remains a concern in several states that use license vendors to register hunters for HIP. Some vendors automatically register all hunters with HIP, whether those hunters are required to register or not. Some vendors fail to ask the screening questions altogether. Other vendors simply respond on behalf of the hunter (often without the hunter's knowledge or consent). One reason for this is that some vendors view the screening questions as burdensome and time consuming. Vendor compliance and the screening questions are therefore related to a certain extent. However, some hunters also view the screening questions as intrusive and time consuming. Memory bias may play a role in the accuracy of the hunter's response as well. So, the screening questions also present certain challenges of their own, unrelated to vendor compliance.

Surprisingly, not all migratory bird hunters seem to be aware of the requirement to be HIP-certified. As agency efforts to inform hunters of HIP wane, hunter awareness and compliance are likely to decline. Enforcement of hunter compliance varies greatly around the country, and few states undertake extensive efforts to monitor hunter compliance. The same can be said for vendor compliance.

Enforcement of HIP compliance, both on the part of vendors and hunters, has been inconsistent at best. In some states, the issue of vendor non-compliance is a serious concern, especially with chain stores that sell hunting licenses. If non-compliance is not treated in a fashion similar to other related regulations, e.g., possession of a migratory waterfowl stamp, then both hunters and vendors fail to take the requirement seriously.

Exempted groups of hunters, e.g., youths, seniors, lifetime license holders, and landowners, present certain challenges from a sampling standpoint. As the number of hunters exempted from HIP registration increases, so does the potential for "accuracy error" and, ultimately, the likelihood of misleading harvest estimates.

Despite these shortcomings, HIP is working and has the potential for considerable improvement. What follows are our key recommendations for improving the program.

RECOMMENDATIONS

Note: These recommendations are not in priority order.

The Future of the Harvest Information Program

The Service should continue with HIP. We believe the need for HIP is as great as, if not greater than, it was when the program was created. However, we believe significant improvement is warranted and, therefore, we recommend that the states and the Service pursue several changes to improve the program.

Information and Education

The Service and the states must increase their efforts to educate hunters and vendors about the HIP certification requirement and the importance of the program. Although compliance among waterfowl hunters on the whole appears fairly high, awareness of HIP among other migratory game bird hunters has considerable room for improvement. Given that the intensive educational efforts typical of most states at the beginning of HIP have waned, hunter compliance in the future is more likely to decline rather than remain stable or increase (see Tasks 4 and 5).

Communication with the States

The Service should work closely with the states *collectively* to improve state agency acceptance of HIP as the standard for obtaining needed harvest data. Continued communications and information exchange between states and the Service will be crucial in order to improve understanding and acceptance of HIP. Nationwide workshops like those of the past could be particularly useful. We especially urge the Service to provide the states with preliminary reports on HIP survey results prior to the beginning of the annual regulations-setting process (see Task 7).

The Service should contact the states *individually* to determine any special needs related to implementing HIP. Additional dialogue about specific state problems and needs is crucial to improving the program and increasing its acceptance. The Service should also share information from states successfully using HIP with other states desiring assistance in implementation. In some cases, HIP provides an opportunity for individual states to discontinue redundant surveys, resulting in a cost savings to the state. We therefore recommend that the Service assist interested states in determining if, and when, HIP can provide data of sufficient quality to replace individual state surveys (see Task 7).

Screening Questions

We recommend that the Service further investigate the feasibility of a reduced level of stratification, primarily by examining an additional year of survey data. We also recommend that the Service pilot a shorter series of screening questions to measure the actual impact of using a reduced level of stratification. Although inconclusive, available information suggests that this approach has merit. Because it will not require a large increase in sample size, the associated costs are not likely to be much greater than the current approach and the quality of the information should not be significantly compromised. We believe that reducing the time and effort required to ask and answer the screening questions has the potential to improve vendor and hunter compliance (see Tasks 2 and 5).

Enforcement of Hunter Compliance

We recommend stricter enforcement of the HIP registration requirement in states where such enforcement has been minimal or nonexistent (see Tasks 4 and 5).

We recommend that, to the extent possible, both the Service and the states provide a more consistent level of HIP enforcement throughout the country (see Task 4). We believe that HIP compliance should be enforced with the same vigor as hunting without a federal or state waterfowl stamp. We specifically urge the Law Enforcement Committee of the IAFWA to develop uniform enforcement guidelines as soon as possible for adoption by the Service and the states.

Vendor Compliance

License vendors are important state agency partners. As such, sanctions or enforcement action against vendors can present special problems. However, license vendors are a critical component of the HIP system in a large number of states. As long as license vendors continue to play a role in HIP, the committee recommends that states employ better techniques to monitor vendor compliance. We also recommend that states establish clear and significant consequences for vendor noncompliance (see Tasks 3 and 5).

We recommend that the President of the IAFWA assign an existing committee, or form an ad hoc committee, to analyze our recommendations further related to vendor compliance. Among other things, that committee should investigate the relationship we detected between the amount of the fee collected by the vendor and the degree of compliance (see Task 3).

We recommend that states examine, and possibly adopt, HIP-certification systems that eliminate or minimize the services of license vendors. Collecting HIP information directly from hunters without third-party, i.e., license vendor, intervention would eliminate many data errors caused by the third party (see Task 8). However, we note that the HIP-certification systems that eliminate the need for license vendors also tend to be the most expensive (see Task 9) and, therefore, may not be an affordable solution for every state. We also suggest that the states consider a standardized, multi-state system for HIP data collection and possibly other permits (see Task 8).

HIP Registration Fees

Each state without the authority to require a fee for HIP registration should consider seeking such authority. Charging a fee for a migratory bird stamp or permit required of all migratory game bird hunters has the potential to increase hunter awareness as well as hunter and vendor compliance. There appears to be a relationship between the amount of the fee charged and the degree of compliance (see Task 3). Additionally, such a fee could generate revenues to support or offset the cost of HIP education and enforcement efforts.

Such a stamp or license could also be very useful to generate state matching shares for such funding programs as CARA, NAWCA, P-R funds, MARSH and other grant sources to foster improved bird conservation (see Tasks 3 and 6).

Exempted Hunters

We recommend that states minimize the number of hunters exempted from HIP. Name and address lists that contain outdated information, fail to include all active hunters, or include inactive hunters compromises the surveys. The sampling frame is the foundation of the HIP surveys. Without this solid foundation, HIP cannot provide sound results. Consequently, it is important for states to improve their efforts to obtain the highest quality HIP sampling frames (see Task 6).

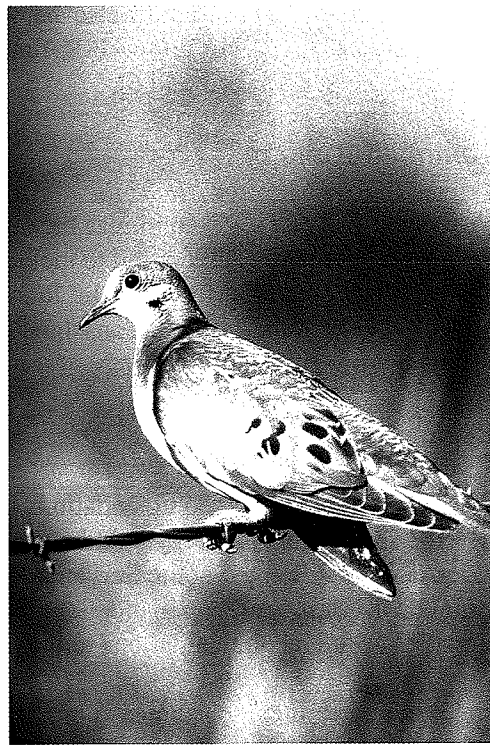
Mechanics

There are a number of recommendations in the full report dealing specifically with the “nuts and bolts” of the HIP survey methodology. Although a few of these recommendations apply to the states, most are understandably directed at the Service. We strongly encourage the Service to note and consider them. A complete list of these recommendations can be found primarily under Task 6. The following are just a few examples of the recommendations to the Service:

1. Investigate potential sources of bias and to evaluate the impact of such biases on the harvest estimates.
2. Develop and maintain data to determine trends and variations in bias over time.
3. Conduct additional research over a number of years to determine if the bias is consistent and to ensure that current harvest estimates are correlated with reality.
4. Determine the impact on harvest survey results when changes are made to the survey design.

Funding

We recommend that IAFWA support an increase in the Service’s budget of \$300,000 annually to assist the Division of Migratory Bird Management (MBM) with research and outreach efforts related to many of these recommendations. We further suggest that \$150,000 of the \$300,000 be allocated to MBM on an annual basis as part of the base budget for at least the next 10 years to support efforts directed specifically at improving the HIP survey design and methodology (see Task 6 regarding research needs).



Top left: Success on Youth Waterfowl Hunting Day at the Russell Lakes State Wildlife area in southern Colorado. *Photo by David Dolton.* Top right: Mourning dove. *Photo by Larry Ditto.* Middle: Hunter with mallards and sandhill cranes near Mercer, North Dakota. *Photo by David Sharp.* Bottom left: Greater scaup. *Photo by T. J. Moser.* Bottom right: Hunter with green-winged teal near Jamestown, North Dakota. *Photo by David Sharp.*

A History of the Development of the Harvest Information Program

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Abstract: This report reviews the need for an improved nationwide harvest survey of migratory game birds which led to a new survey being instituted to help guide management decisions for these species. Also, we document the efforts to develop and implement the nationwide Harvest Information Program (HIP). HIP was proposed in 1990 by the International Association of Fish and Wildlife Agencies (IAFWA). The goal was to provide reliable estimates of hunter activity and harvest at national and regional scales for all migratory game bird species. The objectives were to: (1) establish a national sampling frame annually that consists of all migratory game bird hunters in the United States, and (2) develop national harvest surveys for each migratory game bird species. The U.S. Fish and Wildlife Service (Service) and the IAFWA's committees jointly addressed various issues that surfaced through the implementation phase. At the beginning of the pilot phase in 1991, a state/federal technical group was formed to evaluate program requirements, the different approaches used by the pilot states, and the Service's survey procedures during the pilot phase. Changes were incorporated into the program as a result of the technical group's evaluation. The Migratory Shore and Upland Game Bird (MSUGB) Committee became the lead committee for the IAFWA after the pilot phase. The Flyway Councils were also kept apprised and invited to provide input. The Service held 6 special workshops from 1991 to 1997 with state HIP coordinators to identify and address issues and concerns with program implementation details. The program rules were promulgated through the *Federal Register* process, thus allowing further state and public input on the Proposed Rule and succeeding rule changes. Resolution of the major issues were: (a) the Service pays the state for each record the state provides to help defray the cost to the states; (b) migratory bird hunters are required to validate or certify for HIP in each state that they hunt migratory birds; and, (c) states are not required to HIP-certify hunters who are exempt from state hunting licenses. Most other issues raised through the implementation process were handled with agreements between the Service and the individual state wildlife agencies. Once HIP was fully operational, the MSUGB Subcommittee (formerly Committee) deemed it appropriate to undertake a comprehensive review of HIP to determine whether it is meeting its goal and objectives and whether modifications are necessary. An Ad Hoc Committee on HIP was formed to undertake this task. This report is the result of that effort.

HISTORICAL REVIEW

The Harvest Information Program (HIP) was developed to fill the need for reliable harvest data to help guide management decisions for migratory game birds. Federal waterfowl harvest surveys have existed since 1952. However, the surveys lacked a reliable sampling frame of names and addresses of all migratory bird hunters and, thus, did not adequately address webless migratory game birds. In addition to improving the existing waterfowl harvest survey, the goal of establishing a new survey was to provide reliable estimates of hunter activity and harvest at national and regional scales for *all* migratory bird species. The objectives were (1) to establish a national sampling frame annually that consists of all migratory game bird hunters in the United States, and (2) to develop national harvest surveys for each migratory game bird species.

Over the years, many proposals were made and even bills were introduced in Congress, to establish some type of a permit to hunt migratory birds that would provide a reliable national sampling frame. At the International Association of Fish and Wildlife Agencies' (IAFWA) September Meeting in 1989, President William Molini appointed an ad hoc committee comprised of Ken Babcock (MO) as Chair, Pete Duncan (PA), and Red Hunt (CA) to develop a strategy for obtaining information on basic data gaps on migratory birds. The committee prepared an *Ad Hoc Committee Report on Waterfowl Breeding Ground Surveys and Migratory Bird Harvest Surveys* that was presented to the IAFWA in September 1990. The following

recommendations were made in that report. A time-line of actions taken on these recommendations is shown in Table 1.

1. The IAFWA should urge the U. S. Fish and Wildlife Service (Service) to publish a proposed rule in the *Federal Register* establishing a regulation requiring all migratory bird hunters to obtain annually a national migratory bird hunting permit. For waterfowl hunters, this permit would be required in addition to the federal duck stamp and the permit would be valid in all states. The effective date of this regulation should be July 1, 1992.
2. The Service should be responsible for printing the permits and supplying them to the state wildlife agencies by July 1 of each year for distribution to their normal license vendors or in a manner which best meets their specific needs.
3. The permit should be designed to provide a current list of names and addresses of migratory bird hunters from which a sample could be drawn to conduct a post-season harvest survey.
4. The Service should enter into a Memorandum of Understanding (MOU) with each state outlining the responsibilities of each party concerning the national migratory bird hunting permit program. The MOU would clarify that the cost of the permit would be established by the state, and the state would retain all funds generated by sales.
5. The Service should be responsible for conducting post-hunting-season migratory bird harvest surveys that meet national and regional management needs. The Service should work with individual states to design surveys that meet special management needs or which might replace existing state surveys.
6. Final design of the national migratory bird hunting permit and procedures for implementation should be developed by a committee chaired by the Service with appropriate representation of Service staff, plus one representative from each of the four waterfowl flyway councils and a representative each from the IAFWA Migratory Wildlife Committee and the Migratory Shore and Upland Game Bird Committee.

There was considerable debate at the business meeting on the merits of the recommendations. The following was taken from the minutes of the business meeting, September 11, 1990 in New Orleans, LA, and is recorded in the IAFWA proceedings. "Mr. Babcock then presented the conclusions and recommendations of the report relative to harvest data. Bontadelli (of California) moved and Duncan (of Pennsylvania) seconded a motion to accept the conclusions and recommendations of the report relative to harvest data. Mr. Kelly (of Alabama) indicated he was supportive of the proposal. A question was then asked if the Service had authority to implement such a study. The response was "yes." Can the Service do it without additional revenue? Again the response was "yes." Also, a question on will there be an opportunity to comment on the mechanism for implementation. At this point Mr. Doig (New York) proposed an alternative to delay approval until the Service does a further feasibility study and considers the matter at a later date. Sensing little support, the alternative was withdrawn. Following considerable discussion and several comments supporting the proposal, the vote was called. The motion passed unanimously, with three abstentions for the record: Mr. Opolka for Michigan, Mr. Doig for New York and Dr. Timmerman for South Carolina."

In October 1990, IAFWA formally requested that the Service implement the recommendations. At the IAFWA March 1991 Executive Committee meeting in Denver, CO, the Association's president, William Molini, announced that he was establishing the Migratory Shore and Upland Game Bird (MSUGB) Committee as a separate committee with Ken Babcock as Chairman. The main charge to the MSUGB Committee was to establish a mechanism to acquire data on migratory upland birds. Previously, the Committee was a subcommittee of the Migratory Wildlife Committee.

At the March 23, 1991, MSUGB Committee meeting in Edmonton, Alberta, Tom Dwyer, Chief of the Service's Office of Migratory Bird Management (MBMO), stated that the Service recognized the effort must be truly cooperative (between the Service and the states) to achieve the objectives and proposed initiation of a 2-year pilot project to begin during the 1992-93 hunting season. At the successful conclusion of the pilot study, 10-15 states would be added each year until all states were phased in, probably by 1998. He also stated that "Financing any additional staff will need to be phased in along with the addition of states as the survey progresses".

