

Approved March 5, 1986
Date

MINUTES OF THE HOUSE COMMITTEE ON ENERGY AND NATURAL RESOURCES

The meeting was called to order by Representative Ron Fox at
Chairperson

3:30 xxx a.m./p.m. on February 25, 1986 in room 526-S of the Capitol.

All members were present except:
Representative Guldner (excused) Representative Grotewiel (excused)
Representative Fry (excused)
Representative Foster (excused)

Committee staff present:

Ramon Powers, Legislative Research Department
Theresa Kiernan, Revisor of Statutes' Office
Betty Ellison, Committee Secretary

Conferees appearing before the committee:

Representative Moomaw
Ivan Krug, LaCrosse, Kansas
Loa Hagelgantz, Bazine, Kansas
Larry Kleweno, Bazine, Kansas
Daryl Filbert, Wichita, Kansas
Mason Flora, Harveyville, Wabaunsee County
Lowell Abeltd, State Association of Watersheds
Dean Delaney, Alamota, Kansas
Darrel Montei, Game Division Chief, Kansas Fish and Game Commission
Jerry Hazlett, Kansas Wildlife Federation.
Bill Fuller, Kansas Farm Bureau
Mike Beam, Kansas Livestock Association
Representative Jerry Friedeman
Jake Stremel, Great Bend
Representative Ken Francisco
George Axline, Kansas Fish and Game Commission

The meeting of February 24 was continued with adoption of the minutes of February 20. Chairman Fox made some announcements regarding the agenda for future meetings.

House Bill 2872--Watershed district; power of eminent domain.

Representative Moomaw explained that this bill stemmed from a dispute over a watershed dam in Bazine in his district. He introduced Ivan Krug, who spoke in support of the legislation and explained it. He felt that the method of implementation of the watershed district law could be improved. He noted that the first proposal in the bill said that if a watershed district wanted to put a dam on a farmer's property and they could not agree on terms, then the watershed district would have authority to condemn only the dam easement on the farmer's land against his wishes. The other part of the measure relates to a situation where the farmer who did not want the dam and 60 percent of the farmers in the area were opposed to it, then the power of eminent domain could not be exercised. In response to a question relative to who benefits from a watershed district, Mr. Krug said that there was a public benefit and that the concept was to hold the water back in the small dams upstream, so it wouldn't gather together and flood downstream. In this instance, Mr. Krug felt that the watershed district was taking advantage of the farmers. He said that in some cases, the watershed district was condemning considerably more land than was needed. Also, the landowner was paid only the market value of the land at that time, and this compensation did not cover all the losses that were incurred. Asked who owns oil or gas leases which might be on the land, Mr. Krug said that the watershed takes all minerals.

CONTINUATION SHEET

MINUTES OF THE HOUSE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
room 526-S, Statehouse, at 3:30 ~~xxx~~ p.m. on February 25, 1986

Loa Hagelgantz testified as a proponent, naming the farm economy and taxes as principal reasons. (See Attachment 1) She showed a map of all dams proposed in this watershed district, 48 large dams as well as numerous smaller dams. Asked if she felt the landowners were not being paid a fair price, she replied they were not, because the price of land is down at the present time; if they had wanted to sell the land, they would have done so when the market value was high.

Larry Kleweno, a farmer and irrigator, spoke in favor of the bill. He said there is a small watershed dam on his land which required a 45 acre easement; he donated the easement and they built the structure with no problem. He feels that the watershed should have stayed with this type of dam.

Daryl Filbert testified in support of the measure and submitted an outline of his comments. (See Attachment 2)

Dean Delaney testified in favor of the bill. He said that he had one of the watershed dams on his land. He felt that they shut off the underflow of water and hurt waterwells. He noted that the people in his area would be glad to compromise, but did not know where to go for help.

Mason Flora opposed House Bill 2872. He said he had been a member of the Watershed State Board in the past. He said that the Watershed Districts have created a flood control program and do not take any more land than is needed. He felt that the section of the bill dealing with the power of eminent domain, page 2, lines 66-71, should be stricken because it affects only one district in western Kansas. He did not want to see over 80 watersheds affected by legislation which was meant for only one particular district. Chairman Fox asked Mr. Flora if he thought there was a possibility of this problem being solved without this bill, and he replied that he did.

Lowell Abeldt of Abilene represented the State Association of Kansas Watersheds with testimony opposing the bill. He believed that House Bill 2872 would defer and possibly destroy the good development and procedure of the Kansas Watershed Act. He also felt that it leaned closely on the point of constitutionality in that it limited the right of eminent domain. He was sorry that the problems discussed today had not been brought before the State Association. Responding to a question, he also felt that this problem could be solved by the parties involved without this legislation.

House Bill 2865--Hunting licenses and permits for big game animals.

Representative Moomaw, sponsor of the bill, submitted written testimony. (See Attachment 3) He explained changes that would be made in hunting rules and regulations by this measure, noting that it was not his intent to change the age for an archery permit from 14 to 16. He had intended to leave archery at 14 and firearms at 16 years of age, and requested that this change be made in the bill.

Darrel Montei, representing the Fish and Game Commission, testified in support of the bill and detailed conditions that it would create. (See Attachment 4)

Jerry Hazlett gave favorable testimony on behalf of the Kansas Wildlife Federation. He gave some background information on his organization, noting that several resolutions especially dealing with big game legislation had been passed. (See Attachment 5) He commended the Fish and Game Commission for cooperating in working out areas of agreement leading toward this legislation.

Bill Fuller spoke on behalf of the farmers and ranchers who were members of Kansas Farm Bureau. He was a proponent of House Bill 2865, and quoted a section of a resolution pertaining to this legislation. He also expressed appreciation of the Fish and Game Commission and others in trying

CONTINUATION SHEET

MINUTES OF THE HOUSE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
room 526-S, Statehouse, at 3:30 ~~am~~ p.m. on February 25, 1986

to arrive at a common ground on this issue, but suggested a couple of amendments to the bill.

Mike Beam represented the Kansas Livestock Association with testimony in favor of the bill, but suggested two amendments, one dealing with special season permits.

House Bill 2977--Fish and game; use of steel shot.

Representative Friedeman, sponsor, used a letter that he had received from Senator Diemer True of the Wyoming State Legislature, who had sponsored similar legislation there, as the basis for his testimony. (See Attachment 6) He called special attention to the P.S. at the end of the letter. Copies of other material which had accompanied the letter are also attached. (See Attachment 7) Representative Friedeman said he did not believe that lead poisoning was killing eagles and other birds. He felt that the higher cripple rate of waterfowl from the use of steel shot was much more damaging than lead poisoning, although he agreed that lead poisoning did exist because the high density was there. In reply to a question of Representative Spaniol, Mr. Friedeman said that this requirement was first passed in 1983 in Stafford County on waterfowl and he had been told that it could be for all hunting by shotguns in Stafford County in 1987.

Jake Stremel, a hunter from Great Bend, was a proponent of the bill. He said that he knew of very few hunters in favor of this legislation, and that he had several guns which showed damage from steel shot. He stated that he had not seen positive proof that we were losing bald eagles from lead poisoning, and had seen very little lead deposits in Cheyenne Bottoms.

Jerry Hazlett, representing the Kansas Wildlife Federation, opposed House Bill 2977. He submitted a 1984 Resolution by the Kansas Wildlife Federation. (See Attachment 8) He also submitted a Draft Environmental Impact Statement on the use of lead shot for hunting migratory birds in the United States. He said that this is the evidence as put together by the United States Department of the Interior Fish and Wildlife Service that speaks to the lead shot problem in the United States. Mr. Hazlett felt that the Wyoming Fish and Game Commission had probably found the evidence they wanted in order to take the easy way out of a controversial issue. Discussion followed.

Darrel Montei spoke on behalf of the Fish and Game Commission. He distributed a set of maps relative to counties requiring steel shot for waterfowl hunting. (See Attachment 9) He said that the Commission had no plans for requiring all steel shot for all hunting. Committee discussion followed.

House Bill 2887--Terms of fishing and hunting licenses.

Representative Francisco, sponsor, said that he introduced the bill because in the middle of hunting season in November, when you might be on a trip, you would have to stop and buy another license. A number of people had suggested that the season be changed to comply with the federal duck stamp so it runs through June 30. He noted that a problem which he had not foreseen was relative to the combination license.

George Axline, representing the Fish and Game Commission, opposed this bill because of the fiscal impact on the Commission as well as on the state general fund. He said that his agency preferred December 31 because that was a more expedient time in their work schedule. Committee discussion followed.

Jerry Hazlett of the Kansas Wildlife Federation, said he felt that the funding could be better used for wildlife management programs.

The meeting was recessed at 5:37 until February 26 at 3:30 p.m.

Dear Committee Members:

I would like to encourage you to pass House Bill 2872, which requires the watershed districts to be able to condemn only easements, and only after they have received approval of the landowners representing 60% of the land, including the maximum area to be flooded. If the landowners want a dam on their land, that is fine, but I do not feel that it should be forced upon them.

There are several reasons why we believe this is needed.

First of all is the farm economy. Farmers are in financial trouble due to low crop prices and the high cost of production. Farmers cannot afford to lose land to a watershed dam, because land taken out of production reduces income even more. If it involves pasture and feed land, it could mean the cattle operation would be in jeopardy. Taxes are high and the land taken out of production for a watershed dam is taken off the tax rolls, but it has to be compensated for on the other land, thus increasing the taxes on everyone else. This is in addition to the 1.93 mill levy for the Wet Walnut Watershed District.

The following is the amount of taxes levied for 1986 from the counties involved in this watershed.

Ness	\$ 75,627.30
Rush	41,362.03
Lane	52,022.68
Barton	18,832.49
Scott	3,558.56
	58.22 (Tax of feedlot cattle)
Pawnee	40.70
TOTAL	\$191,571.98

Then you add to this the state and federal taxes spent on watershed dam construction. The farmer pays both in less farm ground and higher taxes.

In March 1983 the watershed settled for \$147,500.00 for 160 acres of land for a dam. They have paid \$800.00 an acre for 240 acres. This would not have been necessary if the landowners had wanted a dam on their land. I don't blame the landowner either. He didn't work to own land, just to give it away. I feel it is a waste of tax money to condemn land that people do not want to give up.

There was a time when building dams was needed, but we have a number of dams in Kansas now. According to the Background Paper No. 9 State Water Plan, there are 21 Federal Dams in operation as of March 1984. Twenty five Federal levees, channel changes and other flood control works are in operation. These are larger dams than the watershed dams, but serve the purpose of flood control.

The cost benefit analysis for the watershed in our area was made in 1970. Since that time the three counties involved the most in this watershed have completed the following conservation practices.

	Waterways	Stock Ponds	Terraces
Ness	1,391 acres	228	2,136 miles protecting 75,000 acres
Rush	4,137 acres	55	2,013 miles
Lane	0	24	1,371 miles protecting 41,130 acres

All of these conservation practices have reduced the run-off of rain water. Also the better farming practices have reduced run-off. We used to have water run down our draws when we got a hard rain, but since we have terraced our land and have improved farming practices, such as undercutting, we do not have the run-off. Where we used to have deep cuts in the fields and pastures, they are filled in now. The need for dams has been greatly reduced.

I don't understand why the watershed doesn't need to consider the location of wells when they consider a dam. The Kansas Health and Environment have told us there is a good possibility that the dam on our land will pollute our water, as the only usable water we have is from a shallow aquifer. We pipe our water 1300 feet from the draw area in order to have it. The Division of Water Resources expresses concern over the possibility the down gradient flow of alluvial water might be restricted to the point that existing down stream water rights would be impaired to the point the agency would be required to take action. When they build these dams it opens up our water supply to evaporation. The Kansas Water Resources Board graph shows the average annual evaporation from reservoirs in our area is 65 inches per year. Our average precipitation is only 20-22 inches per year. This water is evaporating from the ponds and reservoirs, not going into the ground flow.

As you look at this map remember that western Kansas is quite flat. There are 48 large dams in the Wet Walnut Watershed District, besides numerous smaller dams. The 1985 cost estimate for the dam proposed on our land is \$330,000.00. Take this for an average figure, as some dams are larger and some smaller, and multiply it by 48. There is a lot of money being spent, when the economy is so bad in the farm area especially and all across the nation. The local, state or federal governments do not have money for this.

When the watershed was first formed the people thought that a series of small ponds were going to be put in that all could benefit from, not these large dams that cost so much and hurt the farmers in return.

To try to work with the watershed personal is a nightmare in its self, plus the dollars spent and the damages to the farmers needs to be corrected.

I again ask you to support this house bill so that these dams are only put where the people do want them on their land.

If you have any questions, I will try to answer them.

Thank you,

Energy

Major points in testimony before Committee on ~~Conservation~~ and Natural Resources in Topeka, Kansas, February 25, 1986

1. Methodology used to acquire property rights
 - A. Sequence out of order
 - B. Scare tactics
 - C. Philosophy of Board and Contracting Officer of Wet Walnut Creek Watershed
2. Not willing to pay for damages
3. Substantial decline in land values
4. Should be required to prove a need at the present time

Respectfully,

Daryl W. Filbert

Daryl W. Filbert
5720 N. Athenian
Wichita, Kansas 67204

Landowner, Dam #36

Attachment 2

House Energy and Natural Resources 2/25/86

BILL ANALYSIS

Date of Final Committee Action February 26, 1986

Sponsor Moomaw Committee Energy

Brief Explanation Sets up Watershed District public hearing
review each 5 years after general plan is approved to determine
if projects proposed to be undertaken by the District are still
necessary.

Proponents Loa Haggelgantz Opponents Lowel Abeldt, President
and certain other land Kansas Watershed Assn.
owners affected by pro- Mason Flora,
posed Watershed dams. Former KWA Board Member

If close vote explain _____

Explain Important Committee Amendments (if any) _____

Fiscal Note (if any) _____

Other Comments _____

Signed Max Moomaw
Rep. Max Moomaw
Chairman or Designee

Notes for Individual Legislators use:

MAX MOOMAW
REPRESENTATIVE, 117TH DISTRICT
HODGEMAN, LANE AND
PARTS OF FINNEY AND
NESS COUNTIES
HC 2, Box 195
DIGHTON, KANSAS 67839



TOPEKA

HOUSE OF
REPRESENTATIVES

COMMITTEE ASSIGNMENTS
MEMBER: ASSESSMENT AND TAXATION
EDUCATION
TRANSPORTATION

TO: House Energy and Natural Resources Committee
FROM: Representative Max Moomaw
117th District
RE: House Bill 2865
DATE: February 25, 1986

Mr. Chairman and Members of the Committee:

During the past several years the deer population in Kansas has increased rapidly. One indicator of this is the number of road-killed deer. I have attached a table in my prepared testimony. If you would look at it, you will see that in 1977 there were 999 road-killed deer, by 1984 this increased to 3003. I think you would all agree that is a sizeable increase. Although wildlife is the property of the State, the cost of feeding wildlife for the most part is borne by the landowner and the tenant who operates the land.

HB 2865 does several things that affect the hunting of deer, antelope, elk, and wild turkey.

1. All the above animals are declared to be big game animals.
2. Separate permits will be required for deer, elk, antelope, and turkey.
3. A person exempt by law from having a hunting license does not need one to take or attempt to take big

game--these include persons under 16 and over 65 years of age, American Indians, military personnel, and resident landowners hunting on their own property.

4. The bill allows Fish and Game by rules and regulations to establish open season in any part or area of the state. This allows Fish and Game to designate whatever size area they need to under a particular circumstance.
5. Section 3(a) defines terms used in this act.
6. Allows Fish and Game to establish regular or special big game hunting seasons.
7. In a regular big game season 50 percent of permits go to the public and 50 percent to landowners and tenants. Lines 110, 111, and 112 allow the commission to issue any permits not issued within the time period without regard to the 50 percent limitation.
8. The commission may issue additional permits to landowners or tenants not receiving a regular season permit after timely application. These permits may contain restrictions as to sex and specie.
9. The commission may establish special seasons in addition to regular seasons and issue permits without percent limitations.