In June 1991, the Service published a Notice of Intent in the *Federal Register* to establish rules for the Migratory Bird Harvest Information Program. The Service published this Notice to provide information on both the need and procedures that may be necessary to initiate a new program. This notice was to allow the Service to receive public comment and suggestions in advance of preparing a proposed rule to implement the program.

The following was documented in the September 7, 1991 meeting minutes of the Migratory Shore and Upland Game Bird Committee and describes the original intent to implement the program. The name of the effort was changed from "The National Bird Harvest Information *Permit*" to "The National Bird Harvest Information *Program*" [emphasis added] to eliminate the word "permit" which was objectionable to some state agencies. The proposal would have a few states participate in a two-year pilot. At the time of the September meeting, proposed pilot states were California, Missouri, Pennsylvania, and South Dakota. Even though there was not a true Proposed Rule in place, let alone a Final Rule, the Service, being true to its commitment to work with the states, had already worked out a MOU with all 4 states (Pennsylvania had already signed the MOU). The intent was to phase in additional states starting in 1994 and have all states participating by 1998. All migratory game bird hunters in participating states would be required to have in their possession a signed Harvest Information Card with a serial number assigned by the Service. The card would be filled out at the time of "purchase." The states could charge a fee or provide free survey cards. Information gathered would be name, address, and date along with a few questions that could be used to stratify sampling for an efficient survey of all migratory bird hunters. There would also be room for the states to ask additional questions to assist them with individual state surveys. The vendors would send the survey cards to the Service within one day of issuance. State agencies would develop adequate control measures to ensure accounting of all responses and actual survey cards.

Also at the time of the September 1991 meeting, 2 other options were being considered for having cards separate from state licenses. The first option would be to combine the Harvest Information Card with a state hunting license, the survey card remaining separate. The state would assume responsibility for accounting of the Harvest Information Cards. The state license of each hunter would have stamped or printed on it "Migratory Bird Harvest Information Card", and a space would be available for the hunter's signature, birth date, issue date, and the serial number of the survey card. The second option would be to combine both Harvest Information and survey cards with a state license. Under this option, the state would assume responsibility for the accounting of the information. The state agencies would promptly mail to the Service a computer diskette with the names, addresses, date of issuance, and answers to voluntary questions.

The Service would select a sample of hunters for harvest surveys of the various species or groups of species. Letters and hunting record forms would be sent to hunters from each sample within two weeks of receipt of the names and addresses. The survey procedures would be the same as the existing Waterfowl Harvest Survey, except that names and addresses would no longer be obtained from federal duck stamp purchasers.

The cost of the pilot study was estimated to be \$352,000 per year (\$86,000 for staffing and \$266,000 for operating expenses, including a public information campaign). After considerable debate over the use of soft money or asking for a line item in the Service budget, it was decided to have the IAFWA support a line item for the two-year pilot phase.

On September 17-18, 1991, a meeting was held in St. Louis, MO, for the Service to gather input from the states for the development of the HIP pilot stage. Representatives from Missouri, California, Pennsylvania, Illinois, Minnesota and South Dakota, with responsibilities for surveys, waterfowl management, administration, licensing, permits, revenue, and research, were present to assure that all aspects of the states' responsibility for implementing HIP were considered.

Delays in getting the Proposed Rule in the *Federal Register* and the associated problems slowing implementation of the program are documented in the minutes of the Migratory Shore and Upland Game Bird Committee meeting March 28, 1992, in Charlotte, NC. Questions from within the Department of Interior initially delayed the process. Just as these problems were resolved, the President froze all government regulations and put a 90-day moratorium on publishing any new regulations, further delaying publication of the Proposed Rule.

Originally, 4 states, Pennsylvania, Missouri, California and South Dakota were to participate in the first year of the 2-year pilot stage. However, Pennsylvania had to drop out because state regulations required federal action, i.e., publication of a Proposed Rule, to be taken earlier. The question posed to Tom Dwyer, Chief, MBMO, asked if there were any restrictions on the stated use of the sampling frame. He responded that there were none. If a state chooses to combine the HIP with their state license, they will have all the names and addresses available for use without restriction. If a state opts to treat their licensing system and HIP separately, the Service will immediately make the database available to that state, the entire database, not just the sample used for the surveys. It was also asked if a public relations effort was going to be conducted to educate hunters on the need and reasons for the program. Mr. Dwyer answered that a video that was shown to the committee was the first effort and the Service budgeting included money for educational purposes. Also, outdoor writers had been contacted and several articles written, and Ducks Unlimited agreed to show the video at their events. In Missouri, provisions were made for the first year for hunters to purchase the HIP card if they were encountered in the field without one, thereby avoiding law enforcement problems. Mr. Dwyer said that the last thing that is desired is to anger people over a new program that is desperately needed, and that federal law enforcement officials also will be asked to be lenient on "HIPsters" the first year.

The minutes of the MSUGB Committee September 12, 1992 in Toledo, OH, reflect that most of the time was spent discussing HIP. The proposed regulation was finally published in June of 1992. It changed from what had been discussed at the March meeting. The main change was that the Service would not be providing survey cards to the states, thus shifting more of the responsibility and cost to state agencies. The change in the Proposed Rule was the result of concerns raised by the Office of Management and Budget (OMB) during their review of the Proposed Rule. OMB agreed on the need for the program, but felt strongly that it should be a state priority and not burden the hunters with a dual recording process. OMB expressed concerns about requiring hunters to carry a card with the Service's logo and that it might be perceived as a federal hunting license. Also, OMB was concerned about the federal cost of the program. The Service stated they could not provide the states with survey cards but they suggested the Service could provide funding assistance through alternative approaches, although it may be limited to the dollar support planned originally.

The proposed regulation called for phasing in additional states each year after the pilot stage. Starting with states that have the most migratory bird hunters, about 1 million hunters would be added each year over a 5-year period, until all states participated by 1998. The Proposed Rule suggested a yearly entry date for each state and required the states to send in hunter survey information within 5 days of issuance. The Service indicated that a state's entry date would be viewed as a guideline and there would be flexibility within reason. Turnaround time for HIP-certification information may be negotiated in developing individual memoranda of understanding between the Service and each state.

The states raised several concerns. Some states would have to revise their licensing system requiring changes in state law that the legislature may not want to enact. Concerns were raised that the program may evolve into a mandated federal program without federal funding. Service personnel responded that even though funds were tight, they should be able to cover the current pilots. They also stated that they had requested a budget increase to fund the program and that the amount requested along with, possibly, the use of Federal Aid funds may provide funds to help the states. There was a question raised that if a state legislature were to rule against implementation of HIP in that state, what would the Service do? The Service's reply stated in the minutes was "Use of a reasoning and cooperative approach (Note: mandatory compliance was not discussed)." There were 2 other issues raised that the Service could not address at that time. The first was how are hunters that are exempt from a state hunting license, e.g., juniors, seniors, and landowners, going to be handled? The second was if a state legislature stipulates that non-residents, as well as residents, must have the state permit, how would the conflict be resolved since the Proposed Rule called for the HIP card to be valid in all states?

As recorded in the minutes of the MSUGB Committee's March 20, 1993 meeting in Washington, D.C., "Mr. Babcock stated that this program continues as one of the top priorities of the Committee. The ad hoc committee that originally represented the IAFWA to develop the proposal for the program has been dissolved; the IAFWA president has invested the administrative oversight for full implementation of the program to this committee". Mr. Babcock also announced that Mr. Bob Jessen had been hired by the Service as coordinator of HIP and considering Bob's vast experience in Mississippi and the Central Flyway activities, he viewed it as a positive indication of the Service's willingness to work closely with the states in solving their problems as they enter the program.

The following is summarized from the March 20, 1993 minutes of the MSUGB Committee. The Final Rule was published in the March 19, 1993, *Federal Register*. It would have come out earlier as a final rule, but delays were caused by waiting to get input at the IAFWA September meeting and the change in administration and the attendant procedural changes. The implementation schedule remained the same in the Final Rule with a goal of bringing a million hunters into the program per year until 1998 when all states would be participating. OMB not only rejected the concept of a federal permit, but also ruled against the Service cost-sharing state permits because it would imply that the Service would be involved in licensing. However, the Service thought it may be able to cost-share other aspects of the program. The requirement of a 5-day turn-around time for obtaining names and addresses had been softened; the Service would work with individual states to arrive at a mutually acceptable solution. The Service was still exploring alternatives to resolve the problem of sampling exempt hunters (hunters not required to have a state hunting license, e.g., juniors, seniors, and landowners). As to the problem of a state legislature having to enact HIP legislation and failing to do so, the Service responded that they were prepared to negotiate with individual states to reach an equitable solution.

At their September 11, 1993 meeting in Lake Placid, NY, the MSUGB Committee discussed at length the issue of sampling exempt hunters. That discussion resulted in the Committee passing a motion, introduced by Duane Shroufe (AZ), that the Committee go on record in support of a modification of the sampling frame for the Migratory Bird Harvest Information Program that would recognize the fact that some states might have to participate in something other than a universal frame of all migratory bird hunters. Vernon Beville (TX) asked if there wasn't a second part to that motion to encourage those states that initially must pursue a modified approach to find ways to provide all names and addresses. Ken Babcock indicated that he thought that was implied as part of the negotiations that would go on between the Service with each individual state, and that it may not need to be part of the motion.

Congress was considering the Service's budget request for the support of HIP at the time of that meeting. The amounts being considered were \$750,000 in the Senate and \$250,000 in the House of Representatives.

These funds would be used for capital equipment, staffing, and to purchase the names and addresses from the states. There was also a request for Federal Aid Administrative funds through the IAFWA Grants-in-Aid Committee. These funds would be used to help defray some of the start-up costs by the states in modernizing their licensing equipment to help reduce their annual operational costs. Paul Schmidt, the new MBMO Chief, reported on the third annual workshop on the National Migratory Bird Harvest Information Program that was held prior to the Committee Meeting. About 20 states and 50 people attended. He also stated that the Service intended to continue these workshops. Mr. Babcock commended the Service for these workshops because they provided a forum for people to discuss concerns; out of the resulting discussions, HIP will continue to develop and move forward. There was also discussion about how to keep the Flyway Technicians informed and involved in the evolution of HIP.

At the March 19, 1994 meeting in Anchorage, AK, the Service briefed the Committee on proposed changes to the HIP rule. The proposal for 1994 stated that all migratory bird hunters must identify themselves in each state participating in HIP. Also, hunters will be exempt from the permit requirement if they are also exempt from state licensing requirements. There was considerable discussion on how these exemptions should be handled. It was reported that Dr. Vernon Wright at Louisiana State University was investigating the degree of bias and looking at ways to sample the exempt hunters. No action was taken pending the results of Dr. Wright's on-going study. The IAFWA Grants-in-Aid Committee had endorsed, and the Service approved, the Federal Aid administrative funds grant for \$500,000/year for 3 years to be split among the states entering the program in 1994 through 1996. (The Service also requested and received a Federal Aid grant for states that entered into the program in 1997 and 1998. The total from both grants was \$3.25 million for the states to initiate HIP.) The amount distributed to each state was based on the estimated number of hunters in the state. Funding assistance for smaller states was based on a minimal payment of \$25,000 for paper names and addresses and \$50,000 for electronic files. Also, the Service was to pay each state agency \$0.30 per migratory bird hunter name and address provided for sampling purposes for the first two years and \$0.10 each year thereafter. These prices were deemed to represent fair market values. The reimbursement was not to cover total state costs, but it was intended to show partnership between the states and the Service. The FY 1994 annual budget request was for \$750,000, but the Congressional appropriation was reduced to \$500,000. Even though the program was technically out of the pilot phase, it was noted that continued innovative problem-solving would be necessary throughout the entire implementation period. The minutes also noted that the workshops, hosted by the Service, were an exceptionally productive way to identify and resolve problems through cooperative participation between the Service and the states.

In 1995, a small group of Technical Section representatives from the Flyway Councils met with the Service in Laurel, MD in response to the Pacific and Atlantic Flyway Councils' recommendation that HIP surveys be used to gain more precise harvest estimates for some species. The group developed a proposal that addressed the extent and precision levels needed for the survey to address management needs for major and minor species of migratory birds. The proposal would expand the number of surveys and forms that would be needed from 3 to 5. The 5 surveys would be (1) a waterfowl harvest survey covering ducks, sea ducks, geese, and brant; (2) a survey covering mourning doves, white-winged doves, and band-tailed pigeons; (3) a coot, gallinule, rail, and snipe survey; (4) a sandhill crane survey; and, (5) a woodcock survey. The proposal was taken to Flyway Councils and the Migratory Bird Committee of the IAFWA without objections being raised. The Service then incorporated these 5 separate surveys into HIP.

After the pilot phase, the only major change to the program was timing of when individual states were to enter into the program. These changes were addressed by publishing the schedule changes in the *Federal Register*. All of the states except Hawaii, which is not required to participate, were in the program by the fall of 1998.

The issue of how to survey hunters exempt from having a state license had no universal resolution. However,

states were encouraged to make every attempt to include exempt hunters into the sampling frame, and those states that could, did so.

At the March 1999 meeting of the MSUGB Subcommittee (formerly Committee), Ken Babcock suggested that an ad hoc group be formed to work with Paul Padding to help work through problems associated with HIP. Mr. Babcock felt that the Service shouldn't have to go back to the states to solve all the problems; some peer pressure may be necessary. Discussion revolved around that fact that, since HIP was now fully operational, it was appropriate to undertake a comprehensive review of the Program in order to determine whether it was meeting its objectives and whether modifications were necessary. After getting approval and support from the IAFWA's Migratory Wildlife Committee, Subcommittee Chairman Ron George appointed Vernon Bevill as Chairman of that group which became known as the Ad Hoc Committee on HIP. Chairmanship later shifted to Jeff Ver Steeg. Richard Elden was hired to coordinate the collection of information from the states and also coordinate the committee's reports. Attachment A gives the basic plan of approach the ad hoc committee used to organize a group and identify some of the evaluation needs of this effort. This report is the result of that effort.

CURRENT SITUATION

Despite some initial opposition from a few hunters and non-government organizations, e.g., the National Rifle Association, HIP now seems to be well received by both hunters and the organizations that many of them belong to, including the NRA. The burden imposed on hunters has turned out to be minimal, and the states' and the Service's efforts to point out the conservation and management benefits of the program have apparently been successful. About 4 million hunters are participating in HIP each year, and very few of them seem to consider it a burden. However, HIP is less popular with the license vendors who are required to issue migratory bird hunters their HIP certifications in some states, with little or no compensation for their extra effort.

Although the Service apparently believes that HIP is close to achieving the goal of reliable hunter activity and harvest estimates for all migratory game birds, the states have mixed opinions. Some states are satisfied with the program and the results of the HIP surveys, while others are concerned about the cost burden HIP imposes on them and/or the reliability of the HIP survey results to date. Thus, some states question whether the program's benefits justify its costs. There does seem to be consensus among the states and the Service that HIP still can be, and must be, improved to fully achieve its goals.



Dove hunter near Abilene, Texas. *Photo by David Dolton.*

Table 1. Accepted recommendations of the 1990 *Ad Hoc Committee Report on Waterfowl Breeding Ground Surveys and Migratory Bird Harvest Surveys* and subsequent action taken.