It was not my intent to change the age for an archery permit from 14 to 16. I intended to leave archery at 14 and firearms at 16 years of age. I would request that this change be made.

MM:ks

Attachment

Table 1. Number of road-killed deer, road-kill index, and % does in total known-sex road-kill in Kansas, 1961-1984.

Year	Highway Mortalities		Road-Kill Index		% Does in Total Known-Sex Road-Kill
	No. Deer	Percent Change	Deer Killed Per Billion Vehicle Miles	Percent Change	
1961	203	-----	41.6	-----	-----
1962	265	+30.5	52.5	+26.2	-----
1963	311	+17.4	61.3	+16.8	-----
1964	453	+45.6	87.8	+43.2	-----
1965	563	+24.3	107.1	+22.0	-----
1966	569	+ 1.1	105.8	- 1.2	44.8
1967	657	+15.5	125.2	+18.3	47.9
1968	734	+11.7	136.4	+ 8.9	43.9
1969	878	+19.6	156.3	+14.6	54.6
1970	1,144	+30.3	200.5	+28.3	47.4
1971	1,179	+ 3.1	201.6	+ 0.5	52.7
1972	1,273	+ 8.0	207.9	+ 3.1	50.0
1973	1,423	+11.8	223.5	+ 7.5	52.4
1974	1,211	-14.9	195.3	-12.6	54.1
1975	891	-26.4	143.8	-26.4	53.7
1976	798	-10.4	123.8	-13.9	57.8
1977	999	+25.2	154.2	+24.6	52.9
1978	1,456	+45.7	219.2	+42.2	55.1
1979	1,795	+23.3	266.0	+21.4	56.1
1980	2,020	+12.5	309.0	+16.2	55.8
1981	2,253	+11.5	340.8	+10.8	48.9
1982	2,492	+10.6	375.0	+10.0	56.2
1983	2,664	+ 6.9	388.3	+ 3.5	54.8
1984	3,003	+12.7	424.0	+ 9.2	57.0

Table 2. Reported deer mortality by highway, miscellaneous and poaching for each Fish and Game Administrative Region, 1984.

Region	No. of Highway Deer Mortalities	No. of Misc. Deer Mortalities	No. of Rept. Deer Poached	Total
Northwest	243	29	18	290
Southwest	343	37	17	397
Northcentral	447	48	32	527
Southcentral	581	48	51	680
Northeast	797	35	30	862
Southeast	592	41	35	668
Statewide	3,003	238	183	3,424

House Bill 2865

Testimony Provided to House E&NR Comm. on February 26, 1986
By Kansas Fish and Game Commission

House Bill 2865 would authorize more flexibility for the Commission to manage deer, antelope, elk and wild turkey in Kansas. Our big game populations have expanded and with that expansion comes a need to improve our management capabilities, be more responsive to those changing conditions, and address needs of sportsmen and landowners/tenants.

H.B. 2865 will amend K.S.A. 32-110a, 178 and 179 and repeals K.S.A. 32-177. The essential provisions of K.S.A. 32-177 are included in the proposed amendments to K.S.A. 32-110a as contained in H.B. 2865. As written, H.B. 2865 will create the following conditions:

- 1) Designates deer, elk, antelope and wild turkey as "big game" and creates a definition section in the law.
- 2) Authorizes the Commission to establish big game seasons in any portion of the state using identifiable boundaries rather than only by counties, highways, major streams or federal reservoirs as is the current statutory language.
- 3) Continues the 50% split of regular season big game permits between landowners/tenants and general residents. It will authorize greater flexibility for issuing undersubscribed permits from one group to another.
- 4) Authorizes the Commission to establish "special" big game seasons, primarily in response to over-population or depredation occurrences.
- 5) Authorizes the Commission to issue additional big game permits to landowners/tenants under special conditions.
- 6) Raises the minimum age for big game archery hunting to 16.
- 7) Allows the Director to issue information cards to some permit holders rather than all permit holders as is the current requirement.
- 8) Specifies for the wearing of orange while hunting deer and elk with firearms. Current law authorizes both red and orange for deer hunting and elk hunting is not addressed.
- 9) Clarifies conditions under which a hunting license is required to hunt big game and removes hunting license requirement when applying for a big game permit.
- 10) Provides for a reduced fee for all big game permits issued to landowners and tenants.

Supplimental Notes on H.B. 2865

Many of the changes in management of big game as a result of H.B. 2865 would occur through rules and regulations adopted by the Commission. It is our belief that it may assist discussion of H.B. 2865 if a general concept is provided of what this agency intends to accomplish by rule and regulation.

- The boundary provision would permit seasons to be established by rule and regulation using any identifiable boundary. Seasons will continue to be set using major highways. However, use of other boundaries such as; state wildlife areas, federal installations, townships, legal land descriptions, etc., would be used when appropriate.

- There are presently 18 deer management units in Kansas, each with varying conditions and deer management needs. It is agency intent to make additional permits available to landowners and tenants under prescribed circumstances for various units through rules and regulations. This may take several forms on a unit by unit basis subject to proper management of the deer herd in a particular unit. In several units, it may be possible to authorize additional permits to landowners and tenants with only similar restrictions as would apply to all landowners and tenants. In other units, landowners and tenants who were unsuccessful in obtaining a permit during a selection process could obtain a permit to hunt on their own land only. Other possibility includes limiting the additional permits to a specified type of deer such as; buck only, whitetail buck only, doe only, etc.

- There are situations that occur due to local over-population of deer or in response to depredation problems where "special" hunting seasons would help alleviate the problem. Agency action in these cases must be prompt. Rules and regulations would be adopted enabling the Commission to designate such seasons on short notice. Issuance of permits would be prearranged, perhaps to affected landowners and/or tenants, or possibly to general residents who were unsuccessful in obtaining a regular season permit. Other options may also be possible and would certainly be considered.

It should be emphasized that "special" seasons will provide the Commission another tool with which to address deer problems along with other methods currently employed. It is not intended nor will it be used to replace other proven methods of treating deer problems.

- It is not necessary to have 100% reporting of all deer hunters in order to adequately manage the deer herd. Informational cards would be issued to an adequate sample of deer hunters to generate data upon which to base management decisions. Informational cards would continue to be sent to all antelope and wild turkey permittees, although it may be possible to start a sampling scheme for turkey hunters in the foreseeable future in some units.

RECOMMENDED AMENDMENTS TO H.B. 2865

Line 0203 - Add additional sentence:

Notwithstanding the provisions of K.S.A. 32-110b, and amendments thereto, any person violating any provisions of this paragraph shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined in an amount not less than \$25 nor more than \$100.

Line 0071 - After the word resident add "or nonresident".

Line 0139 - Change 16 to 14.

KANSAS WILDLIFE FEDERATION

RESOLUTION 1985-3

TURKEY PERMIT PREFERENCE SYSTEM

WHEREAS, under the present turkey permit allocation system, there are units with unlimited permits and units with restricted permit numbers; and

WHEREAS, there are two choices allowed on the permit application; and

WHEREAS, some hunters who are unsuccessful in drawing a permit in their home unit apply for a permit in another unit; and

WHEREAS, they, then if successful, are restricted from applying in their home unit the following year; and

WHEREAS, this presents a situation where some hunters will never again be able to draw a permit in their home unit without missing out on recreational opportunity for a year or more;

NOW, THEREFORE, BE IT RESOLVED, that the **Kansas Wildlife Federation, Inc.**, in annual meeting assembled on October 19-20, 1985, in Wichita, Kansas, urges the Kansas Fish and Game Commission to take all necessary steps to provide an equal and fair allocation of permits which will allow a turkey hunter to have the opportunity to hunt in his home unit while still being allowed to hunt in an unlimited unit in other years without missing out on recreational opportunity for a period of time.

KANSAS WILDLIFE FEDERATION

RESOLUTION 1985-4

ANTELOPE PERMIT PREFERENCE SYSTEM

WHEREAS, there is presently no preference system on firearms antelope permits; and

WHEREAS, several people have unsuccessfully applied for firearms antelope permits for up to nine (9) years consecutively without being drawn; and

WHEREAS, a number of other applicants have had the opportunity to hunt antelope two and even three times in that same period of time; and

WHEREAS, the successful applicant for an archery antelope permit is considered a successful permittee in regards to the following year's firearms application;

NOW, THEREFORE, BE IT RESOLVED, that the **Kansas Wildlife Federation, Inc.**, in annual meeting assembled on October 19-20, 1985, in Wichita, Kansas, urges the Kansas Fish and Game Commission to take all necessary steps to devise an equal and fair allocation of permits to allow those applicants unsuccessful for a number of years a preference system on antelope similar to the unsuccessful preference system on firearms deer permits, and to handle firearms and archery permits separately as with the deer permits.

KANSAS WILDLIFE FEDERATION

RESOLUTION 1985-5

FIREARMS DEER PERMIT PREFERENCE SYSTEM

WHEREAS, under the present firearms deer permit system allocation system, hunters are being encouraged to harvest whitetail and antlerless deer; and

WHEREAS, those who are successful in receiving antlerless permits, specifically in management units other than their home units, will never have an opportunity to draw a deer permit in their home unit unless they miss out on recreational opportunity a year or two; and

WHEREAS, those who are successful in receiving antlerless permits in their home units will never have an opportunity to draw an antlered permit unless they miss out on recreational opportunity a year or two; and

WHEREAS, all the antlerless permits were not issued in 1984;

NOW, THEREFORE, BE IT RESOLVED, that the **Kansas Wildlife Federation, Inc.**, in annual meeting assembled on October 19-20, 1985, in Wichita, Kansas, urges the Kansas Fish and Game Commission to take all the necessary steps to provide an equal and fair allocation of permits so that everyone has a similar opportunity to draw the quality (antlered) permits and are not penalized from hunting in their own unit by the allocation process at least in some years.

KANSAS WILDLIFE FEDERATION

RESOLUTION 1985-6

LOWERING REQUIRED AGE FOR APPLICATION
FOR KANSAS BIG GAME PERMITS

WHEREAS, a Kansas resident must now reach age 16 to legally apply for a Kansas firearm deer and/or antelope permit; and

WHEREAS, a Kansas resident must reach age 14 to legally apply for a Kansas firearm turkey permit; and

WHEREAS, a Kansas resident must now reach age 14 to legally apply for a Kansas archery deer, antelope, and/or turkey permit; and

WHEREAS, a resident holder of a valid Kansas hunter safety card under age 16 can hunt any legal game except those mentioned above; and

WHEREAS, without the opportunity to hunt Kansas big game, the youth of Kansas below the age 16, who are at an impressionable age, may lose interest in hunting;

NOW, THEREFORE, BE IT RESOLVED, that the **Kansas Wildlife Federation, Inc.**, in annual meeting assembled on October 19-20, 1985, in Wichita, Kansas, urges the Kansas Fish and Game Commission to take all necessary steps to lower the age to 14 for application of all big game permits in Kansas.

BILL ANALYSIS

Date of Final Committee Action February 26, 1986

Sponsor Moomaw Committee Energy

Brief Explanation Combines deer, elk, antelope, and turkey under heading of Big Game. Allows Fish and Game Commission to establish regular or special big game hunting seasons, and to issue additional big game permits to landowners or tenants not receiving a regular season permit, also allows designation of size hunting area under certain conditions.

Proponents	<u>Fish and Game</u>	Opponents	_____
	<u>Kansas Wildlife Assn.</u>		_____
	<u>K.L.A.</u>		_____
	<u>Farm Bureau</u>		_____

If close vote explain _____

Explain Important Committee Amendments (if any) _____

Fiscal Note (if any) _____

Other Comments _____

Signed Max Moomaw
Rep. Max Moomaw
Chairman or Designee

Notes for Individual Legislators use:



December 10, 1985

SENATOR DIEMER TRUE
Natrona County
P. O. Box 2360
Casper, Wyoming 82602

Representative G. R. Friedeman
Post Office Box 21
Great Bend, Kansas 67530

Committees:
Minerals, Business and
Economic Development, Chairman
Judiciary
Management Audit

Dear Representative Friedeman:

Dr. Jim Jagusch in his letter to the editor in "The American Shotgunner" gives me a great deal more credit for the passage of Senate File 145, lead shot-game birds, than I really deserve. He and Hall Stoddard, both of Cheyenne, did a remarkable job in preparing documentation for members of the Legislature in support of Senate File 145. It is difficult for me to know what to send you and what not, but let me include at least a few items.

The first attachment is a copy of Chapter 53 which is the law as it was enacted in Wyoming. I might mention this grew out of a proposed rule by the Wyoming Game and Fish Commission to ban the use of lead shot statewide for all bird shooting and for all types of shotguns by 1987.

The threshold of 20,000 pellets per acre was established by a study done by W. L. Anderson in 1983. The study was from the Illinois Department of Conservation, Division of Fish and Wildlife Resources, Periodic Report No. 40. In there, he states that "The threshold for water fowl appears to be about 20,000 per acre or approximately one pellet for every two square feet of soil." That was the only suggestion we could find for a scientific cut-off point for high density shooting areas. We rejected the concept of number of dead birds found as a result of lead poisoning because inflicted birds generally move some distance from the area where they picked up the lead shot. It just didn't make sense to us to adopt that kind of a standard even though that was the preference by the Wyoming Game and Fish Department.

There is also a great deal of controversy about the cripple rate between steel and lead shot. The most scientific study I could find was the Hunter Performance Using Steel and Lead Shot Loads for Hunting Ducks in Coastal Louisiana which I have attached. Even the proponents of steel shot admit that steel shot loses its kill impact dramatically over 35 to 40 yards.

From personal experience, I know it takes a significant change in your shooting technique when using steel shot. You need to allow for a significantly greater lead when shooting at birds over this 35 to 40 yard range.

Attachment 6

Representative G. R. Friedeman
December 10, 1985
Page 2

We also did a price comparison between lead and steel shot. We went to local stores and purchased ammunition. We then did a chart showing the significantly higher cost of steel shot. You, of course, can do that locally also.

In 1983, the National Wildlife Federation issued a news release saying that lead poisoning from lead shot threatened bald eagles in the United States. Subsequent studies showed that the lead poisoning could have come from a number of other sources other than eagles eating lead poisoned ducks. The point is that the Wildlife Federation attributed all of the loss of these eagles to lead shot while factually there are many other possibilities.

I have also included a sheet titled "Lead Shot, Steel Shot Fact Sheet." It is not identified as such, but it comes from the Wyoming Game and Fish Department. I think they refused to put their name on it because the information is so inaccurate. On the third sheet, it asks the question whether or not steel shot cripples more birds than lead shot. As I have mentioned earlier, the scientific studies, copies of which are attached, show that it does cripple more birds. The other question is does steel shot damage firearms. That response is also inaccurate. We had expert testimony from gunsmiths and actual examples of shotgun barrels which had been blown apart and "tracked" by the use of steel shot. Furthermore, if you look on every package of steel shot loads, you will see that there is a caution that steel shot may cause barrel damage. The argument from the Game and Fish Department and the Wildlife Federation was that it only affected old shotguns. The barrels we presented as evidence were modern Remington Model 870 Wingmaster barrels and other modern firearms. There is no question it does damage.

One other sort of interesting observation came from the publication "Steel Shot and Lead Poisoning in Water Fowl" published by the National Wildlife Federation. On pages 22 and 23, they quote a study done by a Mr. B. Hunter in 1978. It showed that birds dosed with lead or lead iron shot had significantly lower mortality rates from avian cholera than those without the lead dose. Avian cholera is by far the highest cause of death among ducks. I mention it sort of as a chuckle point for use in a debate.

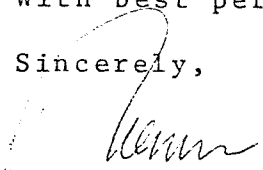
I guess maybe I have given you more than you might have wanted. I don't believe our Wyoming Game and Fish Commission is happy with Senate File 145, but they have performed the necessary studies to make the springer unit a high density area and thus restricted to steel shot. I have been told informally that they hope to seek amendments in the law in our next General Session.

representative G. R. Friedeman
December 10, 1985
Page 3

Good luck in your efforts. I will be most interested in the results.

With best personal regards.

Sincerely,



Diemer True

DT/tas

Attachments

P.S. We were also told that the federal government through the U.S. Fish and Wildlife Service was mandating the use of steel shot. I have enclosed a copy of Public Law 98-473, Section 305 commonly referred to as the Stevens Amendment. In there, it says that the appropriate state regulatory authorities must approve implementation of non-toxic shot zones before they can be implemented.

Hunting— An American Tradition

By G. Ray Arnett
Executive Vice President

The lead/steel shot controversy, carried to the extent that some anti-hunting groups and individuals desire, could drastically affect the sport of hunting. This must not be allowed without incontrovertible evidence that such a sweeping adverse effect on sport hunting is required to protect and preserve an acceptable environment for wildlife and mankind.

"THE PRESERVATION OF THE SECOND AMENDMENT—THE RIGHT TO KEEP AND BEAR ARMS" is THE goal of the National Rifle Association. There never has been, nor will there be, any detraction from that objective.

To achieve this goal the NRA seeks to promote public safety, law and order, and the national defense. To train members of law enforcement agencies, the Armed Forces, the militia, and people of good repute in marksmanship and in the safe handling and efficient use of small arms. To foster and promote the shooting sports, including the advancement of amateur competitions in marksmanship at the local, state, regional, national, and international levels. To promote hunter safety, and to promote and defend hunting as a shooting sport and as a viable and necessary method of fostering the propagation, growth, conservation, and wise use of our renewable wildlife resources. These are all purposes and objectives of the National Rifle Association clearly defined in the Bylaws of the Association.



*It's not as simple as switching to steel
and believing the problem is solved.*

As Executive Vice President, I am to conduct the affairs of the NRA in accordance with the programs and policies established by the member-selected Board of Directors. For NRA to be involved in the lead/steel shot controversy for the purpose of ensuring that any state or federal regulations affecting the sportsmen, the wildlife resources of our nation, and the traditions of hunting are established on scientific data and professional wildlife management principles is not only fitting and proper, it is our obligation.

Ninety-two percent of our 3 million members are hunters who deserve and expect to be represented, not only on the issues involving the right to keep and bear arms, but also on the right to use their arms—including long guns—in lawful activities such as hunting.

The history of NRA's involvement in the lead/steel shot issue goes back to the very beginning—the late 60s and early 70s—when there began a move to ban lead shot pellets for waterfowl hunting. The data available then was speculative, at best, as it related to plumbism (lead poisoning) and its effect on the total population of North America's waterfowl, bald eagles, and other species of wildlife. Throughout the

years, the rhetoric and emotion intensified without benefit of new data to support sweeping claims of large die-offs of wildlife. This has resulted in acrimonious debate and the unfortunate polarization of sportsmen (waterfowlers in particular), a luxury we cannot afford to indulge.

The pro-steel camp claims from 2 million to 3 million waterfowl are lost each year to plumbism caused by ingestion of spent lead pellets fired from sportsmen's shotguns. I've even seen statements of loss that claim up to 7 million loss of waterfowl! The pro-steel folks say steel is just as good (ballistically) as lead, and in some cases better. Now these folks are saying that our national bird, the bald eagle, is in jeopardy of extinction because of lead shotshell pellets.

The pro-lead camp does not accept the hypothesis that spent lead pellets are of such concern as to cause the establishment of unenforceable county-wide, flyway-wide, or state-wide regulations that are of questionable value as to wildlife survival or habitat improvement. They insist that field evaluation substantiate to a reasonable degree that the presence of lead shot is unacceptably detrimental to waterfowl populations; that it is contributing to the eventual extinction of bald eagles; or that the conversion to steel shot for shotgun hunting will eliminate or lessen significantly the disease of plumbism; that steel shot will not exacerbate the crippling loss of wildlife, thereby negating any benefits that may result from the elimination of non-toxic shot. To date, there is no such data available to answer the pro-lead proponents' legitimate concerns.

For the past five or six years, the NRA has taken a "wait and see" attitude on the lead/steel controversy, watching for

the development of new data that would tip the scale one way or the other. Although there has been no reliable evidence submitted that would give cause to alter preconceived biases, the U.S. Fish & Wildlife Service (FWS) had been quietly addressing the issue in a methodical, scientific manner to gather required data from about 20 national wildlife refuges where waterfowl hunting was allowed. This low-key professional approach seems to be perceived by steel-shot advocates as "doing nothing." Their approach is to debate the issue in the media, hoping to gain political support to force the issue. This is an unacceptable approach to good wildlife management. The emotional heat was turned up about 18 months ago when Department of the Interior Secretary Bill Clark made certain concessions to Jay Hair, Executive Vice President of the National Wildlife Federation, and that paved the way to where we are today.

On June 14, 1985, the National Wildlife Federation (NWF) filed suit in Sacramento, California, against the FWS. The Federation's suit complains that the Endangered Species Act (ESA) compels FWS to outlaw all migratory bird hunting in 22 counties in California, Illinois, Missouri, Oklahoma, and Oregon unless those states agree to impose steel shot requirements. NWF is expected to move for a court order closing down the fall migratory bird season in these areas. Since the suit will directly affect thousands of hunters in these states, and may be expanded to cover hunters in up to 70 more counties, a detailed explanation is certainly in order.

The bald eagle is classed as an endangered species throughout the continental United States. The ESA requires federal agencies to, at all costs, avoid putting such species in "jeopardy" of existence. It also requires agencies, in more vague forms, to "conserve" these species.

For some years, the FWS has been working to increase eagle populations. The effort has been successful. Even NWF estimates the eagle population increased by 900 (or about 9%) last year alone. As part of the effort, FWS maintains a wildlife laboratory that autopsies dead eagles. The laboratory has indicated that some eagles appear to be dying from lead poisoning. The numbers were, however, rather small (about 10 to 20 birds per year out of a population of over 11,000). The losses appear even smaller when compared to other sources of loss. Lead poisoning amounts to about 6 percent of autopsy results, while trauma kills and other impacts amount to 21 percent and electrocution 9 percent. Moreover, the cause of lead poisoning is not clear. Wild birds have been known to die en masse from lead ingested from plants growing near lead mines, from consuming paint fragments and other industrial lead, and from ingesting lead sinkers used for fishing. Fish, the eagle's preferred food, have often carried high lead levels brought about by runoffs from mines, industrial areas and even road surfaces. It is well-documented that atmospheric lead contained in automobile exhaust and deposited on the road can bring about high lead levels. One of many studies found birds nesting near highway rights-of-way had lead levels 300-500 percent higher than those of a control group.

NWF, longtime champion of steel shot requirements, has not conducted any original experiments or collected its own field data. It has made its determinations based on its own review and interpretation of FWS and other reports. In August 1984, NWF petitioned the FWS to establish steel shot zones in no fewer than 95 counties nationwide. Essentially, any county in which over 15 eagles are present, and in which even one single duck had died of lead poisoning, was placed on the "steel only" list.

A number of counties (Coconino in Arizona, Modoc and Siskiyou in California, Pierce and Thurston in Washington, Holt in Missouri, and Madison in Illinois) were singled out as special priorities. For these counties, NWF demanded a lead-shot ban for the 1984-85 waterfowl season. NWF was willing to wait until the 1985-86 season for the remaining counties.

NWF argues that bald eagle lead poisoning is the result of

eagles eating wounded and downy waterfowl that contain lead shot pellets, and since the FWS is, by law, bound to "conserve" endangered species, it must outlaw any practice that does anything to slow the eagles' increase in population. Two features of the NWF petition were especially critical to hunters in the special priority counties. First, the petition recognized that the "Stevens' Amendment" to the FWS's Appropriations Act prohibited FWS from imposing steel shot requirements without approval of the affected state wildlife agency. The NWF reasoned that, while this might block FWS from imposing steel shot requirements, it did not stop it from banning hunting altogether. The Federation, therefore, argued that the Endangered Species Act required FWS to "establish emergency county-wide non-toxic shot zones for all waterfowl hunting beginning with the 1984-85 waterfowl season or close these counties to all waterfowl hunting beginning with the 1984-85 season. . . ." (emphasis in original petition). Second, the petition demanded "emergency" rule-making—the imposition of a regulation without public notice or chance to comment. Since there was little chance of getting state consent (or for that matter, an adequate supply of steel shot ammunition) on such short notice, the petition essentially demanded that hundreds of thousands of hunters be barred from hunting without so much as public notice or an opportunity to voice their side of the issue.

FWS responded with its own proposal. It suggested that action during the 1984-85 season was impossible, if for no other reason than that ammunition distributors simply could not get steel shot into the areas on such short notice, especially when the seasons in some states were scheduled to start less than 60 days from the NWF petition. The published FWS proposal, keyed upon size of waterfowl harvest and number of eagles, was to divide counties into three classes: first, where steel shot regulations were probable for the '85-86 season; second, where steel shot requirements would be likely for the '85-86 season; and third, where further study was indicated before determining whether steel shot regulations were required.

In October 1984, the National Wildlife Federation replied with a 40-page comment. It complained that FWS was "not committed to any meaningful action," and stated that "NWF adheres to its original criteria and request for the establishment of 95 steel shot zones." But in addition to the 95 counties, NWF demanded there be added some 71 additional areas. This demand was based upon the very FWS criteria NWF had rejected.

The National Wildlife Federation renewed its demand that FWS consider the outlawing of hunting as an alternative:

"The NWF is fully aware of the Appropriations Bill language that appears to preclude the FWS from establishing or enforcing steel shot zones without state concurrence. This is precisely why the Petition identified 2 options for Class I areas, i.e., either establish steel shot zones or close the area to waterfowl hunting. The FWS is not prohibited from exercising its emergency closure authority under the MBTA (Migratory Bird Treaty Act) which gives FWS control over migratory bird hunting. Indeed, the ESA (Endangered Species Act) compels the Service to exercise this authority to conserve or avoid jeopardizing endangered species, notwithstanding the Appropriations Act language."

On February 13, 1985, FWS published a proposed rule designating 30 counties in eight states for steel shot zones aimed at benefitting eagles. FWS refused to close the areas to migratory bird hunting, NWF commented, maintaining that "lead poisoning mortality in eagles is unacceptable" (emphasis in original). Once again, NWF sought the designation of its original 166 counties and, noting that some states were withholding Stevens' Amendment approval, demanded that FWS "close these areas to waterfowl hunting this fall." (Emphasis added.)

Continued on pg. 66

owners, ensure the perpetuation of legitimate gun use, and promote the shooting sports to satisfy the widely diverse interests of all NRA members. To ignore the lead/steel problem or to view it as unimportant to NRA members would be an unforgivable mistake.

The NRA is not the only organization having serious reservations about how the lead/steel controversy is shaping up. Ducks Unlimited, Mississippi Valley Waterfowl Association, Quail Unlimited, Illinois Duck and Goose Hunters Alliance, California Waterfowl Association, Waterfowl Habitat Owners Alliance, Wildlife Legislative Fund of America, and others have solicited NRA guidance and advice. There are hundreds of thousands of NRA members associated with these organizations. Many sportsmen's clubs and individuals are fearful that anti-hunting groups, the news media, elected officials, and politically sensitive persons will be unduly influenced by emotional rhetoric and demand a "quick fix" to a very complex biological, toxicological and ballistical problem.

It's just not as simple as switching from lead to steel shot and believing the problem is adequately resolved. If that were true, the problem would have been solved years ago. ■

The Forgotten .410

Continued from pg. 43

where he was custodian, during the week and picked up odd jobs around town, mostly yard work, on Saturdays and during the summer months when there was no school. My father paid him more than minimum wage to fight honeysuckle with a swingblade, mend fence, cut trees, and perform other tasks I was too young or too hardheaded to carry out properly. Since honeysuckle vines grew like a cash crop around the home place, especially in what was once the pony lot, and since the pay was good for an honest day's bushhogging, Mouse Tillman devoted a big percentage of his odd-job hours to working for my father, and the sight of him, waist deep in weeds, arcing the swingblade to a slow, deliberate rhythm, eventually became an expected part of the landscape on summer days and Saturdays in fall.

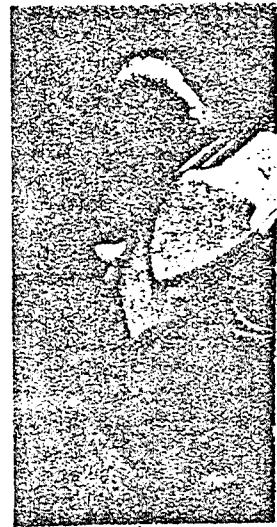
Sometimes right at dusk in the fall, on days when I had had some shooting squirrels, I would walk out with four or five acorn-fat hand, and I would see Mouse at the front door of the house. He would nod a hello to each of us, Mouse punctuating his greeting with an unpraised

in a paper sack, and go offer them to Mouse Tillman, who always took them thankfully and with a three-toothed grin, saying, "My wife, she'gn some kinda stew a squirrel." Looking up at those buttermilk eyes he had, I could see him remembering the flavor of his wife's Brunswick stew, how rich and piquant it was, and then it felt fine indeed to have made a gift out of the day's kill to someone who so loved to eat squirrel.

Then my father would come out of the house to pay for the work and tell Mouse Tillman how much he appreciated the job he had done before taking him home. Sometimes I went along. Each day Mouse came to work for my father he brought a Mason jar filled quarter way with clear corn whiskey, which he claimed to get free from some cousin or nephew who kept a still back in one of the pocosins, and this he never sipped until late in the evening when he had finished working. Often this pleasure was saved for the ride home, when the pungent, flowery aroma of the moonshine would blend with the musky smell of hard work and the sweetness of Mouse Tillman's hand-rolled cigarettes, producing a thick, tangible scent that was pleasant to whiff at some distance but that would cut into one's breathing up close, like the sweet-and-sour smell of a skunk. I would look at him, sitting there in the front seat beside my father, and wonder if he could read, or if he owned a television, or took his kids to the movies, or squirrel hunting, or to baseball games, or if he did any of the things with his sons that my father did with me. Other times, I would look at the black lump on his neck that could have been half a golf ball wedged under his skin, and wonder if it was hard or soft to the touch and if it hurt much, or at all.

Mouse Tillman lived five miles outside town in a clapboard tenant house that seemed never to have been painted and that clung by the side of the dirt farm lane so tightly it made one think that the surrounding fields of corn, soybeans, or peanuts might one day swallow it up whole. Each evening when our car would pull up to the square, box-like house, there would be children playing in the yard, sometimes four but often as many as eight or nine, so that it was difficult to know just how many of them belonged to Mouse. How many were visiting neighbors, though there were no other homes within sight. My father would wave to them and now and then slip their father a few dollars more for the work he had done, saying he thought Mouse had figured the hours up wrong, for he knew that Mouse Tillman worked in the yard from daylight to dusk not because he took pride in the way he cleared ground, or enjoyed it, but because he

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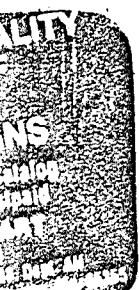
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An American Tradition

Continued from pg. 33

As it turned out, of the eight states proposed for steel shot zones, three states approved and five disapproved. Several of the disapproving states indicated that their decision was based in part on the haste involved, but that they might well agree to steel shot for the 1986-87 season. FWS then published in the *Federal Register* both of its final rules on the three approving states and its formal notice to the five disapproving states (California, Oregon, Illinois, Missouri and Oklahoma) that it would not authorize migratory bird hunting in those states in 1986-87 absent state approval for the authorization of steel shot regulations.

Following this, the decision was explained to NWF by Donald Paul Hodel, Secretary of the Interior. Eight days later, the Federation presented a 60-day notice of its intent to file suit—a notice required by the ESA. Although barely a week had passed since the meeting with Hodel, the Federation letter complained that NWF had not been contacted recently enough. It also complained that the FWS decision to cut off hunting in 1986-87, instead of during the 1985-86 season scheduled to start within four months, was "unacceptable and not consistent with your (Hodel's) stewardship responsibilities." The letter stated that the Federation planned to sue for an order requiring steel shot use "or (to) keep closed the affected counties for the 1985-86 waterfowl hunting season."