Ad Hoc Committee recommendations	Action taken
The International Association of Fish and Wildlife Agencies (IAFWA) urged the U.S. Fish and Wildlife Service (Service) to publish a proposed rule in the <i>Federal Register</i> establishing a regulation requiring all migratory bird hunters to annually obtain a national migratory bird hunting permit. For waterfowl hunters, this permit would be required in addition to the federal duck stamp. The effective date of this regulation should be July 1, 1992.	June 1991: The Service published a Notice of Intent to establish the Migratory Bird Harvest Information Program in the <i>Federal Register</i> . "Permit" was changed to "Program". The Service would provide the Program Card to the states. State license vendors would distribute the cards for all migratory bird hunters.
The Service shall be responsible for printing the permits and supplying them to the state wildlife agencies by July 1 of each year for distribution to their normal license vendors or in a manner which best meets their specific needs.	June 1992: The Proposed Rule was published in the <i>Federal Register</i> . The Service would not be providing permits or reimburse the states for issuing HIP certification. HIP started as a 2-year pilot program for volunteer states after which the Service would do an evaluation and then phase in all states by 1998. March 1993: Final Rule was published in the <i>Federal Register</i> . Each year a new Final Rule was published adding more states into the program.
The permit would be valid in all states, regardless of where purchased.	August 1995: <i>Federal Register</i> required hunters to be HIP certified in all states where they hunted migratory birds.
The permit shall be designed to provide a current list of names and addresses of migratory bird hunters from which a sample could be drawn to conduct a post-season harvest survey.	Hunters that are exempt from the purchase of state hunting licenses are also exempt from the HIP certification requirement.
The Service shall enter into a Memorandum of Understanding (MOU) with each state outlining the responsibilities of each party concerning the national migratory bird hunting permit program. The MOU shall clarify that the cost of the permit shall be established by the state and the state shall retain all funds generated by sales.	At the start of the program, the Service entered into a MOU with each of the participating pilot states. After the pilot state, responsibilities were specified in each new Final Rule.
The Service shall be responsible for conducting post hunting season migratory bird harvest surveys that meet national and regional management needs. The Service should work with individual states to design surveys that meet special management needs or which might replace existing state surveys.	Throughout the implementation and current operation of HIP, surveys were designed to obtain, as accurately as possible, state and national estimates of harvest and hunter participation.
Final design of the national migratory bird hunting permit and procedures for implementation should be developed by a committee chaired by the Service with appropriate representation of Service staff, plus one representative from each of the 4 waterfowl Flyway Councils and a representative each from the IAFWA's Migratory Wildlife Committee and the Migratory Shore and Upland Game Bird Committee.	There was close coordination with the IAFWA committees and the Flyway Councils. The Service sponsored HIP workshops with the states from 1991 to 1997 that also served as the state/federal technical group.

Attachment A.

September 17, 1999

Report to: Migratory Shore and Upland Game Bird Subcommittee (MSUGB)

By: Vernon Bevill, Texas Parks and Wildlife Department
 Paul Padding, U.S. Fish and Wildlife Service

Subject: Establishing an Ad Hoc Committee to Evaluate the Nationwide Implementation of
 the Harvest Information Program (HIP)

Since the March 1999 meeting of the MSUGB Subcommittee in California, we have met twice for the purpose of developing a basic plan of approach for organizing an Ad Hoc HIP Evaluation Committee and we have identified some of the evaluation needs of this effort. Since HIP was approved as a collaborative effort of the International Association of Fish and Wildlife Agencies (IAFWA) and the Service in 1991, we thought it important to approach the following in this evaluation:

1. Revisit the goals and objectives for HIP as set forth by the IAFWA in the earlier meetings to determine whether HIP is operating within the context defined by the IAFWA. If changes or modifications have occurred, what prompted these changes and how were they approved?
2. Now that HIP has been in place in some states for five or more years and in all states for at least two years, determine the continuing issues and/or problems relating to the following:
 - a) are HIP screening questions providing information necessary to stratify the survey as envisioned; b) determine the scope, types and impact of vendor non-compliance; c) determine the same for hunter non-compliance; d) determine the role and impact of the large chain type licensing vendors, such as Wal-Mart, in the overall success or failure of HIP; e) evaluate the current reliability of the national surveys on migratory birds with special emphasis on waterfowl, woodcock, doves, and lesser hunted species; f) determine how HIP has impacted state level survey capability and reliability; g) evaluate the success/problems associated with different types of license systems on the quality of the data received; h) determine the real cost of HIP as an ongoing responsibility of the states and the Service; and i) determine whether implementation of HIP has had a positive or negative impact on the number of licenses sold within a state.
3. Conduct a survey of State Wildlife Agency heads to determine whether HIP still has the support it had when implemented.
4. Develop recommendations necessary to improve or resolve current issues and problems associated with HIP and report to the MSUGB Subcommittee by the March meeting in 2001.

Page 2, Ad Hoc committee on HIP Evaluation

To accomplish the scope of the evaluation outlined above, we believe that it will require hiring a person on contract through the Service to serve as a coordinator for the various phases of the evaluation to assure that the technical aspects and survey requirements are carried through. The Ad Hoc Committee will be comprised of members with expertise in agency administration, license administration, migratory bird biology, Point of Sale licensing, and human dimensions.

The evaluation of this program will require some travel for all committee members, so agreeing to participate in this evaluation should be based on top-management being willing to allow full participation. The first of order of business will be to secure support from the Service, MBMO to fund a contract for a part-time Coordinator for up to two years.

As chairman of the Ad Hoc Committee, I will solicit committee membership from the above noted areas. A general organization meeting should be held by the end of January 2000. A formal evaluation plan will be developed in time to review at the March 2000 MSUGB meeting.

It is anticipated that a number of internal surveys will be required to get at the scope and depth of issues and problems associated with administration of HIP using the different types of licensing systems. Because of the shift toward more automation in licensing, special attention will be paid to how well HIP operated within such systems, referred to as POS systems. The diversity on the Ad Hoc Committee should allow us to identify some education and/or process issues that can be tested during the 2000 license year.

It is also anticipated that a number of focus group meetings may be required with both hunters and license vendors to identify problems and possible solutions associated with HIP and/or the way it is administered.

Since 2000 will be the third full year of implementation, we will attempt to determine whether hunters and vendors are performing better as a result of becoming more familiar with the system, thus improving compliance and the quality of the data.

The product of the Ad Hoc Committee will be a report and recommendation to the IAFWA on the status of implementation nationwide, continuing problems of a serious nature, and recommended solutions and/or alternatives.

A potential list of Ad Hoc members has been developed. From this list, the chairman will contact each person to determine their interest in serving as a committee member.

Do the Harvest Information Program Screening Questions Provide the Information Necessary to Stratify the Survey as Envisioned?

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Abstract: The preliminary analysis outlined in this report indicates that the Harvest Information Program (HIP) screening questions currently in use provide the information necessary to stratify the survey as envisioned. Using no stratification, i.e., using simple random sampling, will reduce the precision of the harvest estimates. This approach would require an overall increase in sampling effort of 103% to maintain current precision levels. A reduced stratification scheme results in estimates with similar precision to those estimated under full stratification. However, while reducing the levels of stratification may be a viable way to reduce survey complexity without sacrificing precision, estimates obtained through the simpler stratification scheme were significantly different from those obtained under full stratification. Thus, further study is needed to fully assess the impacts of a reduced stratification scheme. The analysis reported here is based only on data from the 1999 HIP waterfowl and upland game bird surveys.

INTRODUCTION

We were charged with determining whether or not the Harvest Information Program (HIP) screening questions provided the information necessary to stratify the survey as envisioned. In this report, we outline the approach taken to answer this question, present results of the work to date, and summarize the work that still needs to be completed.

The stratification currently used in the sampling protocol for HIP surveys is comprised of 4 levels for the waterfowl and upland game bird (dove) surveys and 2 levels for the woodcock and snipe, rail, gallinule and coot surveys. Information concerning ducks and geese from the 1999-2000 HIP waterfowl survey and mourning dove data from the 1999-2000 HIP upland game bird survey was used as a starting point in assessing the effectiveness of current HIP stratification. This information is considered preliminary because it is based on data from the first year that acceptable sampling frames were available for most states and because it only concerns results from 2 of the 4 HIP surveys.

The stratification currently in use in the HIP waterfowl survey sampling procedure consists of 4 levels for each of 2 species and is determined by a hunter's responses to screening questions regarding their hunting success the previous year. These questions are presented to the hunter when he/she receives HIP certification according to the state-specific licensing method. Hunters are assigned to 2 different stratification levels based on the number of ducks and the number of geese they report bagging the previous season. The levels are: "NONE" – bagged no ducks/geese the previous season; "LOW" – bagged 1-10 ducks/geese; "HIGH" – bagged >10 ducks/geese; and, "OTHER" – bagged sea ducks/brant. For states where sea ducks and/or brant are not hunted, the stratification consists of 3 levels rather than 4.

A similar stratification scheme is used in the upland game bird survey with LOW being redefined as "bagged 1-30 doves" and HIGH being redefined as "bagged > 30 doves." The OTHER category is used for band-tailed pigeons in states that have a hunting season for that species.

CENTRAL QUESTION

The central question considered in this work was "How would the elimination of stratification in HIP affect the precision of the HIP estimates?" A secondary question was "What increase in sampling effort would be required under simple random sampling in order to maintain a level of precision similar to that obtained under a stratified approach?"

The question of precision and how it is affected by a change in sampling scheme is important to the integrity and usefulness of HIP. Stratification is commonly used as a method to increase precision and was incorporated into HIP as an efficient method to obtain precise estimates. Several years ago, an ad hoc task group was appointed to investigate the issue of the screening questions and the HIP stratification scheme. The resulting work of that task force included a set of goal precision levels for each survey. Under the current sampling protocol, HIP comes close to meeting these goals for both the waterfowl and upland game bird survey for some, but not all states. The premise of this current work is that those goal precision levels are still in effect and the consequences of any changes in HIP that will make those goals more difficult to reach need to be clearly stated and understood.

APPROACH

In order to assess the effect of a simple random sampling scheme on precision levels of HIP estimates, the initial step was to obtain a simple random sample (SRS). To accomplish this in theory, we would want to use the universe of hunters (the sample frame), select a SRS and conduct a HIP survey of hunters selected in the sample. Once the survey was complete we could obtain harvest and hunter-activity estimates and compare them to those obtained under a simultaneously conducted survey using the stratification scheme. Since we could not actually select and conduct two simultaneous waterfowl or upland game bird surveys, due to time and other constraints, another approach was taken. The technique we employed, known as bootstrapping, is a widely used and well accepted resampling method. The premise of bootstrapping is based on the idea that the distribution of values found in a random sample of size n from the population is the best guide to the distribution in the population, when no other knowledge about the population is known. To approximate what would happen if the population was sampled under an alternative sampling scheme, it makes sense to use that scheme to resample (with replacement) the original sample.

Data from the 1999-2000 HIP waterfowl survey was used to construct a series of bootstrap SRSs from which harvest estimates and their variances were computed. The averages of these statistics, over all bootstrap samples, provided estimates of what we would expect to find under a SRS scheme. This method was then repeated using the original (full) stratification sampling (FSS) scheme and the statistics obtained from that analysis were compared to the SRS results. At the request of the ad hoc HIP committee, we also considered an alternative (reduced) stratification sampling (RSS) scheme in which the LOW and HIGH levels are combined. This reduces the levels of stratification to three levels (NONE, SOME, and OTHER) and would allow states to ask hunters fewer questions when they purchase their hunting license. The bootstrap analysis was conducted using this scheme and the results compared to FSS and SRS. This same approach (SRS, FSS, and RSS) was then repeated with the 1999-2000 HIP data for mourning doves.

METHODS

Using the 1999-2000 HIP waterfowl survey sample data, 1000 random samples were selected. Since the sample data originally arose from a stratified sampling scheme and, therefore, did not necessarily reflect the population stratum proportions, each stratum was sampled in proportion to its occurrence in the population. For example, assume that in a given state the population stratum proportions were 50%, 30%, 10% and 10% for NONE, LOW, HIGH and OTHER, respectively and we needed to select a random sample of size $n=500$.

The sample stratum proportions in that state may have been: 30%, 30%, 20% and 20%. The bootstrap SRSs were structured so that 250 (50%) were randomly selected with replacement from the NONE stratum, 150 (30%) were randomly selected with replacement from the LOW stratum, 50 (10%) were randomly selected from the HIGH stratum and 50 (10%) were randomly selected from the OTHER stratum. The sample that results is what we would have expected had a SRS scheme been applied to the entire population of hunters. For each state, 1000 different samples were obtained using this general framework, harvest estimates and variances were computed, and means of those estimates and variances over all 1000 samples were calculated.

For comparison, this approach was repeated using the FSS scheme. In this case however, the samples were selected based on the sample stratum proportions. In the example above, this means that we would randomly select with replacement 150 (30%) from the NONE stratum, 150 (30%) from the LOW stratum, and 100 (20%) each from the HIGH and OTHER strata. As above, 1000 different samples were obtained for each state and the appropriate estimates and means of the estimates were computed.

Finally, the bootstrap approach was repeated using a RSS scheme to address the impact of reducing the number of categories in the screening questions. This reduction amounted to combining the LOW and HIGH strata, resulting in a three level stratification scheme: NONE, SOME and OTHER (for states where sea duck and brant were hunted).

For all 3 types of samples, SRS, FSS, and RSS, the coefficient of variation ($CV = \text{standard deviation}/\text{mean}$ expressed as a percent) was obtained. The CV provides a unit-less measure of relative variability which can be used for comparison between the three types of sampling.

Finally, the estimated sample sizes needed under SRS in order to obtain the precision levels obtained under FSS were calculated to assess the increase in sampling effort needed under this alternative sampling scheme.

The same methodology used with the waterfowl data was then applied to the mourning dove data using the appropriate sampling scheme.

RESULTS

The results of this study concerning the effect of SRS on the precision of the estimates are presented in Table 1 and Figs. 1-8. Table 1 summarizes the average CV for each sampling scheme for each of 6 variables: total duck hunting days and bag, total goose hunting days and bag, and total mourning dove hunting days and bag. Figure 1 shows the comparison of CVs between the FSS and the SRS for ducks and geese. The response variable is the difference in CVs. States in which the SRS CV was higher than the FSS CV are depicted in gray. Figures 2-3 are also generated from the waterfowl analysis and represent similar comparisons between RSS and SRS, and between RSS and FSS. Figures 4 and 5 illustrate results for similar analyses for mourning doves. Note that the comparisons of both FSS and RSS with SRS yielded the same results (Fig. 4).

The general trend in the SRS comparisons with both FSS and RSS shows that the stratified schemes result in more precise estimates for most states. The comparison of CVs from the FSS and RSS shows mixed results in terms of precision levels. However, for most of the states in which the RSS yielded a lower CV (depicted by states with diagonal lines in the figures), the differences in CVs between the 2 stratification schemes were very small, often less than 5%. These small differences in the CVs are reflected in Table 1.

Although there appear to be small differences in CVs between the FSS and RSS, it is important to note that there are larger differences in the point estimates obtained through the simulation process. Table 2 shows the total average bag bootstrap estimates for duck, geese, and mourning dove obtained through each of the 3 sampling schemes and, for the RSS and SRS schemes, the percent the estimates vary from those obtained

by full stratification. The estimates obtained through reduced stratification are higher than those from full stratification by 5%-9%. It has been hypothesized that an additional benefit from the FSS may be that it has an effect on reducing non-response bias although this has not been tested. The results in Table 2 indicate that full stratification may result in more accurate and precise estimates, however, additional study of how the stratification scheme affects non-response bias is warranted before any conclusions can be made.

Figures 6-8 depict the results of the sample size analysis. Considering any one of the 6 major response variables used in this analysis, sampling effort would need to be greatly increased in order to obtain similar precision levels under SRS as those obtained under FSS. An assessment of the sample size question indicated that sampling effort would need to be increased by 103% overall to gain the current level of precision if SRS were to be implemented.

DISCUSSION AND CONCLUSIONS

It is clear from this preliminary analysis that the HIP screening questions are providing the information necessary to stratify the survey as envisioned. For most states, stratified sampling results in more precise estimates than would be obtained under a SRS scheme. The obvious question that arises concerns those states for which this result does not hold true. It has been noted previously that not all hunters are placed in the correct stratum due to a variety of reasons related to the HIP-certification process. Stratification is a method to group like elements together so as to reduce variation within each group. If the groups (strata) are not homogeneous due to incorrect classification, it is possible that the resulting variance will be higher than expected and result in the anomaly we see here. Results for several states that are known, by past history, to do a good job of obtaining accurate stratum information (South Dakota, Kansas, Wisconsin, Missouri, and Pennsylvania) indicate that stratification is adequate.

The sample size analysis indicates that sampling effort under SRS would need to increase by over 100% of the current rate in order to obtain current precision levels. This value assumes that response rates under SRS would remain the same as they are now under the current scheme. However, under SRS, many more hunters who were previously placed in the NONE stratum may be selected. It is not known how the response rates of these less successful or occasional hunters will vary from the current rates. It should be noted that a decrease in response rates under SRS would further reduce precision. Furthermore, it should be noted that under the current scheme, we have not yet achieved the stated precision goals as outlined by a state-federal technical group charged with addressing this issue several years ago, which were later approved by the Migratory Shore and Upland Game Bird Subcommittee. Adjusting HIP to a new sampling scheme will delay the achievement of these precision levels for an undetermined amount of time and will depend on having the necessary resources available to increase sampling effort.

Table 1. Comparison of average coefficient of variation (CV) between 3 sampling schemes.

Variable (total)	Full stratification	Reduced stratification	Simple random sampling
Duck hunting days	10.34	10.15	11.18
Duck bag	11.96	11.76	13.90
Goose hunting days	16.40	16.53	17.32
Goose bag	19.05	19.61	23.32
Mourning dove hunting days	13.79	13.77	15.49
Mourning dove bag	14.22	14.2	17.41

Table 2. Total average duck, goose, and mourning dove bag bootstrap estimates based on the 3 sampling schemes. Percent change in the estimates from full stratification is provided in parentheses.

Variable (total)	Full stratification	Reduced stratification	Simple random sampling
Duck bag	15,867,581	17,267,051 (+ 9%)	15,849,761 (- 0.1%)
Goose bag	3,348,565	3,509,917 (+ 5%)	3,471,862 (+ 4%)
Mourning dove bag	23,916,583	26,425,363 (+ 8%)	24,478,190 (+ 2%)



Northern pintail. USFWS photo by Glen Smart.

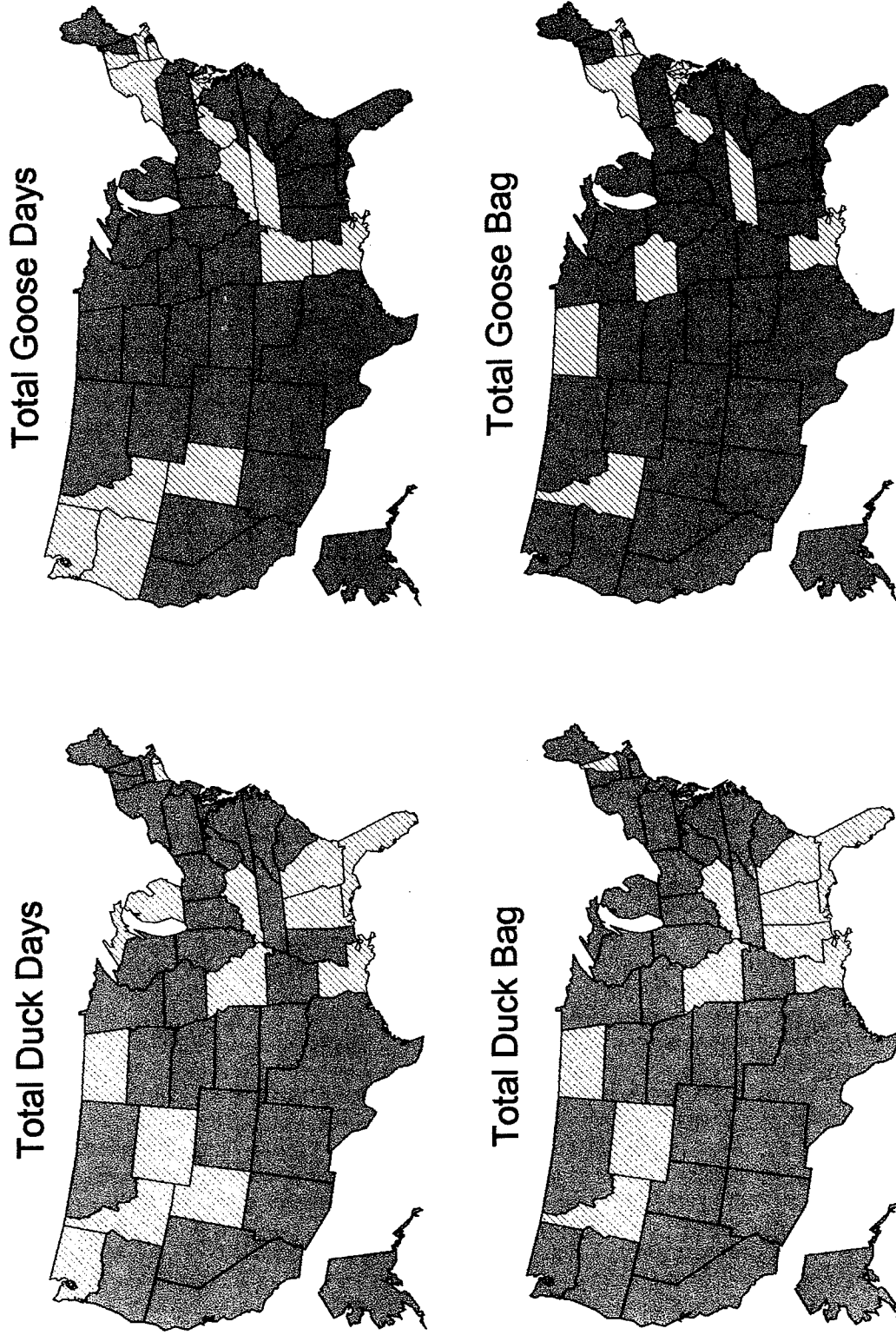


Fig. 1. Difference in coefficient of variation (CV) between a fully stratified sample (FSS) and a simple random sample (SRS) of hunters for estimates of total duck hunting days and bag, and total goose hunting days and bag. Solid = CV of a SRS > CV of a FSS; lined = CV of a SRS < CV of a FSS.

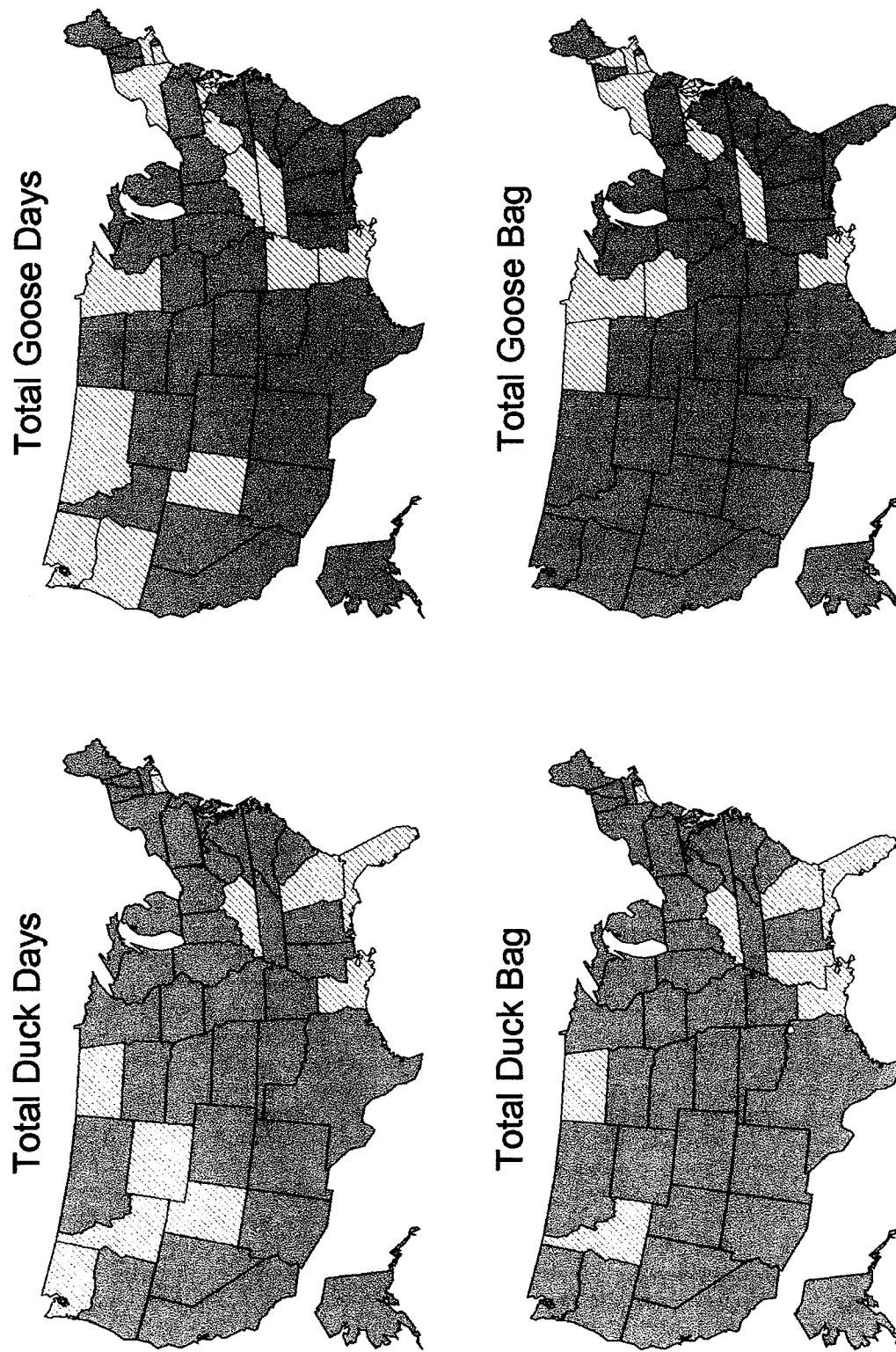


Fig. 2. Difference in coefficient of variation (CV) between a reduced stratified sample (RSS) and a simple random sample (SRS) of hunters for estimates of total duck hunting days and bag, and total goose hunting days and bag. Solid = CV of a SRS > CV of a RSS; lined = CV of a SRS < CV of a RSS.

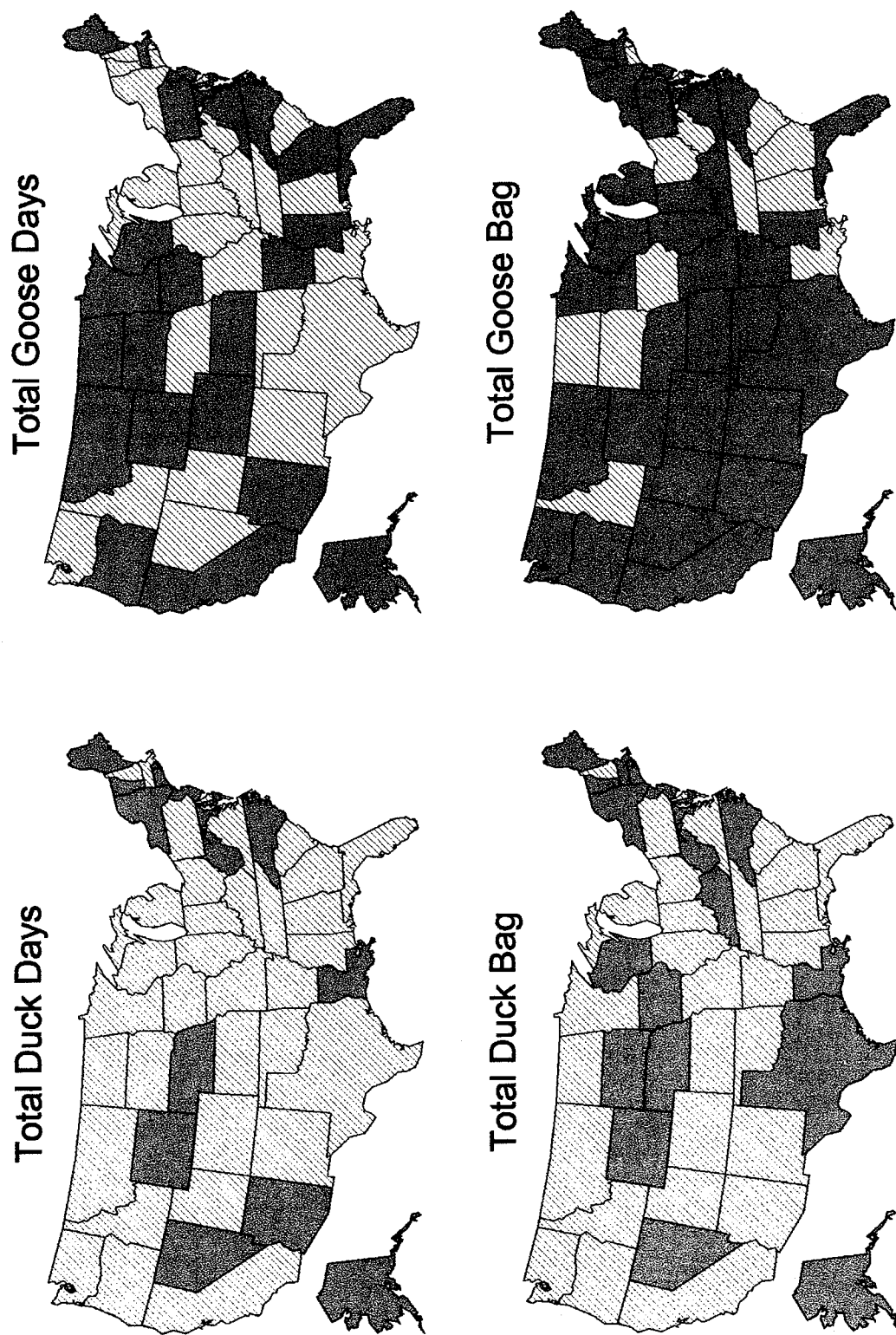
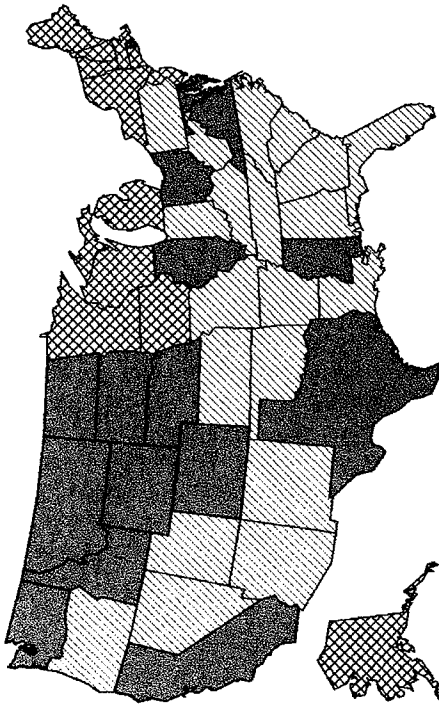


Fig. 3. Difference in coefficient of variation (CV) between a fully stratified sample (FSS) and a reduced stratified sample (RSS) of hunters for estimates of total duck hunting days and bag, and total goose hunting days and bag. Solid = CV of a FSS > CV of a RSS; lined = CV of a FSS = CV of a RSS; white = CV of a FSS < CV of a RSS.