Although the ESA requires 60 days' notice, NWF apparently became impatient and filed suit in Federal District Court in Sacramento some 21 days later. The lawsuit alleges that the loss of 23 out of 11,819 bald eagles in the continental United States constitutes "an emergency posing a significant risk to the survival of the species." (It should be noted that there is no guarantee that the 23 lead-poisoned eagles obtained their lead from spent lead shot pellets.) The NWF lawsuit claims to seek an order requiring steel shot—while not suggesting how the Stevens' Amendment could be evaded—and then proceeds to its real objective, requesting that the court:

"order and enjoin the Defendants to refrain from authorizing waterfowl hunting in the areas described in paragraph (1) of this prayer, beginning with the 1985-86 season, until such time as the exclusive use of steel shot in waterfowl hunting is lawfully required in each such area."

If successful, the NWF lawsuit would outlaw migratory bird hunting in the following areas:

California: Lower Klamath Basin (bounded by Hwy. 161 and

- Illinois: the Dorris-Brownell Road) and Tule Lake Refuge.
- Henderson, Peoria, Fulton, Mason, Calhoun, Pike, Alexander, Jackson, Union and Williamson counties.
- Missouri: Holt, St. Charles, Pike and Lincoln counties, and sections of Chariton, Livingston, Carroll and Linn counties.
- Oklahoma: Sequoyah County.
- Oregon: A portion of Klamath County south of State Hwy. 39 and 39-140, U.S. 97, and State Hwy. 62.

It is assumed these areas were chosen as a suitable test case. If successful, the same order would likely be sought for the remaining 70 to 110 counties at some point in the future.

The National Wildlife Federation approach is disturbing on several counts. First, it seeks to use the Endangered Species Act to bar hunting, claiming that a court may ban hunting whenever it has "any" impact, direct or indirect, on a listed species of animal or plant. Second, it appears to force, through the federal courts, federal control of what should be state wildlife agency decision-making, even after hunters have successfully petitioned Congress to require consideration of state wildlife agency decisions. Third, the conduct throughout smacks of a unilateral and overly zealous desire to unfairly force the issue. The first NWF petition sought to ban hunting without so much as public notice and comment, and subsequent petitions constantly escalated the demands and ended in a lawsuit filed just 21 days into a supposed 60-day notice period.

Finally, there seems little reason to believe that the demands for steel shot will stop here, or even stop with waterfowl hunting. On June 17, NWF submitted its comments on a proposal to open to hunting the Buenos Aires National Wildlife Refuge in Arizona. Nine million tax dollars were spent to acquire the refuge on land that has been open to public hunting for decades. NWF complained that there was an endangered species of quail (masked bobwhite) on the refuge that might somehow ingest from the desert soil lead pellets used by dove hunters. Its comments contained the following:

"If the use of lead shot is not prohibited on Buenos Aires NWR, the NWF opposes opening of the refuge to any form of shotgun hunting."

Many of us view this as an unreasonable position that smacks of anti-hunting.

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HUNTER PERFORMANCE USING STEEL AND LEAD LOADS FOR HUNTING DUCKS IN COASTAL LOUISIANA

CHARLES E. HEBERT, U.S. Fish and Wildlife Service, Lacassine National Wildlife Refuge, Lake Arthur, LA 70549

VERNON L. WRIGHT, Department of Experimental Statistics, Louisiana State University Agricultural Center, Baton Rouge, LA 70803

PHILLIP J. ZWANK, Louisiana Cooperative Wildlife Research Unit, Louisiana State University, Baton Rouge, LA 70803

JOHN D. NEWSOM, Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA 70804

RICHARD L. KASUL, Department of Experimental Statistics, Louisiana State University Agricultural Center, Baton Rouge, LA 70803

Abstract: Performance of hunters shooting 1¼ oz of No. 6 lead shot was compared to those shooting 1½ oz of No. 4 steel shot in 2¾-in. 12-gauge size for hunting ducks at Lacassine National Wildlife Refuge, Louisiana, during the 1980 and 1981 waterfowl seasons. More than 1,000 participating hunters fired 16,648 shots, bagged 2,228 ducks, and crippled 802. Hunters using No. 4 steel hit 19% fewer ducks per shot and 13% fewer ducks per blind-day ($P < 0.05$) than those using No. 6 lead. Of ducks hit, the proportion unretrieved was 0.334 with steel and 0.236 with lead, a 42% higher rate with the steel load ($P < 0.05$). Despite a higher proportion of cripples with steel, there was no significant difference between the loads in mean number of cripples per blind-day ($P = 0.07$) or cripples per shot fired ($P = 0.11$). But a significant load by distance interaction was found in both cripples per blind-day and cripples per shot fired where mean crippling rates were higher with steel ≤ 32 m and somewhat lower with steel > 32 m. Species bag composition was not significantly different between the loads. The 13% fewer ducks hit per blind-day with steel indicate less overall impact on waterfowl with this load under hunting conditions that were mostly opportunity limited. With 0.50 cripples per bird bagged with steel and 0.31 with lead, there would be 15% more total birds hit when bag limits could be consistently reached by all hunters. Thus, under bag-limited hunting conditions, use of this particular steel load could result in greater waterfowl loss due to hunting than use of the lead load tested.

J. WILDL. MANAGE. 48(2):388-398

Controversy surrounds the use of non-toxic steel shot for hunting waterfowl even though much research has been conducted comparing lead and steel shot loads (Andrews and Longcore 1969, Kozicky and Madson 1973, Nicklaus 1976, Mikula et al. 1977, Anderson and Roetker 1978, Anderson and Sanderson 1979, Humburg et al. 1982). Results of most steel shot studies have shown little or no differences in effectiveness between the steel and lead loads tested. However, some waterfowl hunters have not accepted these results, maintaining that there is a real difference based on their experiences.

The purpose of this study was to evaluate relative performance, in actual duck hunting situations, of the most popular lead load used by Louisiana duck hunters and the available steel load with the most

similar down range pellet energy. Data were collected during the 1980 and 1981 hunting seasons. We are grateful to the 33 observers and more than 1,000 hunters who participated in the study. T. A. Roster deserves thanks for training observers and assisting in other ways. We also express appreciation to D. W. Hayne, P. H. Geissler, S. L. Sheriff, and L. D. Soileau who provided assistance with study design, reviews of statistical analyses, and interpretation of results. Study design was facilitated by shooting test data provided by the Mo. Dep. Conserv. We thank the staffs of Lacassine Natl. Wildl. Refuge, La. Coop. Wildl. Res. Unit, and the La. Dep. of Wildl. and Fish. for invaluable assistance throughout the study. The investigation was funded through the La. Coop. Wildl. Res. Unit in cooperation with the

U.S. Fish and Wildl. Serv., La. Dep. of Wildl. and Fish., La. State Univ. Agric. Cent., and Wildl. Manage. Inst.

STUDY AREA

The test was conducted on Lacassine National Wildlife Refuge (NWR) located in the coastal Chenier Plain marshes of southwestern Louisiana approximately 24 km southwest of Lake Arthur. The area is a freshwater marsh dominated by dense stands of bulltongue (*Sagittaria lancifolia*) and maidencane panicum (*Panicum hemitomon*) surrounding shallow open water ponds. Aquatics, including American lotus (*Nelumbo lutea*) and fragrant waterlily (*Nymphaea odorata*), were abundant in the ponds. Ponds with dense aquatic vegetation became more open as temperatures dropped and hunting seasons progressed. Marsh vegetation was fairly homogeneous throughout the study area; however, pond size and interspersed vegetation varied considerably among blind sites.

Water depth in ponds usually varied from 10 to 30 cm, dependent upon wind speed and direction, but was generally similar for all blinds. Marsh water levels were lower during 1980 than 1981. Low water levels and strong north winds in 1980 sometimes caused poor hunting conditions. Lacassine marsh has a soft bottom which makes walking difficult in most areas and impossible in several of the hunted areas. Thus, hunters without dogs frequently needed boats to retrieve downed ducks.

Hunting blinds were constructed on pond edges throughout the study area. Blinds were located on the southeast side of a pond with each blind facing northwest. Each blind consisted of a 1.2 × 2.4-m platform surrounded by mesh wire. A blind for hiding a small boat was attached to the rear. The entire structure was cam-

ouflaged with common reed (*Phragmites communis*), native to the study area.

The study area has been subject to heavy hunting pressure for many years with hunters taking a variety of duck species typical of southwest Louisiana coastal marshes. Steel shot has been required for waterfowl hunting on the refuge each year since 1974.

METHODS

Standard factory loads of 2¾-in. 12-gauge No. 4 steel and Hi-power No. 6 lead shot from Federal Cartridge Corporation (use of trade names does not imply U.S. Government endorsement of commercial products) were tested. The steel shot shell had 1½ oz No. 4 steel with 213 pellets and a nominal muzzle velocity of 1,365 fps. Lead shot shells had 1¼ oz No. 6 lead with 279 pellets and a nominal muzzle velocity of 1,330 fps. No. 6 lead was chosen because of its popularity with Louisiana duck hunters. A 1980 mail survey of randomly selected Louisiana duck hunters conducted by the Louisiana Department of Wildlife and Fisheries showed that No. 6 shot (64% of respondents) with 1¼ oz of pellets (56% of 2¾-in. 12-gauge hunters) was the most popular load for hunting ducks. No. 4 steel was chosen for comparison because it was most similar in down range pellet energy. Choice of No. 4 steel was consistent with the manufacturer's brochures recommending that hunters choose loads two shot sizes larger when switching from lead to steel.

The test was conducted during the waterfowl hunting seasons of 1980 and 1981 (Nov-Jan). Morning-only hunting was allowed from Wednesday through Sunday for a total of 39 hunting days each year. Hunters applied by mail to participate for each hunting day and were selected by a drawing. Parties of one or two hunters were preassigned by random numbers to

blinds for each day of hunting. In 1980, hunters were assigned to 19 of 23 blinds used in the study. In 1981, hunters were assigned to 12 test blinds. The number of blinds was reduced because only 12 of the 23 blinds used in 1980 provided sufficient data to be analyzed statistically.

About 20% of test blinds were filled with stand-by hunters on a first-come daily basis when one or both of the assigned hunters did not show. In 1980, such hunters were given their choice of empty blinds; in 1981, they were generally assigned to empty blinds. Hunters had to provide their own boats in 1980 to traverse 10–19 km of water; boat transportation was provided for all hunters in 1981.

A randomly assigned observer accompanied each hunting party to the blind, distributed two boxes of either No. 4 steel or No. 6 lead shells to each hunter, recorded data during the hunt, and collected unused shells afterwards. Neither observers nor hunters were told which load was being used.

Observers were recruited specifically for the study. In 1980, education of observers ranged from no high school diploma to a Master's degree with most having a college background in wildlife. All observers in 1981 had a college background in wildlife. Observers were trained intensively for 2 weeks (80 hours) prior to each hunting season. They were trained to estimate distances visually and with a mechanical rangefinder (Rangematic Ranging 610, Ranging Co., Rochester, N.Y.) through a series of repetitive exercises and testing of individual ability.

All markings were removed from the shells, thus making lead and steel loads identical in external appearance. Test loads were coded in special boxes with a letter of the alphabet. Eleven letters were assigned to load type I (later identified as No. 6 lead), and 11 others were assigned

to load type II (later identified as No. 4 steel). One load was assigned to each blind each day using a restricted randomization scheme. First, blinds were separated into groups based on size of ponds in the marsh. Days were then grouped into 4-day blocks in 1980 and 8-day blocks in 1981. Test loads were assigned randomly to the blinds and days with the restriction that each blind used each load the same number of days and each blind-group used each load equally often on a given day. For each day of hunting one shell was retained from each blind to provide verification of the shot type used. Load identities were withheld from the shell handler, project field supervisor, and statistician during the study.

Observers recorded only shots fired at ducks. Data were recorded by attempts, defined as one or more shots fired at a flight of ducks, generally without reloading. For each attempt, the observer recorded the distance to the closest duck when the first shot was fired, number of shots fired at ducks on the wing, number of ducks bagged, number of ducks hit but not recovered, and number of shots fired at wounded ducks on the water. A downed duck was not recorded as bagged until it was recovered by the hunter. A cripple was defined as a duck that was visibly hit but not retrieved and any apparently dead bird not recovered (bagged) by the hunter.

Observers recorded whether a retrieving dog was used and types of choke on the gun used by each hunter. At the conclusion of the hunt observers asked each hunter, "Do you think you know which type of shot shell you were using?" If a hunter answered, "yes," he was then asked whether he thought he was using lead or steel. Also recorded was whether the observer had any evidence that the hunter actually knew what shell type was used.

When hunters returned to the check station each day, number and species of ducks bagged were recorded and checked against the observer's data.

For analysis, the experimental unit was defined as the results of all attempts with the same load for a particular blind each season. The 2 years with two loads shot in 12 blinds each year yielded 48 experimental units which were further divided into two distance categories, totaling 96 observational units. Distance to the closest bird at the first shot was divided into ≤ 32 and > 32 m categories separating the total number of cripples into two nearly equal groups. The number of ducks hit and crippled, the number of shots fired at ducks on the wing, and the number of blind-days of hunting were calculated for each observational unit. The number of ducks hit was calculated as the sum of ducks bagged and crippled. From these values the number of ducks hit per shot, hit per blind-day, crippled per shot, crippled per blind-day, and crippled per hit were calculated for each observational unit. Hit per blind-day and crippled per blind-day were transformed by taking the natural logarithm of 0.5 plus the value of each observational unit. The remaining variables were transformed using the angular transformation ($\text{arc sine } \sqrt{P}$) (Steel and Torrie 1980). Transformed variables were evaluated with weighted analysis of variance using a randomized block design with blind-year as a blocking factor, load as a whole-block treatment effect, and distance category as a split-block treatment effect. Hit per shot and crippled per shot were weighted by the number of shots fired for each observational unit. Similarly, hit per blind-day and crippled per blind-day were weighted by the number of days hunted, and crippled per hit was weighted by the number of ducks hit. The means presented were calculated by back-

transforming the means of the transformed variables. All tests are two-tailed.

RESULTS

Data from 725 blind-days of hunting were included for analysis. Observations on an attempt were excluded from some analyses when information—usually distance of first shot or number of cripples—was not recorded. Data from 109 blind-days of hunting in 11 of 23 test blinds used in 1980 were excluded from analysis because they did not produce sufficient data for analysis (at least 50 birds bagged plus crippled).

Either one or both hunters in 39% of the hunting parties attempted to guess which load they were using. Nearly 70% of the hunters who guessed thought they were using steel shot. The data did not indicate that hunters who guessed were actually shooting either load more frequently (χ^2 test, $P = 0.54$). However, more hunters guessed correctly than would have been expected by chance (χ^2 test, $P < 0.01$). This result could mean that hunters were either basing their guesses on a variety of clues that gave them a slightly higher chance of correctly guessing or that some hunters could differentiate between the loads being tested. Because hunters who participated repeatedly had more opportunities to learn to distinguish between the loads, records of these individuals were reviewed. Only one frequent participant consistently guessed correctly.

About 57% of the hunters used modified chokes, 40% used full chokes, and 3% used open chokes. No significant difference in the frequency of choke types used was found between hunters shooting No. 6 lead and No. 4 steel (χ^2 test, $P = 0.97$).

During 1980, 22% of hunting parties used dogs for retrieving ducks; in 1981, 16% used dogs. A significantly higher proportion of hunting parties using No. 4 steel

Table 1. Number of ducks bagged, crippled, and shots fired for each load, year, and distance category.

Distance (m)	Bagged		Crippled		Shots fired ^a	
	Lead 6	Steel 4	Lead 6	Steel 4	Lead 6	Steel 4
			1980			
≤32	344	299	59	88	1,517	1,640
>32	175	115	72	68	1,574	1,898
			1981			
≤32	534	429	129	181	2,518	2,708
>32	189	143	106	99	2,414	2,369
			Both years combined			
≤32	878	728	188	269	4,035	4,348
>32	364	258	178	167	3,988	4,267
			Total			
All	1,242	986	366	436	8,023	8,615

^a Includes only shots fired at ducks in the air and not shots fired at wounded ducks on the water.

used dogs in 1980 (χ^2 test, $P < 0.01$), while the proportion of parties using dogs was nearly identical with the two loads in 1981 (χ^2 test, $P = 0.84$). Little difference was found in the number of ducks hit per shot fired between hunting parties with and without dogs, but significantly fewer ducks were crippled per hit by parties with dogs (binomial test, $P < 0.02$, ≤ 32 m; $P < 0.01$, > 32 m).

The loads were compared using data collected from 8,023 No. 6 lead shells and

8,615 No. 4 steel shells shot at ducks during the 2-year study. Hunters bagged 2,228 ducks: 1,242 with No. 6 lead and 986 with No. 4 steel. A total of 802 ducks was crippled: 366 with No. 6 lead and 436 with No. 4 steel. The data are summarized by year and distance in Table 1.

Mallard (*Anas platyrhynchos*) (24%) and gadwall (*A. strepera*) (15%) were the most common species bagged followed by green-winged teal (*A. crecca*) (11%) and blue-winged teal (*A. discors*) (9%) (Table

Table 2. Species composition of bag for each year and load.

Species	Number of ducks bagged ^a			
	1980		1981	
	Lead 6	Steel 4	Lead 6	Steel 4
Mallard (<i>Anas platyrhynchos</i>)	133	102	182	136
Mottled duck (<i>A. fulvigula</i>)	13	14	30	21
Pintail (<i>A. acuta</i>)	52	41	41	37
Gadwall (<i>A. strepera</i>)	82	64	118	90
Wigeon (<i>A. americana</i>)	20	11	57	37
Green-winged teal (<i>A. crecca</i>)	67	79	68	45
Blue-winged teal (<i>A. discors</i>)	41	25	77	70
Scaup (<i>Aythya</i> spp.)	4	3	24	14
Ring-necked duck (<i>A. collaris</i>)	31	30	36	52
Other ^b	85	71	107	90
Total	528	440	740	592

^a Includes attempts where some data—usually distance of first shot—were not recorded.

^b Consisted mostly of northern shoveler (*Anas clypeata*) and wood duck (*Aix sponsa*).

category.

Shots fired*	
Lead 6	Steel 4
1,517	1,640
1,574	1,898
2,518	2,703
2,414	2,369
4,035	4,345
3,988	4,267
5,023	8,615

Table 3. Mean values measuring hitting, bagging, and crippling rates of No. 4 steel and No. 6 lead shot in the Lacassine study.*

Distance	Hit/ shot	Hit/ blind-day	Bagged/ shot	Bagged/ blind-day	Crippled/ shot	Crippled/ blind-day	Crippled/ hit
No. 6 lead							
≤32 m	0.263	2.72	0.219	2.26	0.0403	0.46	0.156
>32 m	0.137	1.46	0.091	0.97	0.0429	0.47	0.326
All distances ^b	0.196	4.18	0.150	3.23	0.0416	0.93	0.236
No. 4 steel							
≤32 m	0.233	2.53	0.168	1.85	0.0600	0.66	0.263
>32 m	0.096	1.10	0.056	0.66	0.0380	0.43	0.410
All distances ^b	0.159	3.63	0.106	2.51	0.0484	1.09	0.334

* Values are back-transformed from transformed data.
^b Values for hit/shot, bagged/shot, crippled/shot, and crippled/hit are means while values for hit/blind-day, bagged/blind-day, and crippled/blind-day are totals.

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 discors) (9%) (Table

2). The relative abundance of each species in the bag differed significantly between years (χ^2 test, $P < 0.01$) with a higher proportion of green-winged teal and pintail (*A. acuta*) in 1980 and a higher proportion of blue-winged teal, wigeon (*A. americana*), scaup (*Aythya* spp.), and ringneck (*A. collaris*) in 1981. There was no evidence that species composition of the bag differed between loads (χ^2 test, $P = 0.42$, 1980; $P = 0.18$, 1981).

Overall, 0.159 ducks were hit per shot with No. 4 steel and 0.196 with No. 6 lead resulting in 3.63 ducks hit per blind-day with No. 4 steel and 4.18 with No. 6 lead (Table 3). These frequencies indicate that

19% fewer hits per shot and 13% fewer hits per blind-day occurred with No. 4 steel than with No. 6 lead. For both variables, the lower rates obtained for No. 4 steel were significant (Table 4).

Significant differences were found in the ability of hunters to hit ducks at different distances (Table 4) with 53% fewer ducks hit per shot and 41% fewer hit per blind-day at distances >32 than ≤32 m. No load by distance interaction was detected for either variable, indicating that differences in hitting ability between hunters using No. 6 lead and No. 4 steel were about the same in each distance category.

Overall, 0.334 cripples per duck hit oc-

1981	
Lead 6	Steel 4
182	136
30	21
41	37
118	90
57	37
68	45
77	70
24	14
36	52
107	90
740	592

Table 4. Analyses of variance evaluating hitting ability of No. 6 lead and No. 4 steel in the Lacassine study.*

Source	df	Hit per shot		Hit per blind-day	
		MS	F	MS	F
Blind	23	0.365		0.230	
Load	1	8.165	37.44**	0.413	10.00**
Blind × load	23	0.218	0.74	0.041	0.94
(error a)					
Distance	1	106.089	360.47**	7.775	133.22**
Distance × blind	23	0.294	0.79	0.058	1.33
(error b)					
Distance × load	1	0.275	0.74	0.125	2.84
Distance × blind × load (error c)	23	0.372		0.044	

* Analyses conducted on transformed values. ** $P < 0.01$.

Table 5. Analyses of variance evaluating crippling rates of No. 6 lead and No. 4 steel in the Lacassine study.*

Source	df	Crippled per shot		Crippled per blind-day		Crippled per hit	
		MS	F	MS	F	MS	F
Blind	23	0.508		0.123		0.621	
Load	1	0.857	2.77	0.143	3.70	5.883	14.79**
Blind × load (error a)	23	0.309	1.50	0.039	1.20	0.398	1.78
Distance	1	1.750	4.76*	0.286	3.58	17.056	36.21**
Distance × blind (error b)	23	0.366	1.78	0.080	2.49*	0.471	2.11*
Distance × load	1	2.916	14.14**	0.312	9.73**	0.661	2.96
Distance × blind × load (error c)	23	0.206		0.032		0.223	

* Analyses conducted on transformed values. * $0.01 \leq P < 0.05$; ** $P < 0.01$.

curred with No. 4 steel and 0.236 with No. 6 lead (Table 3). The 42% difference was significant (Table 4). At distances >32 m there were 77% more cripples per hit than at distances ≤ 32 m. As with both measures of hitting ability, no load by distance interaction was detected (Table 5).

No overall difference was detected in cripples per shot fired ($P = 0.11$) or cripples per blind-day ($P = 0.07$) between the two loads; however, a significant load by distance interaction was detected in both variables (Table 5). At ≤ 32 m, 49% more cripples per shot and 44% more ducks crippled per blind-day occurred with the steel load. But at >32 m, 11% fewer cripples per shot and 8% fewer ducks crippled per blind-day occurred with steel.

A more detailed evaluation of each load at different ranges in Fig. 1 shows hit per shot, cripples per hit, and cripples per shot in 4.6-m distance classes. As distance of the first shot increased, hits per shot fired decreased while cripples per duck hit increased for both loads. Additionally, No. 6 lead hit more ducks per shot in all 4.6-m distance classes than No. 4 steel, while No. 6 lead crippled fewer ducks per hit than No. 4 steel in most distance intervals. These patterns agree closely with the analyses of variance of hit per shot and crippled per hit where there were signif-

icant differences between loads but no load by distance interaction. Cripples per shot fired results from multiplying hit per shot and cripples per hit. Because No. 6 lead hit more ducks per shot fired and crippled a smaller proportion of the ducks hit, the multiplication cancels out load differences resulting in little overall difference in ducks crippled per shot fired.

In 636 instances ducks fell wounded and hunters continued shooting at them on the water. Overall, 15% of these ducks were not retrieved and therefore recorded as crippled. No difference between No. 6 lead and No. 4 steel was found in the proportion of wounded ducks that were not retrieved (χ^2 test, $P = 0.12$), so differences in the number of ducks crippled per hit between the two loads seemingly cannot be attributed to differences in abilities of the loads to kill wounded ducks on the water.

DISCUSSION

Selection of Variables

Data collected in this study allow calculation of many different measures for comparing loads. We give results for five variables which express different aspects of hitting ability (hit per shot, hit per blind-day) and crippling rate (cripples per

Lacassine study.*

Crippled per hit	
MS	F
0.621	
5.853	14.79**
0.398	1.78
17.056	36.21**
0.471	2.11*
0.661	2.96
0.223	

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tion. Cripples per shot
multiplying hit per shot
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hit per shot, hit per
ling rate (cripples per

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hit, cripples per blind-day, cripples per shot).

Before a duck is recorded as bagged or crippled, it must be hit by at least one shot. We evaluate two measures of hitting ability which use different indicators of shooting opportunity. Hit per blind-day is a measure of the average number of ducks hit each morning of hunting in each blind. In contrast, hit per shot measures the ability of hunters to hit ducks on a per-shot basis rather than on a per-day basis. The distinction appears to be important because 14% more shots were fired with No. 4 steel than No. 6 lead. We think that many hunters who missed a bird continued to shoot until the bird was brought down or flew out of range. Hunters using steel generally missed shots more frequently so they were more likely to be involved with continued shooting at missed birds and, as a result, they expended more shells for about the same amount of opportunity. Hunters using steel hit 19% fewer ducks per shot but only 13% fewer ducks per blind-day. With 1,422 ducks hit with steel and 1,608 hit with lead in the study, there were 12% fewer hit with the steel load indicating that hit per shot exaggerated differences in the actual number of ducks hit with the two loads.

Crippling rate has been measured in past field tests as the number of cripples per duck knocked down (Mikula et al. 1977), the number of cripples per bird bagged (Anderson and Sanderson 1979), and the number of cripples per shot fired (Humburg et al. 1982, Anderson and Sanderson 1979). We did not analyze cripples per bird bagged because of some undesirable properties which include being undefined on experimental units where there are ducks crippled but none bagged. Cripple per bird hit is a comparable measure that eliminates this drawback. Cripple per hit is a measure of the proportion of hit birds that are unretrieved by hunters. It is

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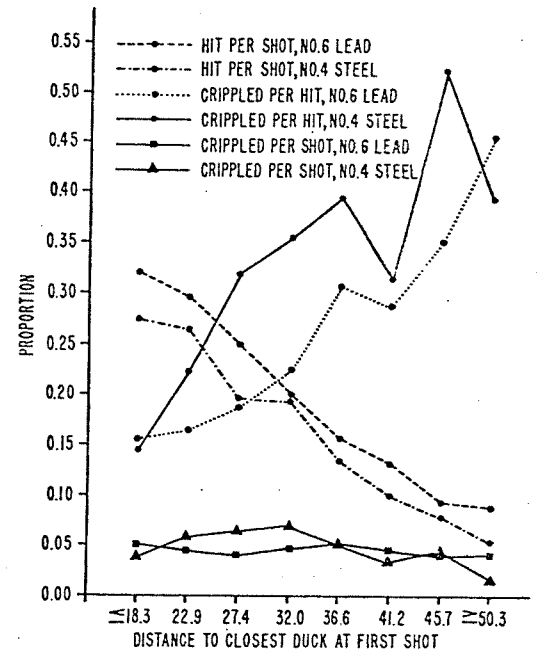


Fig. 1. Proportion of ducks hit per shot, crippled per hit, and crippled per shot in 4.6-m distance intervals.

particularly useful for comparing different loads because it is stochastically independent of the two measures of hitting ability, hit per shot and hit per blind-day. However, it does not measure population impact or the number of unretrieved birds left in the marsh. Cripple per shot and cripple per blind-day standardize the number of cripples to the amount of opportunity; they are the product of cripple per hit with either hit per shot or hit per blind-day, respectively. In this study we found substantially more cripples per duck hit with the steel load ($P < 0.05$), but no clear evidence of overall differences in cripples per blind-day ($P = 0.07$) or cripples per shot fired ($P = 0.11$).

Comparison With Other Studies

All steel vs. lead shot field tests have compared somewhat different loads. Anderson and Sanderson (1979) evaluated three different 12-gauge 3-in. loads for

hunting Canada geese (*Branta canadensis*). The study at Lacassine and the two other duck shooting studies available for comparison tested 2¾-in. 12-gauge loads. Mikula et al. (1977) and the current study both tested 1½ oz of No. 4 steel. However, they compared this steel load to 1¼ oz of No. 4 lead while 1¼ oz of No. 6 lead was used at Lacassine. Humburg et al. (1982) also tested No. 4 steel and No. 4 lead but with 1¼ and 1½ oz of pellets, respectively. In addition, Humburg et al. (1982) also tested a 1¼ oz load of No. 2 steel and a 1½ oz load of No. 4 buffered lead.

We found 19% fewer ($P < 0.05$) ducks hit per shot with steel than lead. Neither Mikula et al. (1977) nor Humburg et al. (1982) tested for differences in hitting ability of lead and steel loads. However, Mikula et al. (1977) did report data that indicated 20% fewer ducks were hit per shot with No. 4 steel than No. 4 lead. We also calculate that 7–8% fewer ducks were hit per shot with steel and buffered lead loads compared with the No. 4 lead load using data presented in Humburg et al. (1982). As an alternative to hitting ability, Humburg et al. (1982) examined the number of ducks bagged per shot and found no differences among any of the loads tested. We also tested this variable and found significantly ($P < 0.05$) fewer ducks bagged per shot with steel. Our results were similar to those we obtained with hit per shot.

None of the previous field tests reported an overall difference in crippling rate between lead and steel loads, although Anderson and Sanderson (1979) reported significant differences in crippling rates at some distances. Mikula et al. (1977) reported 0.136 and 0.160 cripples per duck knocked down with No. 4 lead and No. 4 steel, respectively, which is an 18% ($P > 0.05$) higher rate for steel. Data presented in Humburg et al. (1982) indicated 0.17

and 0.20 ducks crippled per hit with No. 4 lead and No. 4 steel, respectively, which is 17% percent higher for steel. Similar calculations for all other lead and steel comparisons in Humburg et al. (1982) resulted in smaller differences. In both studies, No. 4 steel tended to cripple a greater proportion of ducks hit than did lead although differences were considerably smaller than the 42% found at Lacassine NWR. In contrast, from data presented in Anderson and Sanderson (1979), we calculate the proportion of Canada geese crippled per bird hit as 0.264 with No. 2 lead, 0.234 with No. 1 steel, and 0.215 with BB steel. The two steel loads crippled 11–19% fewer geese per bird hit than did lead. Apparent differences between the field tests involving ducks and the test involving geese, if real, may be attributable to differences in species hunted or loads tested.

The last two paragraphs have emphasized similarities between results of this study and those of previous duck shooting tests. As at Lacassine NWR, previous studies all show numerically fewer ducks hit per shot and more ducks crippled per shot with No. 4 steel compared to the standard lead load tested. A major difference between this study and other studies is that significant differences between loads were found at Lacassine NWR. Whether a difference is significant in a particular study depends not only of the magnitude of the mean difference but also on the standard error of the mean difference. The larger the standard error the less likely that the difference will be statistically significant. The standard error is partly a function of sample size with larger sample sizes producing smaller standard errors. There were more ducks hit on average with each load tested at Lacassine NWR (3,000 ducks hit with two loads) than either Mikula et al. (1977) (540 ducks knocked down with

two loads) or Humburg et al. (1982) (2,400 ducks hit with four loads). Larger sample sizes at Lacassine NWR would have enabled us to detect smaller differences than either Mikula et al. (1977) or Humburg et al. (1982) for both crippling and hitting rates. Of the differences observed between No. 4 steel and lead in the other studies, only hit per shot in Mikula et al. (1977) would have been significant if this difference were observed at Lacassine NWR. Differences in the proportion of ducks crippled with No. 4 steel and lead of the magnitude observed in these studies would not have been significant at Lacassine NWR. The major contrast in results between Lacassine NWR and the other studies is that differences between No. 4 steel and lead was generally much larger at Lacassine NWR.