Total Mourning Dove Days



Total Mourning Dove Bag

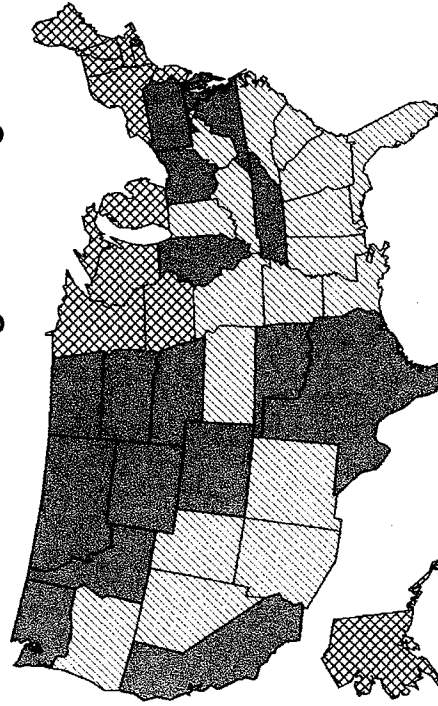


Fig. 4. *Note: These represent 2 separate analyses with the same results. Analysis 1: Difference in coefficient of variation (CV) between a fully stratified sample (FSS) and a simple random sample (SRS) of hunters for estimates of total mourning dove hunting days and bag. Solid = CV of a FSS > CV of a SRS; lined = CV of a FSS < CV of a SRS; hatched = no season. Analysis 2: Difference in CV between a reduced stratified sample (RSS) and a SRS. Solid = CV of a RSS > CV of a SRS; lined = CV of a RSS < CV of a SRS; hatched = no season.*

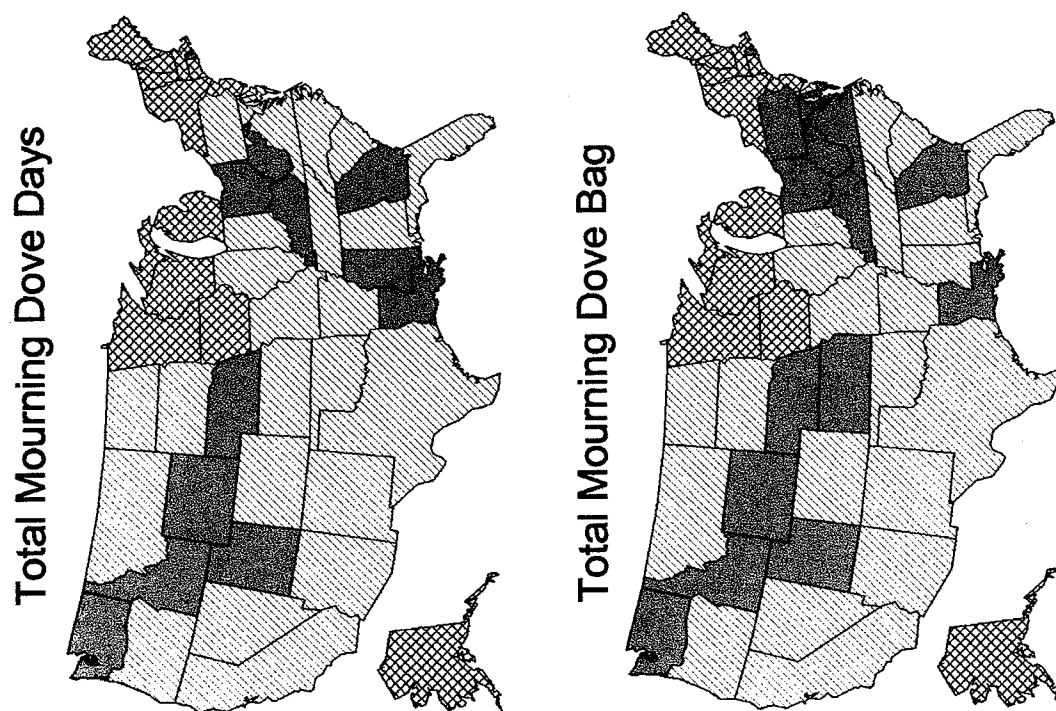
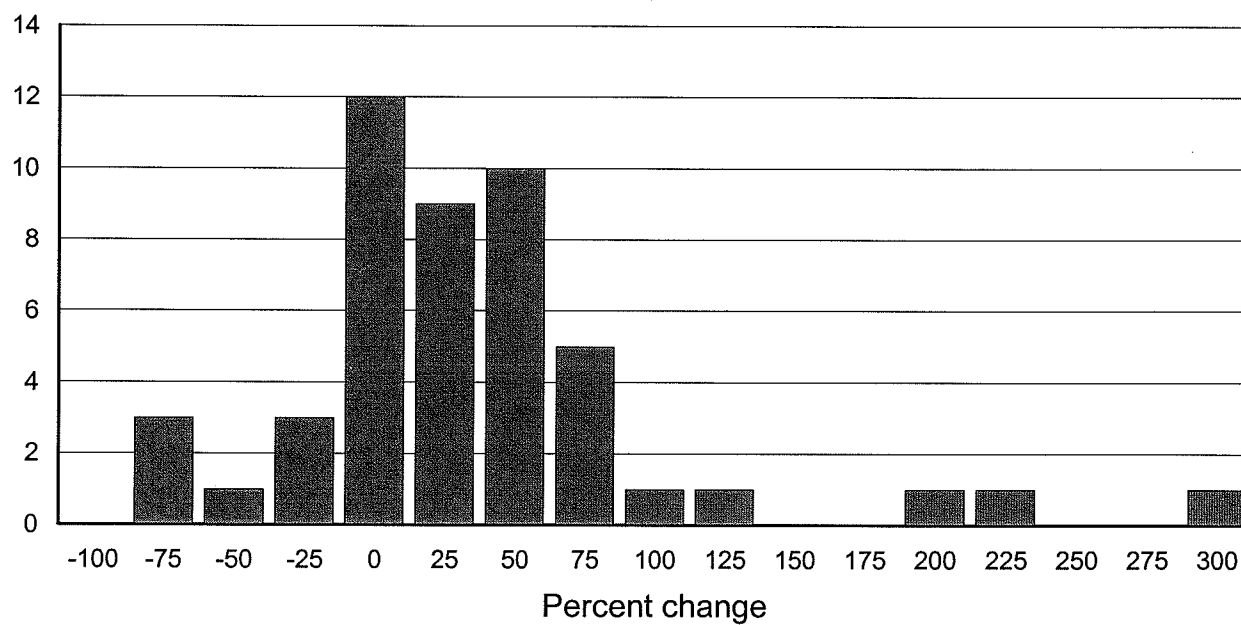


Fig. 5. Difference in coefficient of variation (CV) between a fully stratified sample (FSS) and a reduced stratified sample (RSS) of hunters for estimates of total mourning dove hunting days and bag. Solid = CV of a FSS > CV of a RSS; lined = CV of a FSS < CV of a RSS; hatched = no season.

Total Duck Days

Number of states



Total Duck Bag

Number of states

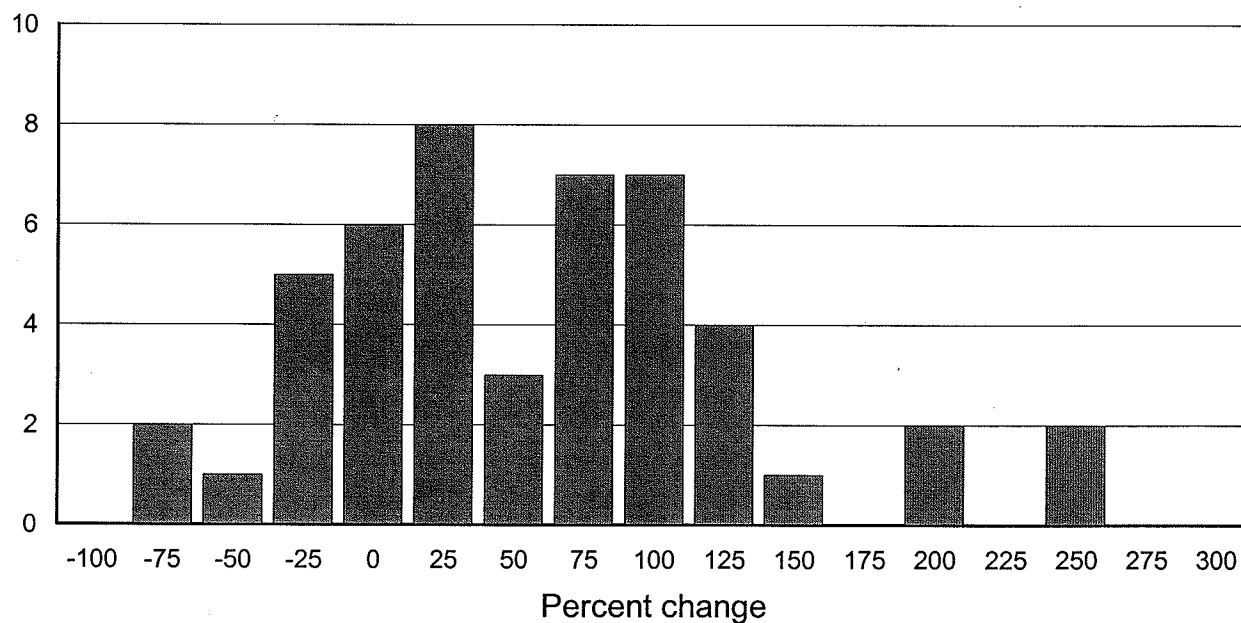
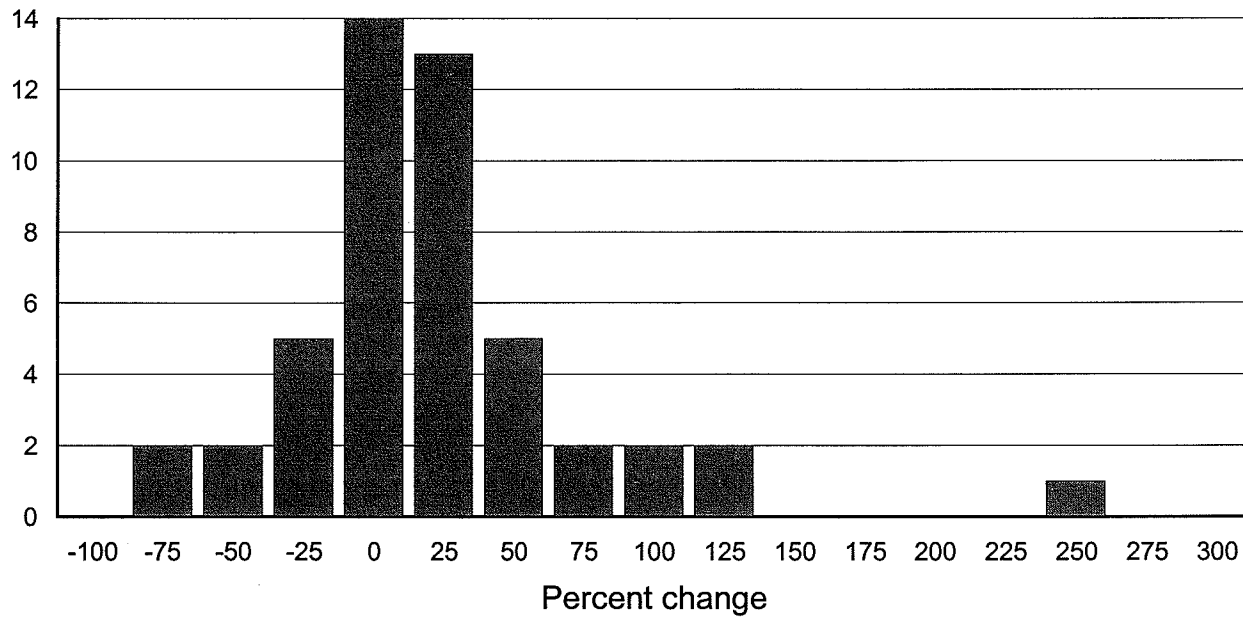


Fig. 6. Summary of the state-level increases in sampling effort (percent change) needed to achieve current precision levels for estimates of total duck hunting days and bag if the Harvest Information Program used a simple random sampling design rather than a stratified sampling design.

Total Goose Days

Number of states



Total Goose Bag

Number of states

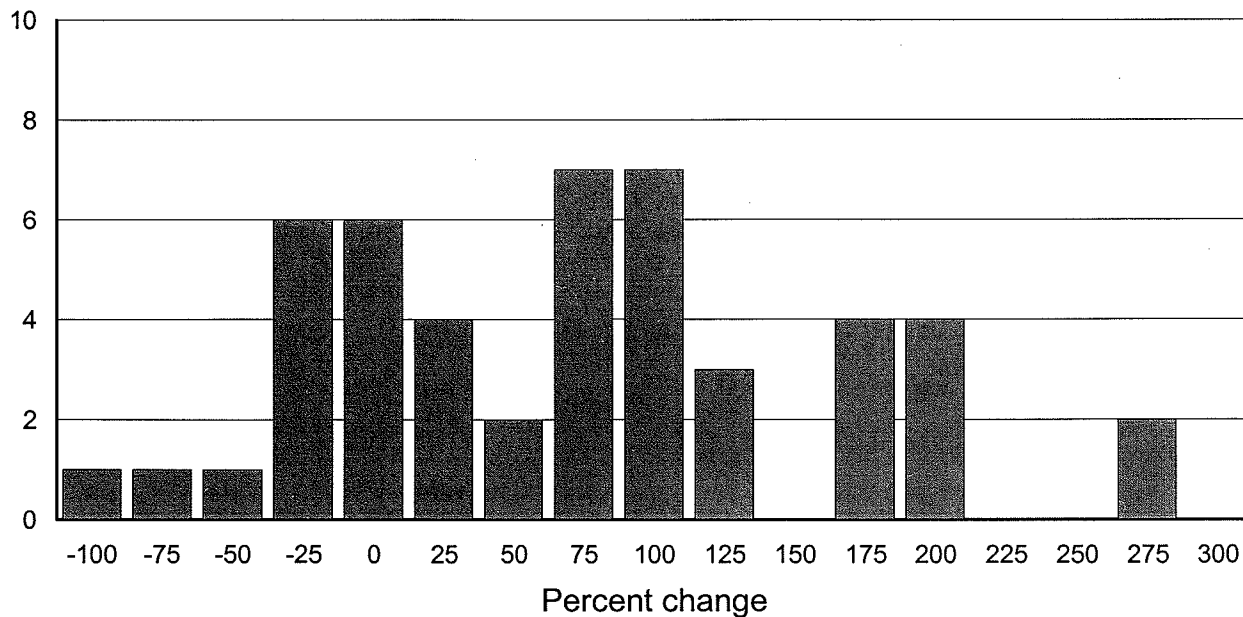
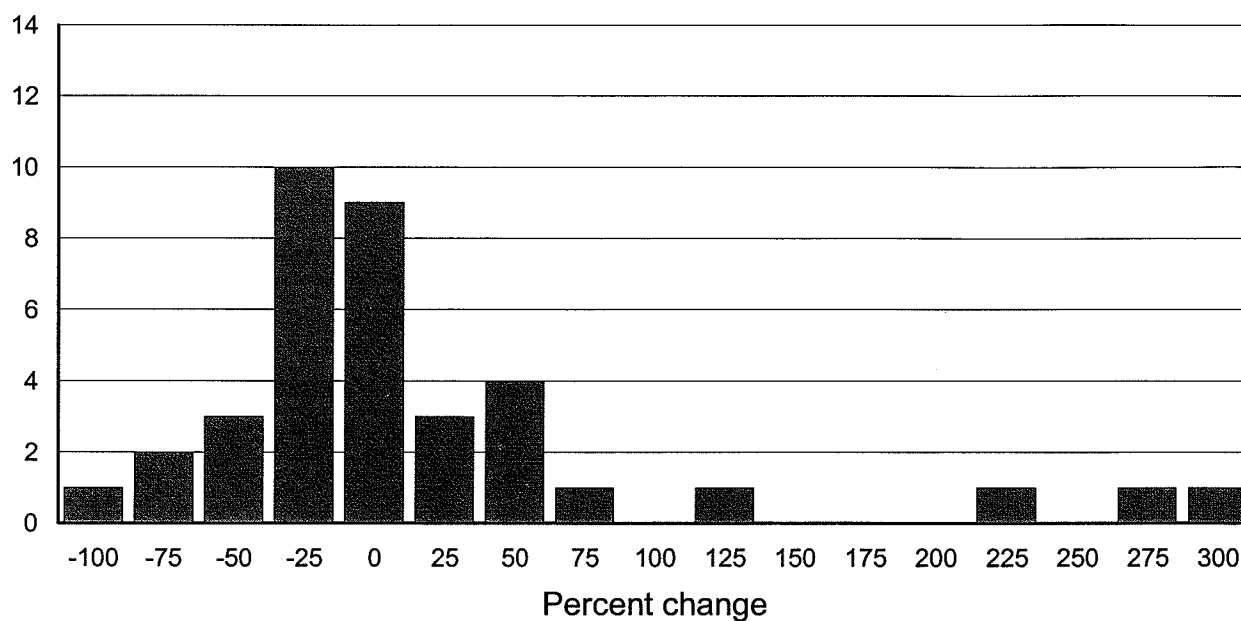


Fig. 7. Summary of the state-level increases in sampling effort (percent change) needed to achieve current precision levels for estimates of total goose hunting days and bag if the Harvest Information Program used a simple random sampling design rather than a stratified sampling design.

Total Mourning Dove Days

Number of states



Total Mourning Dove Bag

Number of states

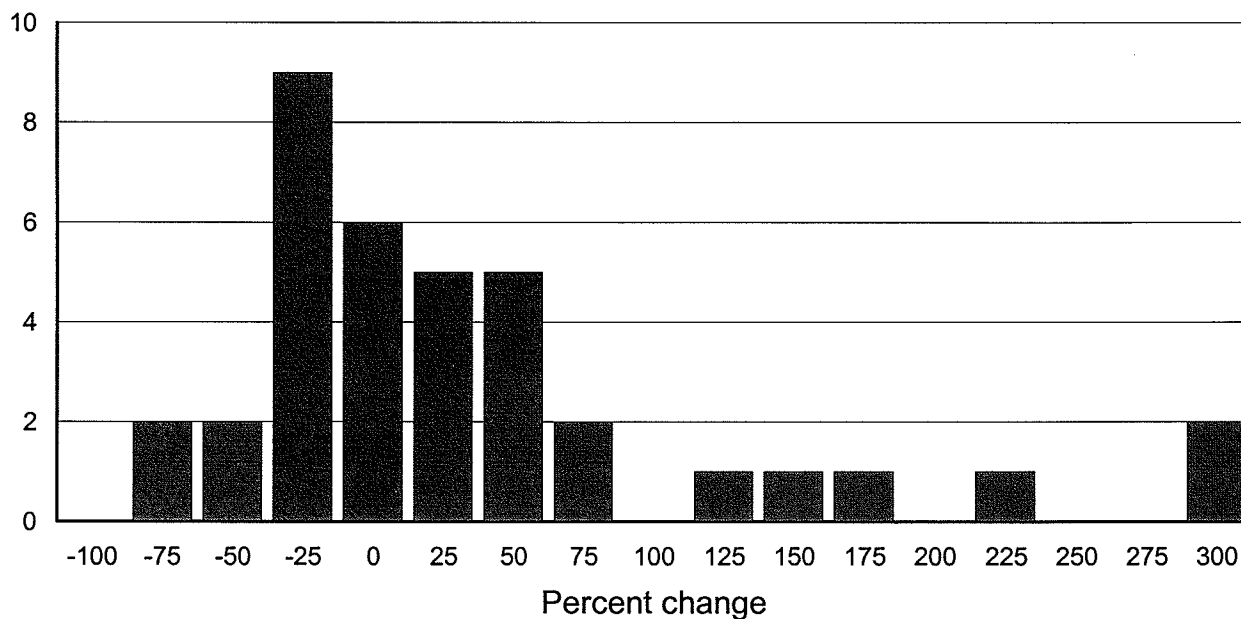
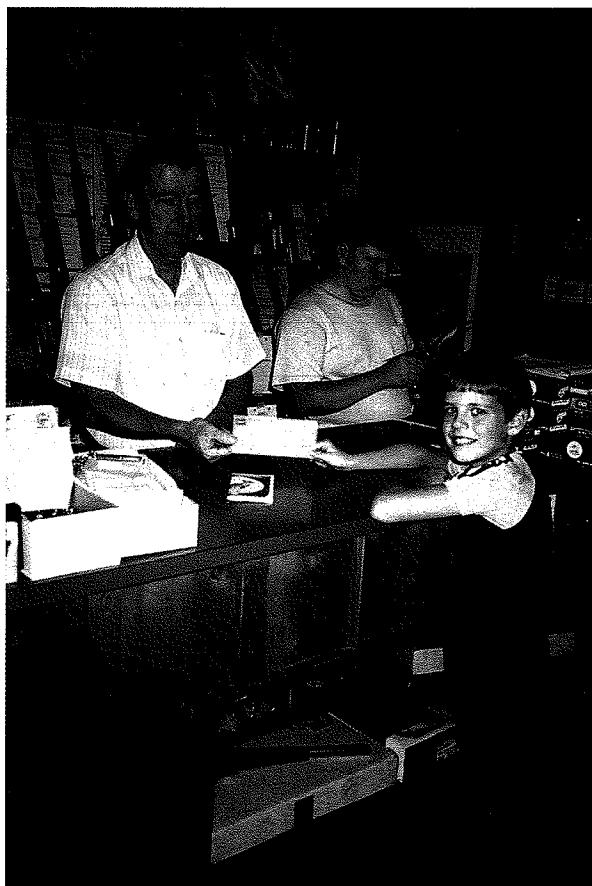


Fig. 8. Summary of the state-level increases in sampling effort (percent change) needed to achieve current precision levels for estimates of total mourning dove hunting days and bag if the Harvest Information Program used a simple random sampling design rather than a stratified sampling design.



Purchasing first hunting license. *Photo by David Dolton.*

The Types, Impacts, and Scope of Vendor Non-compliance with the Harvest Information Program

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Abstract: Preliminary studies indicate that vendor non-compliance is a significant problem with properly recording Harvest Information Program (HIP) information. Most states do not have any penalty for vendor non-compliance. License vendors who entered HIP screening questions and received a vendor commission of <\$0.20 over-reported HIP certifications by almost 126% of the base. Conversely, license vendors who entered the screening questions and received a vendor commission of >\$0.20 under-reported the number of HIP certifications. Most of the states whose estimates of the number of migratory bird hunters were significantly higher than the U.S. Fish and Wildlife Service's Harvest Survey Section's estimates are the major migratory bird harvest states. Consequently, the issue of vendor non-compliance in those states is a serious concern.

INTRODUCTION

Most migratory bird hunters obtain their Harvest Information Program (HIP) certification from license vendors. HIP's success is dependent on the participation of all migratory bird hunters in the program. Thus, the degree of compliance by, and the quality of data received from, the various license vendors are significant contributing factors to HIP's success in adequately determining harvest.

During 2000, states were asked 30 direct and indirect questions that related to license vendors, hunters and the HIP certification process. During the survey, states were asked to submit any applicable study that they had completed related to any of the questions. Two states (North Carolina and Texas) submitted copies of their studies evaluating the compliance by license vendors. Both of these studies indicated they have vendor compliance issues.

Additionally, the Harvest Surveys Section (HSS) (U.S. Fish and Wildlife Service, Division of Migratory Bird Management), compiled state-specific migratory bird hunter estimates for 1999 and 2000 that were based on the 1991 and 1996 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* estimates, federal duck stamp sales, and information provided by state wildlife biologists. The number of 1999 HIP certifications exceeded the HSS estimate by 12.6%. The estimated 2000 HIP certifications exceeded the HSS estimate by 31.6% (4.3 million hunters vs. 3.3 million). Over-certifications can significantly affect the HIP harvest estimates and cost of the program.

RESULTS

Vendor non-compliance studies by North Carolina, Texas, and an unpublished study by Idaho found non-compliance to be a significant issue. North Carolina and Idaho found vendor non-compliance to be in the

17% range. Texas reported widespread anomalies in responses to the screening questions throughout their vendors. They also reported that "Large multipurpose stores had lower [HIP] awareness ratings, lower customer attitude ratings, and typically had more than 5 clerks selling licenses." Interestingly, the Texas study found that 17% of their vendors had no working knowledge of HIP and 62% recognized HIP only as that program "where you ask a bunch of questions".

For most states, the level and degree of vendor non-compliance with HIP is simply undetermined. Only 4 states out of 47 responses stated they systematically monitor the quality of data from vendors. The most frequent quality-assurance activity was listed by 31 states which said they follow up on hunter complaints of vendor non-compliance. The next most frequent method was similar in that 25 states said they investigate vendors based upon incidental observations by agency staff. Both of these methods to detect vendor non-compliance are dependent upon a personal observation of a potential non-compliant action and that person being sufficiently concerned to contact the appropriate personnel in the agency.

The HIP Survey had 7 questions related to vendor penalties for non-compliance. An overwhelming number of responding states (40 of 45) indicated there were no penalties for vendors that did not HIP-certify migratory bird hunters. Of the 5 states that said there were penalties, no state has ever penalized a vendor for failure to HIP-certify migratory bird hunters. Additionally, states were asked if there was a penalty for vendors who HIP-certify hunters, but do not send in HIP data. An even larger number of states (44 of 46 responses) reported there were no penalties and the 2 states with penalties for this form of non-compliance said they had never penalized a vendor.

The 3 vendor compliance studies suggest that vendor non-compliance appears to be surprisingly uniform among the 3 widely divergent states. The responses to the HIP Survey suggest that there is a very small chance of detecting vendor non-compliance and that even if it is detected, there are no penalties to the license vendor. The degree of non-compliance can also be inferred by combining the states' responses to the HIP Survey with the HSS estimate of the number of migratory bird hunters in 1999. There were 2 primary license vendor systems— automated and manual. Many states supplemented their primary license systems with telephone, Internet or other ancillary methods. Twenty-five states *did not* have the license vendors enter the hunters' responses to the HIP screening questions into their license system while 24 states *did* require the license vendor to do so.

Table 1 shows the states that did not have the license vendor enter the answers to the HIP screening questions. In general, the number of hunters that were HIP-certified in those states was less than the HSS estimate for 1999 HIP certifications. States in which license vendors received a vendor commission had an average difference from the HSS estimate (-3%) that was similar to this category's overall average (-9%), but their standard deviation and range of differences were smaller than those states that did not pay the vendor a commission.

Different results were obtained in states that had the vendor enter the answers to the HIP screening questions (Table 2). For the 24 states that used this method, 15 had an automated license system that included HIP-certification, and 9 had manual HIP certification. Regardless of the license system, the table shows the average difference from the HSS 1999 estimate was +21% with a range from -34% to +169%. It also suggests that despite "common sense", vendors that receive no vendor commission or a minimal vendor commission over-reported HIP certifications by an average of 26% of the HSS base with a very wide variance ranging from -34% to +169%. Conversely, vendors who received a vendor commission >\$0.20 (average was \$0.40) actually under-reported by an average 6%.

Table 3 shows those 15 states that have automated license systems through which vendors entered the answers to the HIP screening questions. Thirteen of those states paid their vendors <\$0.20 per HIP

certification. Of those, 10 (76.9%) over-reported HIP certifications and only 3 under-reported. The average difference from the HSS estimate was +35%, with a range of -20% to +109%. There were 2 states whose vendors received commissions >\$0.20; their average difference from the HSS estimate (+8%) was much smaller. This suggests that rather than having vendors certify hunters to collect the vendor commission, vendors with no or minimal commissions are certifying hunters to “get it over with.” Most of the states that were significantly over the HSS estimate were major migratory bird harvest states. This is a significant vendor non-compliance issue in these states, which is a serious concern.

Table 4 details the states that had manual license systems (and/or HIP-certification systems) through which the vendors entered the answers to the HIP screening questions. HIP certifications in 7 of those states were less than the HSS estimate, whereas only 1 state HIP-certified more hunters than the HSS estimate. The amount of vendor commission, or lack of commission, did not have any significance to vendor compliance. With a manual system, vendors can easily skip the screening questions and not certify the hunter, thus, there is a significant non-compliance issue of under-certifying hunters.

RECOMMENDATIONS

1. The states should actively monitor vendor compliance and explore vendor education and promotional methods to help improve voluntary compliance.
2. The states should review their vendor penalties for non-compliance, pursue vendor penalties where needed, and emphasize enforcement of HIP requirements for vendors and the application of vendor penalties, where warranted, to improve vendor compliance.



Left: Hunter with mallards at the Cleveland Waterfowl Production Area in North Dakota. *Photo by David Sharp.* Right: Mallard pair. *USFWS photo by Tim McCabe.*

Table 1. Comparison of the number of 1999 Harvest Information Program (HIP) certifications submitted by states with the Harvest Survey Section's estimate of hunter numbers in states that did not have the license vendor enter the answers to the HIP screening questions.

State	Percent difference	Vendor commission	Vendors with commission		Vendors with no commission		Vendors with commission < \$0.20		Vendors with commission > \$0.20		License systems*
			Percent difference	Vendor commission	Percent difference	Vendor commission	Percent difference	Vendor commission	Percent difference	Vendor commission	
Alabama	-4	\$0.10	-4	\$0.10			-4	\$0.10			M/P
Alaska	-15	\$0.00			-15	\$0.00	-15	\$0.00			M/P/I
Colorado	-19	\$0.00									M/P/I
Connecticut	-3	\$1.00	-3	\$1.00					-3	\$1.00	M
Delaware	-11	\$0.00									M/P/I
Illinois	-31	\$0.00									M/P/I
Indiana	-3	\$0.00									M/P/I
Iowa	+1	\$0.00									M/P
Kansas	+4	\$0.50	+4	\$0.50					+4	\$0.50	M/I
Massachusetts	-44	\$0.00									M/P/I
Montana	-32	\$0.50	-32	\$0.50					-32	\$0.50	M/I
Nebraska	-5	\$0.00									M/P/I
Nevada	-31	\$0.00									M/P/I
New Hampshire	+45	\$0.00									M/P/I
New Jersey	-34	\$0.00									M/P
New Mexico	-3	\$1.00	-3	\$1.00					-3	\$1.00	M
New York	-38	\$0.00									M/P/I
North Dakota	+5	\$0.00									M/P/I
Oklahoma	-4	\$0.00			-4	\$0.00	-4	\$0.00			M/P
Pennsylvania	+20	\$1.00	+20	\$1.00					+20	\$1.00	M/I
South Carolina	+6	\$0.00			+6	\$0.00	+6	\$0.00			M/P/I
Utah	+9	\$0.00									M/P/I
Virginia	-24	\$0.00									M/P
West Virginia	-19	\$0.00			-19	\$0.00	-19	\$0.00			M/P
Wyoming	+5	\$0.00			+5	\$0.00	+5	\$0.00			M
Average	-9		-3	\$0.68	-5		-5		-3	\$0.80	
SD	19.8		15.4	\$0.34	10.2		9.3		16.8	\$0.24	
Maximum	+45		+20	\$1.00	+6		+6		+20	\$1.50	
Minimum	-44		-32	\$0.10	-19		-19		-32	\$0.50	
Count	25		6		5		6		5		
<0	17	68.0%	4	66.7%	3	60.0%	4	66.7%	3	60.0%	
>0	8	32.0%	2	33.3%	2	40.0%	2	33.3%	2	40.0%	

* M= Manual P= Phone I= Internet

Table 2. Comparison of the number of 1999 Harvest Information Program (HIP) certifications submitted by states with the Harvest Survey Section's estimate of hunter numbers in states that had the license vendor enter the answers to the HIP screening questions.