Hunters at Lacassine using both lead and steel loads hit fewer ducks per shot and crippled a greater proportion of the ducks they hit than participants of other studies. This may be due, in part, to differences in hunting conditions that occurred at Lacassine NWR. Hitting ability may have been influenced by species hunted. There were a greater variety of species harvested at Lacassine with a bag that was 24% mallard compared with a bag that was 80% mallard in Mikula et al. (1977) and 66% mallard in Humburg et al. (1982). While Lacassine hunters had greater difficulty hitting ducks in general, the bag composition was the same for both loads indicating that the lead and steel loads performed about equally well on the different species of ducks. The marsh conditions at Lacassine NWR may have made retrieval of downed ducks more difficult resulting in greater crippling losses with both loads. The blind sites at Lacassine were adjacent to pools surrounded by dense vegetation providing excellent escape cover for wounded ducks. Addition-

ally, the deep soft mud required that most of the hunters without a dog retrieve ducks using a boat propelled by a push-pole. Better escape cover combined with greater difficulty retrieving ducks may have resulted in far more unretrieved ducks at Lacassine NWR. Subtle differences in the effects of lead and steel loads may differentially affect the ability of wounded ducks to escape retrieval more often in conditions like those at Lacassine, thereby contributing to the larger proportion of crippled ducks observed with the steel load.

IMPLICATIONS

Shooting opportunities were usually limited for hunters participating in the study with fewer than 10% of hunting parties bagging a limit of ducks. Our results suggest that, under similar conditions, there would be 13% fewer ducks hit per blind-day with No. 4 steel than with No. 6 lead indicating that duck populations would be subjected to less hunting mortality with the steel load. Hunters would also bag fewer ducks with the steel load. Of the ducks hit, a greater proportion would be left in the marsh with No. 4 steel than No. 6 lead. But because fewer ducks would be hit with steel, the total number of cripples left in the marsh for each blind-day of hunting might be no greater with the steel load. The larger number of cripples per blind-day observed with steel was nearly significant ($P = 0.07$). Lower hunter bags and possibly increased crippling could have some negative impact on hunter satisfaction with this particular steel load but there should be less overall impact to duck populations when used in opportunity-limited hunting situations.

In marsh conditions like those at Lacassine NWR, but where bag restrictions, rather than opportunities to shoot, limit

the size of the hunter bag, there is a potential for waterfowl populations to incur greater hunting mortality with No. 4 steel than No. 6 lead. By algebraically transforming the means of cripples per hit for each load, we calculate that the steel and lead loads crippled 0.50 and 0.31 ducks per duck bagged, respectively. Applying these means to bag-limited hunting situations where hunters using either load bag a limit of ducks, hunters using the steel load would cripple more ducks in order to bag the same number of ducks as hunters with the lead load. As a result of bagging the same number of ducks with either load there would be $(1.50 - 1.31)/1.31 \times 100\%$ or 15% more ducks hit with No. 4 steel than No. 6 lead. When bag limits could be consistently reached by all hunters using either load, there would be more unretrieved ducks and, as a result, more total ducks hit with No. 4 steel than No. 6 lead.

We have no data indicating the extent to which southwest Louisiana duck hunters are limited by opportunity or bag restrictions. As this study shows, opportunity-limiting duck hunting does exist in the state. However, hunters in some coastal marshes have a reputation for regularly obtaining limits. Our results suggest that No. 4 steel could result in from 13% fewer ducks hit in opportunity-limited situations to 15% more ducks hit in bag-limited situations. For southwest Louisiana an intermediate value is likely.

Two specific loads were tested at Lacassine NWR and the results cannot be generalized into conclusions about all steel and lead shot loads. The two loads had

similar down range energy per pellet but were different in muzzle velocity, number of pellets, and the size, weight, and hardness of shot pellets. One or more of these attributes may have influenced observed differences in performance of the two loads. Investigation into how these and other shotshell characteristics affect performance is justified. A better understanding of the relationship between shotshell characteristics and load performance might provide insights into how performance of both lead and steel shot could be improved.

LITERATURE CITED

- ANDERSON, W. L., AND F. ROETKER. 1978. Effectiveness of steel shot for hunting interior Canada geese. III. Dep. Conserv., Migratory Bird Sec. Periodic Rep. 20. 11pp.
- , AND G. C. SANDERSON. 1979. Effectiveness of steel shot in 3-inch 12 gauge shells for hunting Canada geese. *Wildl. Soc. Bull.* 7:213-220.
- ANDREWS, R., AND J. R. LONGCORE. 1969. The killing efficiency of soft iron shot. *Trans. North Am. Wildl. and Nat. Resour. Conf.* 34:337-345.
- HUMBURG, D. D., S. L. SHERIFF, P. H. GEISSLER, AND T. ROSTER. 1982. Shotshell and shooter effectiveness: lead vs. steel shot for duck hunting. *Wildl. Soc. Bull.* 10:121-126.
- KOZICKY, E., AND J. B. MADSON. 1973. Nilo shotshell efficiency test on experimental mallard ducks, 1972-73. *Proc. Int. Assoc. Game, Fish Conserv. Comm.* 63:100-117.
- MIKULA, E. J., G. F. MARTZ, AND L. A. RYEL. 1977. A comparison of lead and steel shot for waterfowl hunting. *Wildl. Soc. Bull.* 5:3-8.
- NICKLAUS, R. H. 1976. Effects of lead and steel shot on shooting flighted mallards. *Wildl. Monogr.* 51:21-29.
- STEEL, R. G. D., AND J. H. TORRIE. 1980. Principles and procedures of statistics. McGraw-Hill Book Co., New York, N.Y. 633pp.

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ALMANAC

Lead And Steel Shot Compared In Field Study

The results of a scientific study of the relative effectiveness of lead and steel shot for hunting ducks under field conditions showed that more ducks were hit and less were crippled with lead shot than with steel shot.

The study was done by the Cooperative Wildlife Research Unit at Louisiana State University in cooperation with the U.S. Fish and Wildlife Service and the Louisiana Department of Wildlife and Fisheries.

The loads compared were 12-gauge, 1 1/4-oz. of No. 6 lead shot and 1 1/4-oz. of No. 4 steel shot. More than 1,000 hunters participated in the study, which spanned the 1980-81 and 1981-82 duck hunting seasons. The identity of the shells used was not known by the hunter, the observer in the blind, the shell handler, the project field supervisor, or the statistician.

Twenty-one percent more ducks were hit per shot fired with No. 6 lead than with No. 4 steel. Of the birds hit, No. 4 steel crippled 41 percent more than No. 6 lead. Long-range shots (over 35 yards) resulted in an increase of 55 percent in cripples per hit for both loads combined. NRA Staff.

Nation's Youth Believe Hunted Species Scarce

Educational tests conducted for the National Shooting Sports Foundation and the International Association of Fish and Wildlife Agencies indicate that the vast majority of school-age youngsters think most American wildlife is in serious trouble.

Of nearly 500 youngsters questioned, more than 80 percent thought that species such as elk, deer, or antelope were either in "serious danger of extinction" or "some danger of extinction." With such a high percentage of young people believing that native wildlife is seriously threatened, it should come as no surprise that they would be against hunting.

In one respect, this isn't such bad news. Attitudes based on erroneous facts, instead of on emotions, are far easier to change. But the attitudes won't change by themselves. Hunters and their organizations must be willing to do the "changing." NRA Staff.

Leather Belt Handy To Hone Dull Knife

How many times have you needed to hone your knife when you're in the middle of field dressing an animal and you find you've forgotten your whetstone. You've probably got the answer around your waist. Your leather belt makes a good substitute for a whetstone. Loop the belt around an antler or branch on a tree, hold the other end and work the blade back and forth. The stroke

Display Beard And Shotshell



Here's a good way to display not only the beard of your turkey, but also the shotgun shell you used to bag it.

Cut off the beard, leaving 1/2-inch excess skin on the beard. Punch out the primer of the spent shotshell and run a doubled thong through the hole. Tie both ends to the beard, then pull tightly. You might want to tie a knot in the thong a couple inches above the beard to prevent it from being drawn up too far inside the shotshell. You don't want the beard to look smaller than it really is. Charles Ernst.

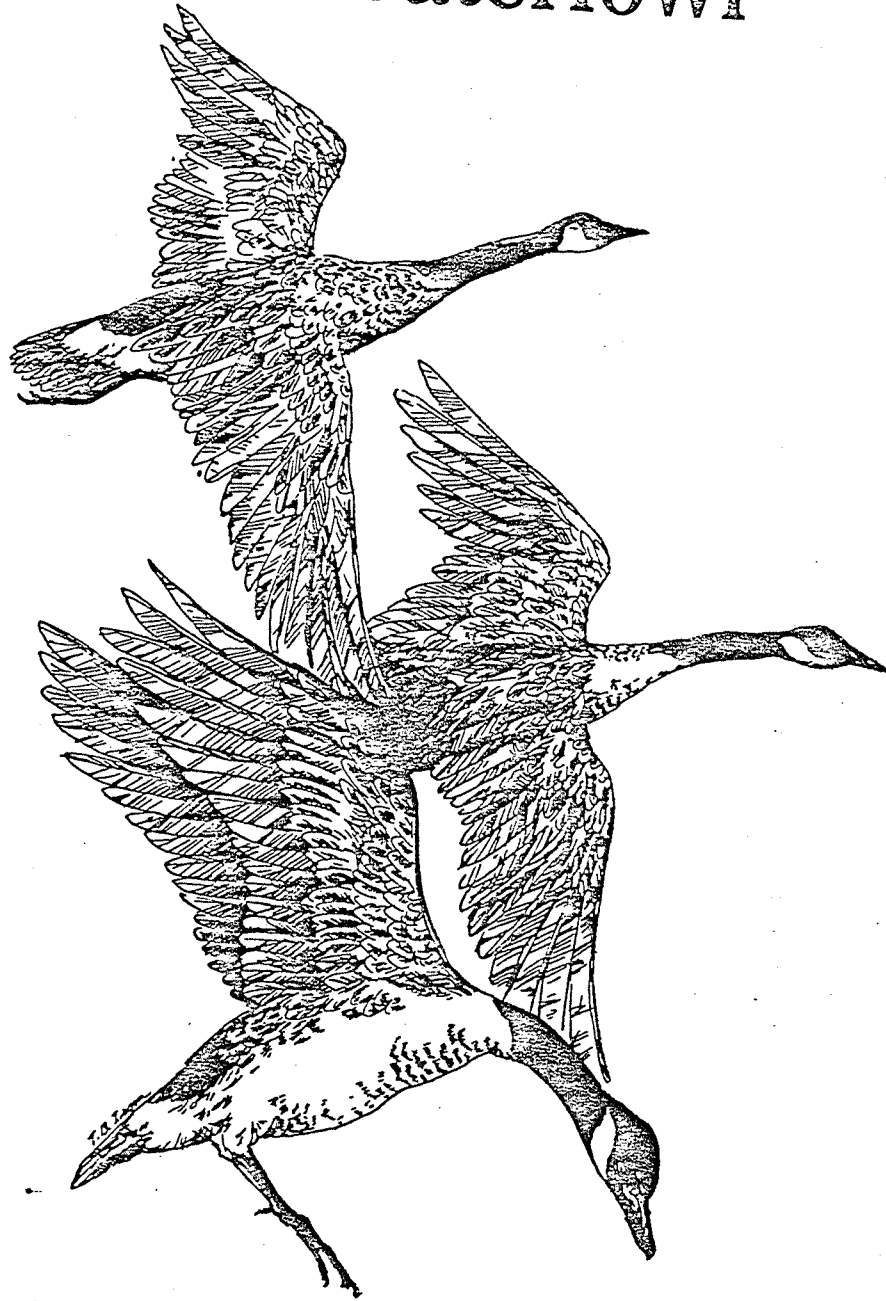
Dry Your Boots With Field Corn

Wet or sweat-dampened boots are hard to dry. The easiest method is to put a couple of ears of field corn on the back of the stove in the morning where they will become warm and dry. In the evening, put one in each boot.

The warm, dry ears of corn absorb moisture like a blotter, and are never hot enough to damage the boots.

Next morning, take the corn out of the boots and put it back on the stove for future use. Ray Beck.

Steel Shot and Lead Poisoning in Waterfowl



Scientific and Technical Series 8



National Wildlife Federation

An Annotated Bibliography of Research 1976-1983

J. Scott Feierabend

October 1983

Steel Shot and Lead Poisoning in Waterfowl

An Annotated Bibliography of Research 1976-1983

By
J. Scott Feierabend



National Wildlife Federation

Scientific and Technical Series Number 8

Resources Conservation Department
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Nontoxic shot regulations appeared to reduce waterfowl losses to lead poisoning. On 1 site where steel shot was required throughout the study, lead poisoning was relatively infrequent. On a second area the magnitude of lead poisoning losses declined dramatically after nontoxic shot regulations were imposed. Ingested lead shot pellets were present in 40.4% of 94 gizzards examined and elevated lead levels were found in 46.5% of 46 livers analyzed. The investigators found more lead-poisoned birds alive, 43%, than they found crippled birds alive, 25%. Furthermore, lead-poisoned birds were more difficult to detect because they were more often found in vegetation and were therefore less visible. The higher proportions of live birds incapacitated by crippling or lead poisoning reflect the bias against detecting day-to-day chronic waterfowl mortality versus acute waterfowl losses to diseases.

The authors conclude that, except for lead poisoning, nonhunting mortality factors do not appear to significantly affect mallards in Missouri. Compared to crippling losses, lead poisoning and avian cholera are important nonhunting mortality factors for snow geese. Data indicate that lead poisoning could probably be reduced through the use of nontoxic shot.

40. Humburg, D. D., S. L. Sheriff, P. H. Geissler, and T. Roster. 1982. **SHOTSHELL AND SHOOTER EFFECTIVENESS: LEAD VS. STEEL SHOT FOR DUCK HUNTING.** Wildlife Society Bulletin. 10(2):121-126.

The effectiveness of commercially available 12 gauge shotgun shells for duck hunting was tested during the 1979 waterfowl season on the Schell-Osage Wildlife Management Area, Missouri. Ammunition tested included 2-3/4" Winchester Super Double X Magnum 1-1/2 ounce #4 buffered lead shot, Super X Magnum 1-1/2 ounce #4 lead shot, Super X Magnum 1-1/4 ounce #4 steel shot, and Super X Magnum 1-1/4 ounce #2 steel shot. Lead shot loads represented high quality shells used for duck hunting and steel shot loads were selected that were approximately comparable in pellet count, muzzle velocity, and patterning to the lead shot loads. Observers accompanied hunters to their blinds where both parties recorded data on the number of shots fired, the distance at which the first shot was fired, and the number of birds bagged, crippled, and missed. Neither observers nor hunters knew what type of shell was being tested. After the hunt, participants evaluated the performance of their shotshell load and were asked to determine whether they had used lead shot or steel shot.