State	Percent difference	Vendor commission	Vendors with commission		Vendors with no commission		Vendors with commission < \$0.20		Vendors with commission > \$0.20	
			Percent difference	Vendor commission	Percent difference	Vendor commission	Percent difference	Vendor commission	Percent difference	Vendor commission
Arizona	-33	\$0.15	-33	\$0.15			-33	\$0.15		
Arkansas	+47	\$0.10	+47	\$0.10			+47	\$0.10		
California	-12	\$0.00			-12	\$0.00	-12	\$0.00		
Florida	+2	\$0.00			+2	\$0.00	+2	\$0.00		
Georgia	+65	\$0.00			+65	\$0.00	+65	\$0.00		
Idaho	-9	\$0.75	-9	\$0.75					-9	\$0.75
Kentucky	-25	\$0.25	-25	\$0.25					-25	\$0.25
Louisiana	+3	\$0.00			+3	\$0.00	+3	\$0.00		
Maine	+169	\$0.00			+169	\$0.00	+169	\$0.00		
Maryland	+25	\$0.35	+25	\$0.35					+25	\$0.35
Michigan	-6	\$0.00			-6	\$0.00	-6	\$0.00		
Minnesota	-20	\$0.00			-20	\$0.00	-20	\$0.00		
Mississippi	-34	\$0.10	-34	\$0.10			-34	\$0.10		
Missouri	-3	\$0.00			-3	\$0.00	-3	\$0.00		
North Carolina	+109	\$0.10	+109	\$0.10			+109	\$0.10		
Ohio	+86	\$0.10	+86	\$0.10			+86	\$0.10		
Oregon	+13	\$0.00			+13	\$0.00	+13	\$0.00		
Rhode Island	-26	\$0.00			-26	\$0.00	-26	\$0.00		
South Dakota	0	\$0.00			0	\$0.00	0	\$0.00		
Tennessee	+61	\$0.00			+61	\$0.00	+61	\$0.00		
Texas	+53	\$0.00			+53	\$0.00	+53	\$0.00		
Vermont	-7	\$0.00			-7	\$0.00	-7	\$0.00		
Washington	-14	\$0.25	-14	\$0.25					-14	\$0.25
Wisconsin	+48	\$0.00			+48	\$0.00	+48	\$0.00		
Average	+21		+17	\$0.24	+23		+26		-6	\$0.40
SD	49.3		50.2	\$0.20	48.6		51.8		18.7	\$0.21
Maximum	+169		+109	\$1.50	+169		+169		+25	\$0.75
Minimum	-34		-34	\$0.10	-26		-34		-25	\$0.25
Count	24		9		15		20		4	
<0	11		5	55.6%	6	40.0%	8	40.0%	3	75.0%
>0	12		4	44.4%	8	53.3%	11	55.0%	1	25.0%

Table 3. Comparison of the number of 1999 Harvest Information Program (HIP) certifications submitted by states with the Harvest Survey Section's estimate of hunter numbers in states having automated license systems through which the license vendors entered the answers to the HIP screening questions.

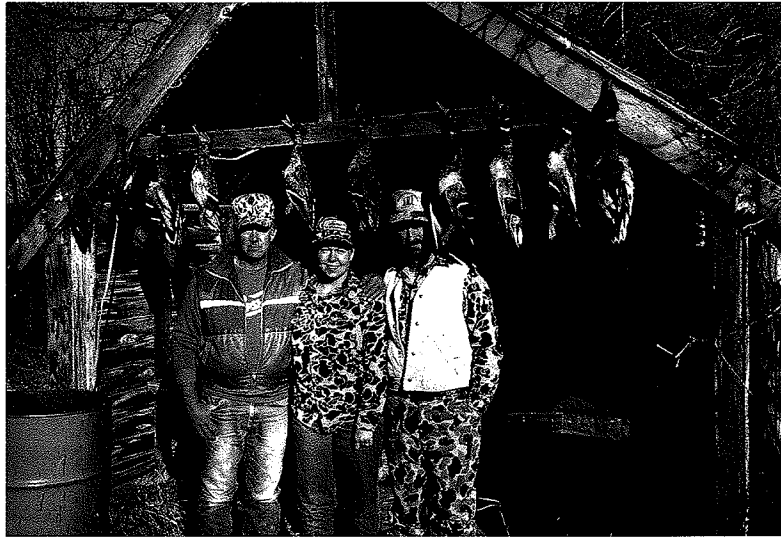
State	Percent difference	Vendor commission	Vendors with commission < \$0.20		Vendors with commission > \$0.20		License systems*
			Percent difference	Vendor commission	Percent difference	Vendor commission	
Arkansas	+47	\$0.10	+47	\$0.10			A/P/I
Florida	+2	\$0.00	+2	\$0.00			A/P/I
Georgia	+65	\$0.00	+65	\$0.00			A/P/I
Idaho	-9	\$0.75			-9	\$0.75	A/P/I
Louisiana	+3	\$0.00	+3	\$0.00			A/P/I
Maryland	+25	\$0.35			+25	\$0.35	A
Michigan	-6	\$0.00	-6	\$0.00			A/P/I
Minnesota	-20	\$0.00	-20	\$0.00			A/M/P/I
Missouri	-3	\$0.00	-3	\$0.00			A
North Carolina	+109	\$0.10	+109	\$0.10			A/P
Ohio	+86	\$0.10	+86	\$0.10			A
Oregon	+13	\$0.00	+13	\$0.00			A
Tennessee	+61	\$0.00	+61	\$0.00			A
Texas	+53	\$0.00	+53	\$0.00			A/P
Wisconsin	+48	\$0.00	+48	\$0.00			A/P
Average	+32		+35		+8	\$0.55	
SD	37.3		38.3		17	\$0.20	
Maximum	+109		+109		+25	\$0.75	
Minimum	-20		-20		-9	\$0.25	
Count	15		13		2		
<0	4	26.7%	3	23.1%	1	50.0%	
>0	11	73.3%	10	76.9%	1	50.0%	

* A= Automated M= Manual P= Phone I= Internet

Table 4. Comparison of the number of 1999 Harvest Information Program (HIP) certifications submitted by states with the Harvest Survey Section's estimate of hunter numbers in states having manual license systems through which the license vendors entered the answers to the HIP screening questions.

State	Percent difference	Vendor commission	Vendors with commission < \$0.20		Vendors with commission > \$0.20		License systems*
			Percent difference	Vendor commission	Percent difference	Vendor commission	
Arizona	-33	\$0.15	-33	\$0.15			M/P/I
California	-12	\$0.00	-12	\$0.00			M
Kentucky	-25	\$0.25			-25	\$0.25	M
Maine	+169	\$0.00	+169	\$0.00			M
Mississippi	-34	\$0.10	-34	\$0.10			M
Rhode Island	-26	\$0.00	-26	\$0.00			M
South Dakota	0	\$0.00	0	\$0.00			M
Vermont	-7	\$0.00	-7	\$0.00			M
Washington	-14	\$0.25			-14	\$0.25	M
Average	+2		+8		-20	\$0.25	
SD	60.1		66.8		5.5	\$0.00	
Maximum	+169		+169		-14	\$0.25	
Minimum	-34		-34		-25	\$0.25	
Count	9		7		2		
<0	7	77.8%	5	71.4%	2	100.0%	
>0	1	11.1%	1	14.3%	0	0.0%	

* M= Manual P= Phone I= Internet



Top: Picking shed. *Photo by David Sharp.* Bottom left: Successful goose hunt in Oregon. *Photo by Margaret Thompson Mathewson.* Bottom right: Duck hunting in flooded bottomland hardwoods in Arkansas. *Photo by J. P. Schneider.*

The Scope and Impact of Hunter Non-compliance with the Harvest Information Program

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Abstract: Hunter compliance with the harvest Information Program (HIP) requirement that all licensed migratory bird hunters must participate is critical to the program's success. Although information on hunter compliance is scarce, the available evidence suggested that HIP compliance rates among waterfowl hunters are probably >90% in most states, but compliance rates are probably lower in most states for dove and woodcock hunters. This may be because many dove and woodcock hunters do not consider those species to be migratory birds, thus they do not think the HIP requirement applies to them. We recommend that the States and the U.S. Fish and Wildlife Service take steps to improve HIP compliance rates by renewing their efforts to inform and educate all migratory bird hunters and license vendors about the HIP requirement, and by enforcing the HIP requirement.

INTRODUCTION

The primary key to the success of the Harvest Information Program (HIP) is that all licensed migratory bird hunters must participate. Hunters are required to be HIP-certified in each state in which they hunt migratory birds, but so far, it appears that compliance with this requirement is a problem in some states. Our goal was to determine the scope of hunter non-compliance and the impacts of non-compliance on HIP survey results.

Direct estimates of hunter compliance rates were available from only a few states. These estimates were based on the findings of law enforcement officers who checked migratory bird hunters in the field, or on hunter survey results. We also compared the results of various harvest surveys to get some idea of both overall compliance rates and compliance by different types of hunters. Although this was an indirect method of examining compliance rates, which required several assumptions, these comparisons may provide some guidance on where efforts to increase compliance should be concentrated.

DIRECT ESTIMATES

Nine states provided data on field checks by law enforcement officers in their responses to the recent IAFWA HIP evaluation survey. These were states in which some or all law enforcement officers were asked to keep track of how many of the migratory bird hunters that they checked in the field had the required HIP certification. These law enforcement reports suggest that overall compliance rates are high (>90%), but may be somewhat lower for dove hunters than other migratory bird hunters, at least in some states (Table 1). Note that the data from Arizona suggest that dove hunter compliance increased significantly in 2000 compared with previous years. This likely is due to the fact that in 2000, Arizona required dove hunters to purchase a separate \$3.00 permit that served as proof of HIP participation. However, so few hunters were checked for HIP certification prior to 2000 that we can not conclusively attribute the increase in compliance to the \$3.00 permit requirement.

Six states provided data on compliance from surveys of hunters, and those compliance rate estimates were generally lower than the law enforcement estimates (Table 2). However, it should be noted that the lowest compliance estimates (Illinois and Michigan) were also the most out-dated (1996 and 1997-98, respectively). We also note that the validity of survey results depends on the ability and willingness of respondents to answer accurately, which may be problematic as illustrated by the survey that the Texas Parks and Wildlife Department conducted to estimate HIP compliance rates. Results of that survey indicated that some hunters reported getting HIP-certified when they actually did not, and some said they did not get HIP-certified when the electronic licensing records showed that they actually did. Despite the potential problems with these survey results, they do seem to indicate that compliance rates are higher for waterfowl hunters than they are for dove and woodcock hunters (Table 2).

COMPARISONS OF THE 2 FEDERAL WATERFOWL HARVEST SURVEYS

We compared state-specific estimates derived from the 1999 HIP waterfowl survey and the 1999 federal duck stamp-based national waterfowl harvest survey to help get some idea of compliance by waterfowl hunters. We used estimates of active waterfowl hunters for the comparisons because those estimates are only 1 or 2 steps removed from actual counts (of HIP certifications and federal duck stamps sold, respectively) and are not likely to be significantly influenced by response bias. [We assume that hunters may forget about and/or exaggerate their harvest, but it is unlikely that they will misreport whether or not they hunted waterfowl.] The comparison of the 2 estimates was based on whether the point estimate from the duck stamp-based survey fell within the 95% confidence interval for the HIP estimate, and how precise the HIP estimate was. We assigned each state a "match" ranking based on how well the 2 estimates agreed (Table 3). It should be noted that we do not consider the duck stamp-based estimate to be "truth" in these comparisons. Recently, our ability to obtain accurate counts of duck stamps sold at the state level has deteriorated, and the duck stamp-based survey also tends to underestimate hunter numbers in states having many nonresident hunters.

The 2 estimates of active waterfowl hunters were in very close or at least fairly close agreement for 38 states ("match" ranks 1-4, see Table 3). Two of the states that were not in close agreement have many nonresident waterfowl hunters (Arkansas and North Dakota), which is why the HIP estimate was significantly greater than the duck stamp-based estimate. HIP and duck stamp-based estimates for Idaho and California, 2 more states that were not in close agreement, have agreed closely in previous years, and at this point we are not sure why there were significant differences for 1999. At least part of the discrepancy for Colorado is due to an inflated duck stamp sales figure, which resulted in the duck stamp-based survey overestimating hunter numbers for the state. Thus, these comparisons suggest that in most states, HIP compliance among waterfowl hunters is similar to their compliance with the regulation that they must have a federal duck stamp. We assume that compliance with the duck stamp requirement is very high.

COMPARISONS OF HIP AND STATE HARVEST SURVEYS

We also compared estimates of active dove and woodcock hunters derived from state harvest surveys with HIP estimates, again using "match" ranks to facilitate the comparisons. State survey estimates reported in the International Association of Fish and Wildlife Agency's HIP evaluation survey were used for these comparisons. Since we only had reliable HIP estimates for 1999, and some of the state estimates were for the 1998 hunting season, we compared estimates from 2 different years in some cases. Although this is not ideal methodology, the data available for comparisons were very limited. So, in order to get the most from the available data, we assumed that the true number of active hunters does not change much in just 1 year.

Estimates of active dove hunters matched very well to fairly well for 5 of the 17 states that provided estimates (Table 4). In all cases where the 2 estimates did not match well, the state estimate was significantly greater than the HIP estimate. Estimates of woodcock hunters matched very well to fairly well for 8 of the

13 states that provided estimates (Table 5). However, note that the “match” rank criteria for woodcock hunter estimates were much less stringent than they were for the dove and waterfowl hunter estimate comparisons, because the HIP woodcock hunter estimates were much less precise than the other HIP estimates. In all but one case where the 2 estimates of woodcock hunters did not match well, the state estimate was significantly greater than the HIP estimate.

Since the state harvest surveys utilize sampling frames, sampling rates, and survey methodologies that vary from state to state, we did not have a single, “standard” set of dove and woodcock hunter estimates to compare with HIP estimates like we did with the waterfowl hunter estimates. Furthermore, since we do not have a uniform “standard” that we know is close to “truth”, the comparisons in Tables 4 and 5 are of little use by themselves. However, we were able to make use of the estimates from states that provided both waterfowl and dove hunter estimates or both waterfowl and woodcock hunter estimates. We assumed that the degree to which state survey results reflected “truth” was the same for its estimates of duck, goose, dove, and woodcock hunters. This assumption seemed reasonable because those 4 state-specific estimates were all derived from similar survey methodology by the state, and in most cases were all derived from the same survey. Similarly, we assumed that state-specific HIP estimates of duck, goose, dove, and woodcock hunters were all equally reflective of the true number of each of those types of hunters that were HIP-certified (i.e., the number of those hunter types in the sample frame). Again, this assumption seemed reasonable because all of the HIP estimates were obtained using the same methodology.

If these assumptions are correct, then we would expect HIP estimates and state survey estimates to differ by roughly the same proportion for all types of hunters if compliance rates are the same for all types of hunters. However, if compliance rates differ among hunter types, we would expect the proportional differences between HIP and state estimates to vary among hunter types as a function of compliance rates. For example, if a state’s active duck hunter estimate is 20% higher, and its active goose hunter estimate is 30% higher, than the corresponding HIP estimates, it would suggest that compliance rates are similar for duck and goose hunters. However, if the same state’s dove hunter estimate is 150% higher than the HIP estimate (rather than somewhere around 20% or 30%), it would suggest that the HIP estimate is biased low because the HIP sample frame did not include all of the state’s dove hunters. This would imply that the compliance rate for dove hunters was lower than it was for duck and goose hunters. Since we compared point estimates without taking variances into account, we expected considerable variation among the calculated proportional differences for a state. Therefore, we only considered very large discrepancies, such as the one illustrated in the example above, to be indicative of compliance rate differences.

Comparisons based on waterfowl and dove hunter estimates for 14 states (Table 6) suggested that compliance rates of the 2 hunter types were similar in 6 states (Alabama, California, Florida, Georgia, South Dakota, and Texas), lower for dove hunters in 3 states (Arizona, Louisiana, and Virginia), probably lower for dove hunters in 3 more states (Delaware, Maryland, and Pennsylvania), and higher for dove hunters in 2 states (New Mexico and Wyoming). Comparisons of waterfowl and woodcock hunter estimates for 9 states suggested that compliance rates for those two hunter types were similar in Alabama, Louisiana, Maryland, and Minnesota, but lower for woodcock hunters in Delaware, Michigan, New York, Pennsylvania, and Virginia.