A total of 1,967 ducks were bagged with 10,587 shots; 83% were bagged at distances less than 37m. The number of shots missed increased as the distance at which the shot was fired increased. Significant differences between the 4 shotshell loads were not observed in the number of birds bagged per 100 shots, the number of birds crippled per 100 shots, or the number of misses per 100 shots. Under field conditions and in the hands of typical hunters, the 2-3/4" 1-1/2 ounce buffered load of #4 lead shot did not outperform either the 1-1/4 ounce #4 steel shot load or the 1-1/4 ounce #2 steel shot load either in terms of increased bag rates or in terms of lower crippling rates. Furthermore, under the field conditions that existed in this test, the buffered 1-1/2 ounce #4 lead shot load did not produce either a significantly greater bagging rate or a significantly lower crippling rate than the unbuffered 1-1/2 ounce #4 lead shot load. Sixty-four percent of the hunters correctly identified the pellet type used and more than 66% expressed satisfaction with shotshell performance. However, regardless of the load type actually used, hunters who thought they had fired lead shot reported better shotshell performance than hunters who thought they had fired steel shot.

41. Hunter, B. 1978. **INTERACTIONS BETWEEN LEAD, LEAD-IRON AND IRON SHOT AND AVIAN CHOLERA IN WATERFOWL.** 1978. Wildlife Diseases Association Meeting. Ft. Collins, Colorado. 9 pages.

Mallard ducks were dosed with various numbers of commercial #4 lead shot pellets, experimental #4 lead-iron shot pellets, and commercial #4 iron shot pellets. Blood lead levels were monitored every 3 days for 21 days. Birds administered lead shot had consistently higher blood lead levels than those dosed with lead-iron shot.

X
In a second experiment, 5-week old mallards were administered lead, lead-iron, or iron shot. Nine days after dosing, birds were injected with viable avian cholera bacteria. Five weeks later, birds dosed with lead or lead-iron shot had significantly lower mortality rates than those dosed with iron shot or no shot at all. These data suggested to the author that lead may have an inhibitory effect on avian cholera bacteria.

The physiological processes responsible for this observation were subsequently examined. Avian cholera bacteria were cultured on blood agar treated with lead. Regardless of the lead concentrations, all agar plates containing lead had significantly fewer avian cholera colonies than did the control plates. Hunter, therefore, concluded that lead is a bacteriostatic and that its inhibitory effects on avian cholera bacteria are not due to the stimulation of physiological processes in the mallard. Despite these findings, the author notes that the phenomenon of protection from avian cholera by lead is unlikely to have any significant impact on wild waterfowl populations.

42. Hunter, B. and G. Wobeser. 1980. **ENCEPHALOPATHY AND PERIPHERAL NEUROPATHY IN LEAD-POISONED MALLARD DUCKS.** *Avian Diseases.* 24(1):169-178.

This study examined the effects of lead shot ingestion on the changes in the nervous systems of 18-week old mallards. Birds were dosed with varying numbers of #4 commercial lead shot pellets. Blood samples were taken at 3-day intervals and all birds were sacrificed at 21 days. The mallards were maintained on 2 diet regimes, 1 group receiving a grain mix and 1 group receiving a commercial mix.

Blood lead concentrations in both groups peaked at day 9 and then declined. Blood lead levels were consistently higher in grain fed birds, although packed cell volume did not vary significantly between groups. Two ducks dosed with 10 pellets died at 5 and 17 days post-dosing.

Mallards dosed with 8 to 10 lead shot pellets developed lesions in the myelin of the vagus, brachial and sciatic nerve. They also developed focal microhemorrhages within the cerebellum. These results suggest that peripheral nervous system damage occurs early-on in lead poisoned ducks and may be important in producing the clinical manifestations associated with lead poisoning. The authors believe that encephalopathy and neuropathy may be important aspects of lead poisoning symptoms in waterfowl.

43. Interagency Committee on Non-Toxic Shot Regulations. 1981. **FINAL COMMITTEE REPORT OF MEETING IN ST. LOUIS, MISSOURI, AUGUST 12 AND 13.** T. Miller, Chairman. Illinois Department of Conservation. Springfield. 20 pages.

An Interagency Committee was formed in 1981 to discuss and formulate recommendations to the U.S. Fish and Wildlife Service and State Fish and Wildlife Agencies on the implementation of nontoxic shot regulations. The Committee included Flyway Council Chairmen, a representative from the International Association of Fish and Wildlife Agencies, representatives from the arms and ammunitions manufacturers, U.S. Fish and Wildlife Service representatives, and representatives from national conservation organizations. The report presents the findings and recommendations of the Interagency Committee for implementation of nontoxic shot regulations.

It was recommended that the "hot spot" approach be continued as the basis for the establishment of nontoxic shot zones for the 1981 season. Several criteria were proposed for adding or deleting areas to these zones. Hot spots were defined as areas having known histories of waterfowl mortality due to lead poisoning or areas not having known histories of waterfowl mortality due to lead poisoning but could be identified based on ingested gizzard shot levels, liver lead residues, blood lead residues, blood enzyme and enzyme levels, bottom and/or upland soil samples, levels of waterfowl harvest, and secondary poisoning from waterfowl carcasses.

Deletion of nontoxic shot zones should be identified 1 year in advance to accommodate the operational constraints of steel shotshell manufacturers for product marketing and distribution. Nontoxic shot

3 copies to Bill Morris
Rick Cassa
Larry Kullenberg
NR

Density of Spent Lead Shotgun Pellets in Soil
On the Springer Wildlife Habitat Management Unit, 1984

Prepared by: Steve Kilpatrick, Assistant Coordinator, Region III,
Wyoming Game and Fish Department.

Abstract: The upper one (1) inch of soil was sampled for spent lead shotgun pellets at four (4) different sample sites on the Springer Unit. Site #1, a permanent cover area heavily gunned for pheasants during a put-and-take hunt, had a mean of 38,332 pellets/acre. Site #2, a cultivated area heavily gunned for pheasants, had a mean of 13,939 pellets/acre. Sites #3 and #4, permanent cover areas moderately gunned for pheasants, had means of 15,682 and 13,939 pellets/acre, respectively. All sites receive moderate to heavy utilization by pheasants and waterfowl as feeding and loafing areas. It was concluded that certain areas of the Unit are a serious aggravation to the lead poisoning problem and that other areas will become serious aggravations in the near future. The future use of steel shot should be considered for all shooting on the Springer Unit.

Introduction

The purpose of this investigation was to determine the approximate abundance of lead shotgun pellets in the soil at the Department's Springer Wildlife Habitat Management area. From late February through May, 1984, three (3) of four (4) dead Canada geese were confirmed by the Department's laboratory (University of Wyoming, Laramie) to be lead poisoning victims. Two (2) mallard ducks were also suspect of having been lead poisoned. The ppm lead concentrations of the livers (dry weight) for the confirmed geese ranged from 20.1 to 81.0 ppm. Since the above mentioned waterfowl were collected incidental to other routine activities and not found as a result of an organized search, an investigation to determine the abundance of lead shot in and the lead poisoning potential of the Unit's soil appeared necessary. Lead shot ingestion has been confirmed in waterfowl (Trainer et al. 1965, Szymezak et al. 1978) as well as bobwhite (Westemier 1966), scaled quail (Campbell 1950), pheasants (Hunter and Rosen 1965), and mourning doves (Lewis and Legler 1968).

Study Area

The Springer Wildlife Habitat Management Unit is located two (2) miles south of Yoder and 15 miles south of Torrington, Wyoming. Approximately 125 pairs of Canada geese (Branta canadensis moffitti) utilize the Unit for nesting and brooding. An estimated 25,000 to 100,000 ducks and 5,000 to 13,000 Canada geese inhabit the Unit

	REVIEW	INITIALS	DATE
Chief		NR	12/10/84
Asst. Chief		NR	12-6-84
Leads			
Engineer			
Measurement		NR	12-16-84
Game Warden			
Game Warden			
Game Warden			
Game Warden			

each spring and fall. A population of 200 to 300 pheasants (Phasianus torquatus) winter and nest on the Unit. A substantial population of mourning doves (Zenaidura macroura), sandhill cranes (Grus canadensis), and nongame birds also utilize the Unit at various times (Wyo. Game & Fish Dept., 1981).

Approximately 584 surface acres of water and 1,327 acres of marsh and upland habitats comprise the Unit. The upland portion of the Unit is a mixture of permanent cover areas and cropland with numerous shelterbelts and hedge rows interspersed. Crops consist mostly of corn, alfalfa, and winter wheat. The area is hunted intensively during a put-and-take pheasant hunting season. The past three (3) year average indicates a mean of 1,817 pheasant hunters are accommodated during the season and account for 2,978 pheasants harvested (Reg Rothwell, Biologist--Wyo. Game & Fish Dept., pers. comm. 1984). Pheasant hunters are discharging approximately 3.1 million pellets on the 1,327 acres of marsh and upland annually (2,978 pheasants harvested x 3.7 shells per pheasant x 281 pellets per 2 3/4 in. 12-gauge shell loaded with 1 1/4 oz. of #6 shot = 3,096,227 pellets/year) (Data for number of shells fired per pheasant harvested, courtesy of R. E. Warner, Illinois Natural History Survey, pers. comm. (Anderson 1983), and Reg Rothwell, Biologist, Wyo. Game & Fish Dept., pers. comm. 1984). This results in an annual average density of 2,333 pellets/acre spent by pheasant hunters during the put-and-take pheasant season initiated in 1973. In addition, an undetermined amount of lead pellets are spent on the Unit during a portion of the regular pheasant and waterfowl seasons.

Methods and Materials

Dimensions of the soil samples were one (1) foot x one (1) foot x one (1) inch deep, as described by Anderson (1983). An angle iron frame of the above dimensions was pressed into the soil one inch. Samples were collected with small flat coal shovels and placed in plastic bags for transportation. Large materials were separated from the samples by sifting through a two (2) ft. square wooden frame with a bottom of 1/4 inch (6.35 mm) hardware cloth. Shot sizes of #4 and greater were retained in this sifting process. Each sample was then placed in a five (5) gallon plastic pail with approximately three and one-half (3 1/2) gallons of water and hand agitated. The surface materials were removed with a small piece of standard window screen (0.28 mm). The samples were then poured into a second two (2) ft. square frame with a standard window screen bottom (0.28 mm) and rinsed with water from a hose. The residue contained small pebbles, lead shot, seeds, etc. The remaining residue (amounting to approximately 1/10 or less of a liter of material) was spread evenly over the bottom of the two (2) ft. square frame and examined for lead shot. The residue examination was relatively simple with most of the shot easily seen. Fluoroscopy was not utilized for pellet detection.

Therefore, pellet counts should be considered minimum counts since the possibility of visually missing a pellet exists. Uncertain "pellets" were smashed with pliers to differentiate between pebbles and lead shot.

A total of 150 random samples were taken on the Springer Unit. Fifty (50) samples were taken from Site #1 (Fig. 1) which is adjacent to Site #2 but has been in permanent cover since 1973. An additional 50 samples were taken from Site #2 (Fig. 1) which has been in winter wheat production since the beginning of the put-and-take pheasant hunt (1973). Twenty-five (25) samples were taken in each of Sites #3 and #4, which have also been in permanent cover since 1973. Sites #1 and #2 were considered to have received heavy gunning pressure while Sites #3 and #4 were considered to have received moderate gunning pressure.

Results

A total of 44 lead pellets were found in the 50 samples taken from Site #1 (Table 1). This results in a mean of 0.88 pellets/sample which equates to 38,332 pellets/acre (Table 2). The upper and lower confidence limits were 49,891 pellets/acre and 25,774 pellets/acre, respectively ($P \leq 0.10$, $SD = 1.1183$) (t values from Steel and Torrie 1960).

The 50 samples taken from Site #2 contained 16 lead shot resulting in a mean of 0.32 pellets/sample (Tables 1 & 2). This equates to 13,939 pellets/acre with upper and lower confidence limits of 19,636 and 8,242 pellets/acre, respectively ($P \leq 0.10$, $SD = 0.5511$) (Table 2).

Nine (9) pellets were found in the 25 samples taken from Site #3. The mean number of pellets/sample was 0.36 or 15,682 pellets/acre (Tables 1 & 2). The upper and lower confidence limits were 24,157 and 7,206 pellets/acre, respectively ($P \leq 0.10$, $SD = 0.5686$).

A total of eight (8) shot were found in the 25 samples from Site #4, giving a mean pellet density of 0.32 pellets/sample or 13,939 pellets/acre (Tables 1 & 2). The upper and lower confidence limits of the site were 22,238 and 5,639 pellets/acre, respectively ($P \leq 0.10$, $SD = 0.5568$).

Discussion

Anderson (1983) states that: "the threshold for waterfowl appears to be about 20,000 per acre or approximately one (1) pellet for every two (2) square feet of soil. At such levels, mallards and other waterfowl that will dig into soil for food would be expected to ingest spent pellets at relatively high rates. The die-off of 3,500 Canada geese at Horseshoe Lake (Alexander County) and Union County refuges in January to February 1977 (Anderson and

Sanderson 1979) occurred in the presence of 17,424 and 44,431 spent pellets per acre, respectively (Esslinger and Klimstra 1983)."

Site #1 has been in permanent cover area with one of the undisturbed since the beginning of the put-and-take pheasant hunt in 1973. It is also considered a heavy-gunned area for pheasants. As expected, it contained the highest abundance of spent lead shot. The 90% confidence limits are well above the 20,000 pellets/acre threshold level of Anderson (1983) (Fig. 2). The vegetative composition of the area is primarily crested wheatgrass (Acropyrm cristatum) and downy bromegrass (Bromus tectorum) with several shelterbelts within the immediate vicinity. The site receives heavy use by pheasants and light to moderate use by Canada geese and ducks. Pheasants would be the primary ingestors in the vicinity of this site.

Site #2 has been cultivated (winter wheat) for the duration of the put-and-take hunt. It appears to receive equal gunning pressure to Site #1 (heavy). The abundance of pellets found on this site was certainly less than Site #1. However, it must be realized that only the top one (1) inch of soil was removed for the samples and the soil is tilled on an annual basis to a depth of five to seven (5 - 7) inches, thus mixing the spent pellets throughout this five to seven (5 - 7) inch layer of soil. Theoretically, each one (1) inch layer of soil (to a depth of five to seven (5 - 7) inches) should contain 13,939 pellets/acre. This site receives heavy use by pheasants and Canada geese for feeding and loafing. Both species would be primary ingestors. The upper 90% confidence limit was slightly below the 20,000 pellets/acre threshold (Fig. 3) but was above the 17,424 pellets/acre figure that resulted in a major die-off at Horseshoe Lake (Anderson and Sanderson 1979).

Sites #3 and #4 have been in permanent cover for the duration of the put-and-take pheasant hunt. Major vegetative species include: tall wheatgrass (Acropyron elongatum), yellow sweetclover (Melilotus officinalis) and smooth bromegrass (Bromus inermis). Both areas receive moderate gunning pressure during the put-and-take season. The upper 90% confidence limits of both sites exceed the threshold level. The two sites are moderately utilized by pheasants and are heavily utilized by Canada geese as grazing (feeding) areas during gosling development (brooding period). Canada geese would probably be the primary ingestors with pheasants and ducks being secondary ingestors of lead shot within these areas.

Conclusions

It is evident from the data gathered for the put-and-take pheasant hunt and this soil sampling investigation that certain areas within the Springer Unit have a definite high lead poisoning

potential for waterfowl and pheasants. With the continued mean annual deposition of 2,333 pellets/acre it is also evident that it is only a matter of a relatively short time period before all areas of the Unit will have a high lead poisoning potential. Documentation of lead-poisoned waterfowl occurred on the Springer Unit in 1984 and is expected to increase in frequency with the continued use of lead shotgun pellets.