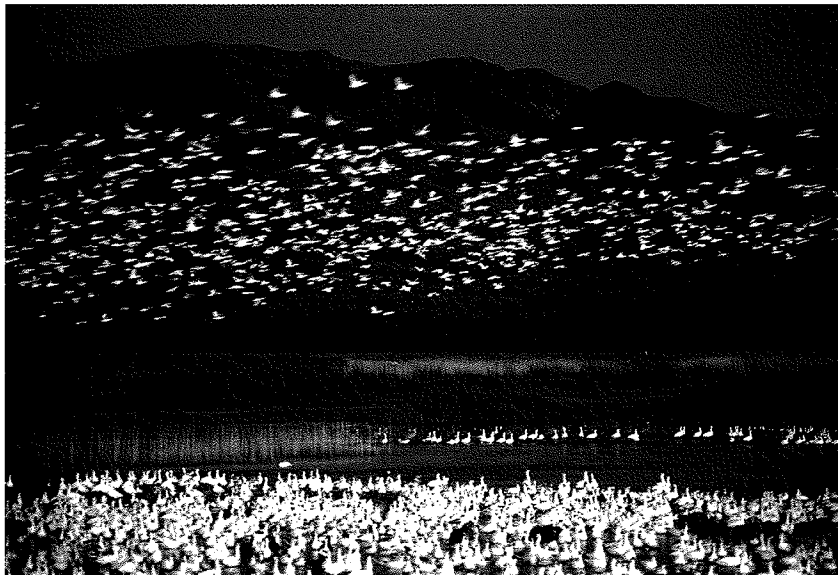
CONCLUSIONS AND RECOMMENDATIONS

The available evidence suggested that compliance rates are high (probably >90%) for waterfowl hunters in most states. This is not surprising given that most states made substantial efforts to notify migratory bird hunters of the HIP requirements, and presumably all waterfowl hunters know that waterfowl are migratory birds. However, the data also suggested that compliance rates are lower for dove and woodcock hunters. This may be due to the fact that significant numbers of dove and woodcock hunters do not know that those

species are migratory birds, thus they do not consider themselves migratory bird hunters. Information and education efforts to publicize HIP have waned in most states since they first implemented the program. As a consequence, compliance rates among migratory bird hunters other than waterfowl hunters will probably decline rather than increase over time.

Less than 100% compliance will result in HIP hunter activity and harvest estimates that are biased low. Since we do not know what compliance rates are, we do not know the magnitude of the bias at this point. The evidence suggests that compliance varies among both states and hunter types, which further complicates the problem of getting a sufficient understanding of the bias to allow reliable interpretation of the survey results. Finally, there is a high probability that compliance rates will deteriorate over time, thereby exacerbating the bias problem.

Therefore, we recommend that all states and the U.S. Fish and Wildlife Service (Service) take steps to improve compliance rates and to maintain them at a high level for all types of migratory game bird hunters. Efforts should be aimed primarily at migratory shore and upland game bird hunters, particularly dove and woodcock. They should include renewed emphasis on informing hunters about the HIP requirements and the need for HIP certification along with renewed and sustained efforts to make sure that license vendors provide HIP certification to all migratory bird hunters. These steps should also include law enforcement efforts by all states and the Service to enforce the HIP requirement on hunters in the field, because without active enforcement, high compliance rates will not be achieved and sustained. State and federal law enforcement officers should issue citations to migratory bird hunters who do not have the required HIP certification.



Snow geese at the Bosque del Apache National Wildlife Refuge, New Mexico. *Photo by David Dolton.*

Table 1. Harvest Information Program compliance rates reported by law enforcement personnel.

State	Year	Hunter type	Number of hunters checked	Percent of hunters HIP-certified
Arizona	1997	Dove	27	70%
Arizona	1999	Dove	41	71%
Arizona	2000	Dove	2,416	96%
Georgia	1998	Dove	5,697	96%
Georgia	1999	Dove	6,158	95%
Georgia	2000	Dove	9,774	97%
Pennsylvania	1999	Dove	3,711	99%
Tennessee	1996	Dove	1,000	98%
Virginia	1999	Dove	1,195	95%
Virginia	2000	Dove	1,574	90%
West Virginia	1998	Dove	114	76%
Pennsylvania	1999	Waterfowl	6,524	99%
West Virginia	1998	Waterfowl	24	92%
Pennsylvania	1999	Woodcock	199	99%
Maryland	1994-99	Migratory bird	Unknown	>95%
Minnesota	1999	Migratory bird	Few	90%
Minnesota	2000	Migratory bird	Few	99%
Pennsylvania	1999	Migratory bird	10,434	99%
Utah	1999	Migratory bird	500	97%
West Virginia	1998	Migratory bird	138	80%

Table 2. Harvest Information Program compliance rates estimated from surveys conducted by states.

State	Year	Hunter type	Percent of hunters HIP-certified
Illinois	1996	Dove	58%
Pennsylvania	1999	Dove	80%
Illinois	1996	Waterfowl	78%
Michigan	1997-98	Waterfowl	70%
Pennsylvania	1999	Waterfowl	94%
Michigan	1997-98	Woodcock	32%
Pennsylvania	1999	Woodcock	66%
Colorado	1998	Migratory bird	>90%
Colorado	1999	Migratory bird	>90%
Illinois	1996	Migratory bird	66%
Pennsylvania	1999	Migratory bird	82%
Rhode Island	1999	Migratory bird	95%
Texas	1998	Migratory bird	88%

Table 3. Number of active waterfowl hunters estimated by the 1999 Harvest Information Program (HIP) vs federal duck stamp waterfowl harvest surveys. "Match" rank 1 = point estimates overlap, HIP confidence interval (CI) <16% of HIP estimate; 2 = estimates overlap, HIP CI >15%; 3 = estimates nearly overlap, HIP CI <16%; 4 = estimates nearly overlap, HIP CI >15%, or estimates fairly close, HIP CI <16%; 5 = estimates not close, HIP CI <11%; 6 = estimates not close, HIP CI >10%.

State	HIP waterfowl survey		Duck Stamp Survey	
	Point estimate	95% CI	Point estimate	"Match" rank
Delaware	4,900	4,300 - 5,500	4,600	1
Iowa	23,900	22,700 - 25,100	24,600	1
Michigan	55,400	51,500 - 59,300	56,100	1
Missouri	30,700	26,700 - 34,700	27,700	1
Nebraska	25,000	23,000 - 27,000	26,300	1
Nevada	5,800	4,900 - 6,700	6,600	1
New Jersey	9,700	9,000 - 10,400	10,000	1
Oklahoma	17,000	14,500 - 19,600	16,600	1
Oregon	28,000	26,300 - 29,700	26,800	1
Rhode Island	1,400	1,200 - 1,600	1,300	1
Texas	107,300	95,500 - 119,100	102,500	1
Virginia	17,900	15,400 - 20,400	18,900	1
Washington	32,500	29,900 - 35,100	35,000	1
Wisconsin	86,700	81,500 - 91,900	87,100	1
Alabama	14,100	10,400 - 17,800	14,400	2
Georgia	15,100	10,900 - 19,300	17,300	2
Indiana	17,400	14,300 - 20,500	18,400	2
Maine	9,600	7,700 - 11,500	8,500	2
North Carolina	30,200	22,300 - 38,100	26,100	2
South Carolina	17,800	14,200 - 21,400	20,200	2
Vermont	2,500	1,900 - 3,200	2,900	2
Arizona	6,200	4,300 - 8,100	6,100	2
Florida	15,100	10,600 - 19,600	17,400	2
Kentucky	20,100	13,900 - 26,300	15,400	2
West Virginia	1,000	100 - 2,000	1,300	2
Alaska	6,200	5,500 - 6,900	7,400	3
Connecticut	5,300	4,800 - 5,800	4,500	3
Louisiana	87,400	82,200 - 92,600	95,600	3
New Hampshire	3,500	3,200 - 3,800	3,900	3
Pennsylvania	43,800	39,000 - 48,600	38,800	3
South Dakota	33,500	31,200 - 35,800	29,400	3
Utah	21,500	18,900 - 24,100	24,400	3
Kansas	20,500	18,000 - 23,000	15,800	4
Maryland	21,200	19,300 - 23,100	18,000	4
Mississippi	16,200	13,100 - 19,300	20,700	4
New Mexico	3,000	2,200 - 3,800	3,900	4
New York	24,000	22,600 - 25,400	28,600	4
Tennessee	21,500	16,600 - 26,400	27,200	4
Arkansas	74,500	69,300 - 79,700	53,700	5
California	49,800	46,300 - 53,300	65,500	5
Illinois	39,100	36,000 - 42,200	52,800	5
Massachusetts	3,400	3,200 - 3,600	8,000	5
Minnesota	76,200	71,600 - 80,800	120,100	5
North Dakota	42,400	40,300 - 44,500	26,500	5
Colorado	19,600	17,100 - 22,100	34,800	6
Idaho	16,400	14,600 - 18,200	20,800	6
Montana	12,500	10,600 - 14,400	18,100	6
Ohio	26,100	22,400 - 29,800	35,100	6
Wyoming	5,900	4,400 - 7,400	9,200	6

Table 4. Number of active dove hunters estimated by the 1999 Harvest Information Program (HIP) survey vs 1998 or 1999 state harvest surveys. "Match" rank 1 = point estimates overlap, HIP confidence interval (CI) <16% of HIP estimate; 2 = estimates overlap, HIP CI >15%; 3 = estimates nearly overlap, HIP CI <16%; 4 = estimates nearly overlap, HIP CI >15%, or estimates fairly close, HIP CI <16%; 5 = estimates not close, HIP CI <11%; 6 = estimates not close, HIP CI >10%.

State	HIP dove survey		State survey	
	Point estimate	95% CI	Point estimate	"Match" rank
Colorado	14,200	12,100 - 16,300	13,272	1
New Mexico	7,400	4,700 - 10,100	7,618	2
South Dakota	10,900	8,600 - 13,200	12,518	2
Wyoming	2,900	1,500 - 4,300	2,418	2
Pennsylvania	39,900	35,900 - 43,900	49,551	4
Alabama	57,300	52,700 - 61,900	73,500	5
Arizona	30,500	28,400 - 32,600	56,157	5
California	56,400	50,800 - 62,000	114,249	5
Georgia	46,900	42,200 - 51,600	109,096	5
Kansas	36,300	33,400 - 39,200	73,800	5
Oklahoma	37,200	34,200 - 40,200	69,527	5
South Carolina	37,000	33,300 - 40,700	58,701	5
Texas	297,500	282,600 - 312,400	393,352	5
Delaware	3,700	2,500 - 4,900	6,146	6
Florida	18,100	14,300 - 21,900	25,911	6
Louisiana	40,100	32,900 - 47,300	67,100	6
Maryland	5,400	3,900 - 6,900	10,957	6
Virginia	23,400	20,800 - 26,000	50,970	6

Table 5. Number of active woodcock hunters estimated by the 1999 Harvest Information Program (HIP) survey vs 1998 or 1999 state harvest surveys. "Match" rank 1 = point estimates overlap, HIP confidence interval (CI) <50% of HIP estimate; 2 = estimates overlap, HIP CI >50%; 3 = estimates nearly overlap, HIP CI <50%; 4 = estimates nearly overlap, HIP CI >50%, or estimates fairly close, HIP CI <25%; 5 = estimates not close, HIP CI <50%; 6 = estimates not close, HIP CI >50%.

State	HIP woodcock survey		State survey	
	Point estimate	95% CI	Point estimate	"Match" rank
Minnesota	14,600	9,900 - 19,300	19,200	1
Pennsylvania	14,900	8,500 - 21,300	12,212	1
Wisconsin	24,800	19,600 - 30,000	24,000	1
Louisiana	7,200	2,100 - 12,300	5,500	2
Maryland	3,400	0 - 7,600	1,148	2
Oklahoma	2,500	300 - 4,700	821	2
Texas	14,400	0 - 19,500	1,737	2
Delaware	50	0 - 150	362	4
Alabama	4,000	2,300 - 5,700	500	5
Michigan	21,600	16,200 - 27,000	53,067	5
Virginia	300	200 - 400	2,597	5
Florida	0		595	6
New York	4,600	2,300 - 6,900	11,682	6

Table 6. Percent by which the state survey estimate of hunter numbers exceeds the 1999 Harvest Information Program (HIP) survey estimate. A "<0" denotes a state survey estimate less than the HIP survey estimate.

State	Year	Hunter type			
		Duck	Goose	Dove	Woodcock
Alabama	1998	37	65	28	
California	1999	105	63	102	
Florida	1998	50		43	
Georgia	1998	170	117	133	
South Dakota	1999	8	19	15	
Texas	1999	80	13	32	
Delaware	1998	35	39	65	
Maryland	1999	72	28	104	
Pennsylvania	1999	3	<0	24	
Arizona	1999	7	8	84	
Louisiana	1999	16	9	67	
Virginia	1998	15	52	118	
New Mexico	1998	173	56	3	
Wyoming	1999	83	112	<0	
Alabama	1998	37	65		<0
Louisiana	1999	16	9		<0
Maryland	1999	72	28		<0
Minnesota	1998	77	52		32
Delaware	1998	35	39		620
Michigan	1998	15	48		146
New York	1999	47	28		154
Pennsylvania	1999	3	<0		82
Virginia	1998	15	52		766

The Role and Impact of the Large Chain Store License Vendors, such as Wal-Mart and State Wildlife Agencies, in the Overall Success or Failure of the Harvest Information Program

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Abstract: Wal-Mart and K-Mart were the 2 leading non-agency chain store license vendors. All chain stores combined sold an average of 45% of the licenses each year in each of the 26 states reporting sales by chain stores. Sixty-eight percent of the reporting states indicated that their agencies did a better job of handling Harvest Information Program (HIP) certifications than did other vendors. There were no apparent differences in the performance assessment of HIP among these other vendors. However, the assessment of all licensing responsibilities (HIP and non-HIP) indicates that Wal-Mart and K-Mart (combined) are performing at a slightly lower level. Seven recommendations are offered for improving the performance of large chain stores in order to comply with HIP.

INTRODUCTION

Central to the theme of evaluating the Harvest Information Program (HIP) is the role that large chain stores have in the success or failure of HIP. Most state wildlife agencies use vendors to sell and distribute licenses and other associated material. Historically, these vendors were very important and possibly the only link the state agency had with the sportsperson. As our society has developed and urbanized, many hunters have changed their pattern of shopping from small stores to large chain stores in urban centers.

These large chain stores have significant personnel turnover which varies from chain to chain and also from store to store. The successful implementation and continuation of a licensing or permitting process through the sporting goods departments of these stores can be a significant problem.

METHODS

States were asked to respond to 1 quantitative and 4 subjective questions in a matrix which related to major chain store license vendors in their state. For the survey, states were instructed to consider their agency to be a major chain store (Appendix A, question 51). The state wildlife agency, Wal-Mart, and K-Mart were listed specifically and slots were left blank to list up to 6 additional vendors.

RESULTS

Write the percent of all licenses sold by each chain store.

K-Mart and Wal-Mart accounted for sales of licenses in 24 and 26 states, respectively, in the survey, with 49 states reporting. Wal-Mart was the largest chain store license vendor; 12 states reported that they sold more than 25% of their licenses. K-Mart was second with 8 states reporting sales of 10% or more. One state (Mississippi) reported that Wal-Mart sold 86% of the licenses and 1 (West Virginia) reported that K-Mart sold 25%. Wal-Mart and/or K-Mart averaged 32.4% of total sales in these states. Other vendors listed include, but are not limited to, Sports Authority, Dick's Sporting Goods, Bass Pro Shops, Academy Sports,