Literature Cited

- Anderson, W. L. 1983. Spent shotgun pellets in soil on the pheasant put-and-take hunting area at Rend Lake in 1983. Illinois Department of Conservation, Division of Fish and Wildlife Resources, Periodic Report No. 40. 5 pp.
- Anderson, W. L. and G. C. Sanderson. 1979. Effectiveness of steel shot in three (3) inch 12-gauge shells for hunting Canada geese. Wildl. Soc. Bull. 7(4):213-220.
- Campbell, H. 1950. Quail picking up lead shot. J. Wildl. Manage. 14(2):243-244.
- Hunter, R. F., and M. N. Rosen. 1965. Occurrence of lead poisoning in a wild pheasant (Phasianus colchicus). California Fish and Game 51(3):207.
- Lewis, J. C. and E. Legler, Jr. 1968. Lead shot ingestion by mourning doves and incidence in soil. J. Wildl. Manage. 32(3):476-482.
- Steel, R. G. D. and J. H. Torrie. 1960. Principles and Procedures of Statistics. McGraw-Hill Book Co. Inc., New York. 481 pp.
- Szymezak, M. R. and W. J. Adrian. 1978. Lead poisoning of Canada geese in woutheast Colorado. J. Wildl. Manage. 42:299-306.
- Trainer, D. O. and R. A. Hunt. 1965. Lead poisoning of waterfowl in Wisconsin. J. Wildl. Manage. 29:95-103.
- Westemeier, R. L. 1966. Apparent lead poisoning in a wild bobwhite. Wilson Bull. 78:471-472.
- Wyoming Game and Fish Department. 1981. Management plan - Springer Wildlife Habitat Manage. Unit. 50 pp.

Table 1. Numbers of samples and pellets found by site location, Springer Unit, 2-13 October 1984.

Site #	No. Samples Taken	No. Pellets Found
1	50	44
2	50	16
3	25	9
4	25	8

Table 2. Mean pellets/sample, mean pellets/acre, standard deviations and confidence intervals of sites sampled for lead shot, Springer Unit, 2-13 October 1984.

Site #	\bar{x} Pellets/Sample	\bar{x} Pellets/Acre	90% Conf.Int. (Pellets/Acre)	Standard Deviation
1	0.88	38,332	26,774-49,891	1.1183
2	0.32	13,939	8,242-19,636	0.5511
3	0.36	15,682	7,206-24,157	0.5686
4	0.32	13,939	5,639-22,238	0.5568

Figure 1. The Wyoming Game and Fish Department's Springer Wildlife Habitat Management Area.

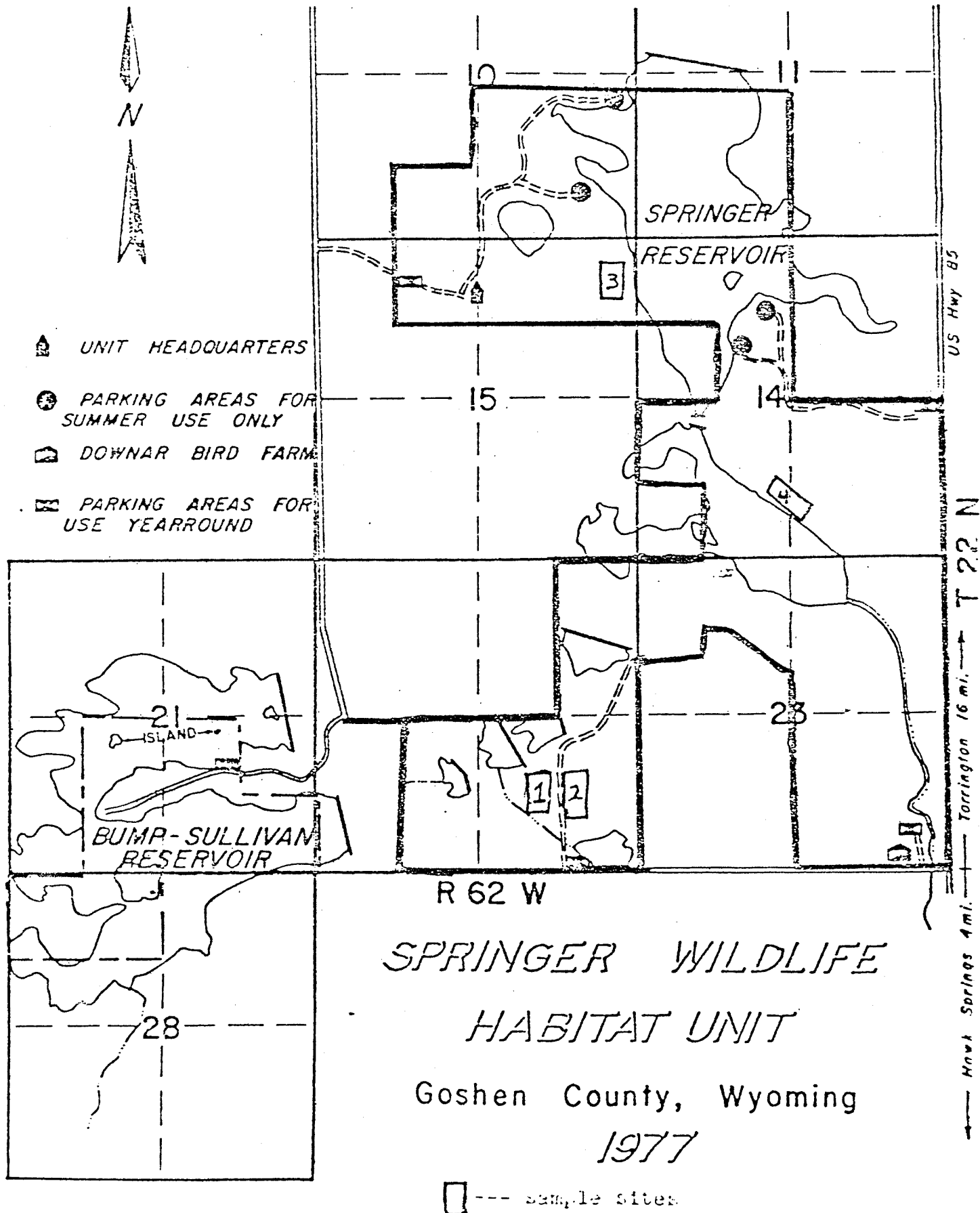
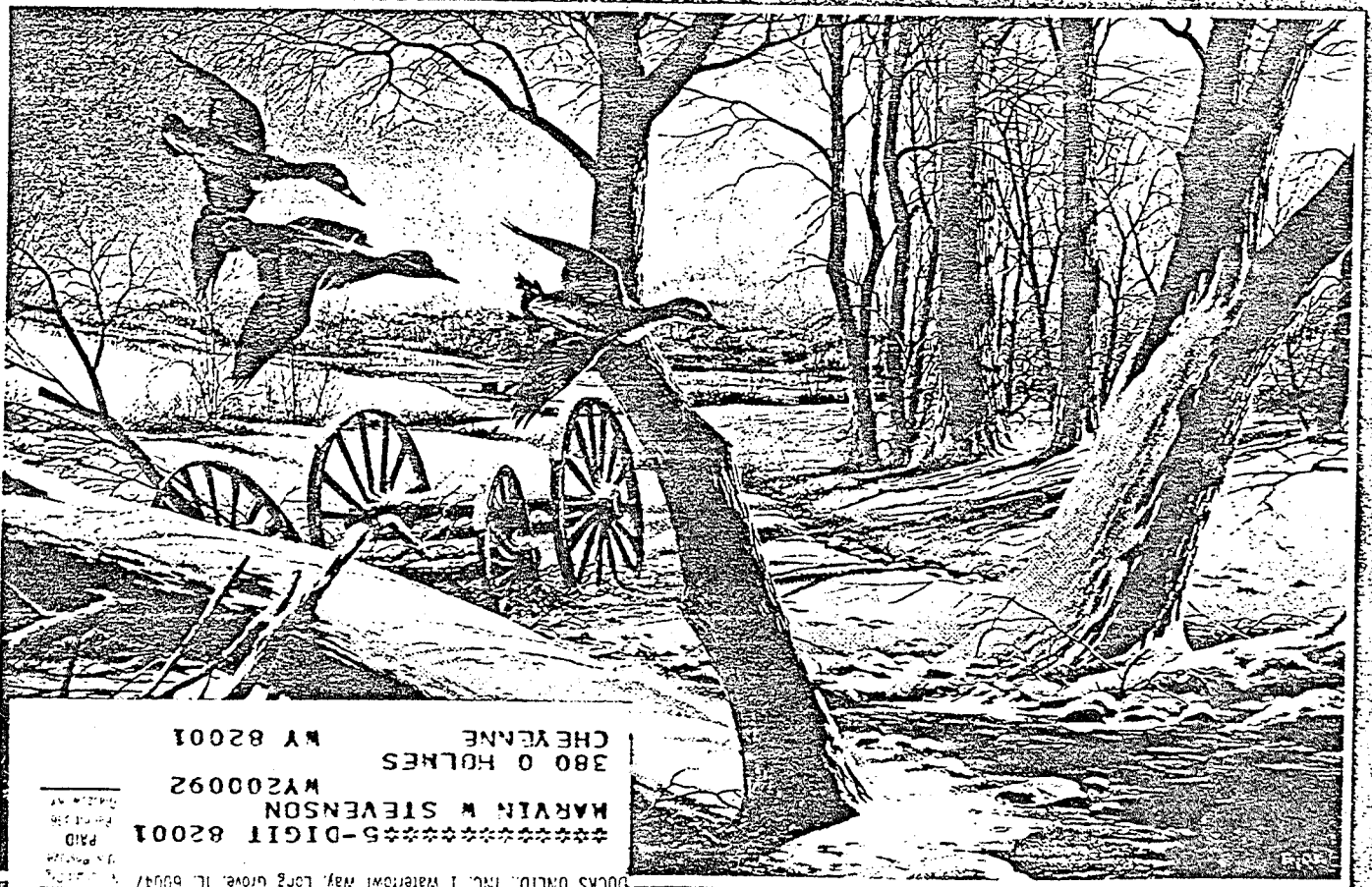


Figure 2. Ninety percent (90%) confidence intervals of lead pellets found by site location, Springer Unit, 1984. (\bar{x} = mean).



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Leaded or unleaded

For over two decades the lead/steel debate has gone on.
The U.S. Fish and Wildlife Service plans an end to it.

EDITOR'S NOTE: *The FWS has announced it is establishing a plan to resolve the lead/steel shot controversy. The service has expressed a desire to provide objective information to the public, and to work with the many persons and agencies who have an interest in waterfowl, to decide the course this wildlife management issue should take. Here the FWS, in a recent news release, addresses common questions about its plan and the lead/steel controversy.*

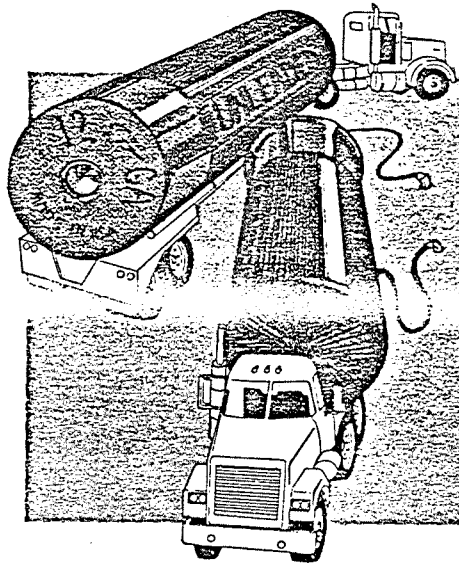
Q: What is your plan?

A: We've developed a six-point plan:

1. The FWS has increased its efforts to monitor and identify lead poisoning problem areas or "hot spots."
2. The FWS is working with state fish and wildlife departments and the flyway councils to develop concrete ways to identify non-toxic shot zones. Lack of these criteria has been a concern to many in the past. Final criteria should be adopted by April, 1985.
3. The FWS will update information in a 1976 environmental impact statement (EIS) on the use of steel shot for waterfowling.
4. The FWS will create a research plan to study further issues. These might include the extent, sources and effects of lead poisoning on wildlife species other than waterfowl, the sublethal effects of lead and the crippling effects of steel shot.
5. The FWS will prepare a report on the effects of lead on bald eagles and other wildlife.
6. The FWS will make a plan to present factual information about lead and steel, the criteria for requiring non-toxic shot and how these criteria will be applied in specific areas. The plan will be completed by February, 1985. We want to give timely, accurate information to sportsmen who have complained in the past about the lack of information.

Q: Why take this action now?

A: The debate over the use of lead or steel has been around for over two decades. Many studies have been conducted on the effects of ingested lead pellets in waterfowl, non-toxic substitutes and related topics. The EIS that was completed



in 1976 led the Department of Interior to require steel in problem areas. But those areas were often poorly defined. And the federal government acted on its own in implementing this policy, either without ensuring it had adequate scientific information and criteria for designating hot spots, or without explaining its position adequately to those affected. Congress thus prohibited non-toxic shot zones unless the states involved agreed.

We plan to put this debate to rest by adopting scientifically sound steel-zone standards in consultation with states, flyway councils, sportsmen and conservationists; and by clearly telling people what we are doing and why. We must resolve this debate so we can focus our attention on the loss of waterfowl habitat and other priority matters.

Q: Do you propose steel shot as the cure?

A: No. Our aim is to protect the best interest of the resource while recognizing the legitimate concerns of hunters. Steel is the only lead substitute now available to hunters. It is the only alternative in areas where waterfowl are being substantially harmed by lead poisoning. We are aware of work on other substitutes that may be ballistically more comparable to lead, but these have not been developed to the point that they can be produced and marketed for hunters.

Q: What of the concern that steel cripples more waterfowl than lead?

A: We share that concern. Past field

shooting tests show conflicting results. A group of expert statisticians hired to review each study determined there is no comparison among them because of differences in study designs and methods. But past work does indicate lead poisoning is a bigger problem that must be addressed. We are still looking at this and are considering conducting a study to provide more information.

Q: How many waterfowl die from lead poisoning annually?

A: We cannot pin down the precise number. To do so would take an immense amount of time and money. But there is no doubt that waterfowl die from lead poisoning. To better understand lead-caused death, we are implementing our monitoring program on selected refuges and on waterfowl areas identified by states. Last year we monitored some 19 areas. This year 40 areas are scheduled for study.

Q: How will the people have a voice in this program?

A: We will continue to solicit and evaluate comments from all interested persons. We receive comments through public notices, public meetings and mailings from interested groups. For example, we will hold a meeting on or near each national wildlife refuge proposed for conversion from lead to steel. We will also hold meetings in appropriate areas to discuss our non-toxic shot proposals in connection with bald eagles. And we will conduct public hearings around the country sometime in August and September on our draft supplement to the 1976 EIS on steel.

The point is that we are not trying to operate in a vacuum. We want to reach a solution, inform people what we are doing, seek their suggestions, reach a consensus and explain that consensus.

Waterfowl hunters are the people most affected by the issue. Hunters have a sincere concern and desire to enhance conditions for waterfowl and for wildlife in general. We think hunters have a right to know and to be involved. It is our obligation to provide the best possible scientific information so that we all can decide what is best. ☐

P.L. 98-473, Section 305

No funds appropriated by the Act shall be available for the implementation or enforcement of any rule or regulation of the United States Fish and Wildlife Service, Department of the Interior, requiring the use of steel shot in connection with the hunting of water fowl in any state of the United States unless the appropriate state regulatory authority approves such implementation.

Stevens Amendment

Dennis -

From: Dr. Smith

(a) This is Stevens' amendment

(b) Act referred to is Dept. of Interior Appropriations Act.

Dr. Smith - Officer of Integrity and Management, FWS is taking care.

Federal government, State governments, and commercial motor carriers to determine a driver's compliance with the maximum hours of service limitations prescribed in the FMCSR. For example, during the last six months of 1981, the Bureau reviewed over 600,000 logs for driver and carrier compliance with the hours of service requirements. This included logs checked during management audits made at the carrier's terminals and those checked during roadside inspections. The information obtained from the log is used to place drivers out of service when they are in violation of the maximum limitations at the time of inspection. It is also used in determining a motor carrier's overall safety compliance status in controlling excess on duty hours, a major contributory factor in fatigue induced accidents. Additionally, it has traditionally been the principal document that is accepted by the court system as evidence to support enforcement actions for excess hours of service violations. Many motor carriers use the log to determine whether a driver has available hours to drive within the limitations set out in the regulations. Currently, it is the only single universally recognized instrument available to both Government and industry to insure compliance with the hours of service rules.

The rulemaking on the driver's record of duty status also demonstrated the importance of uniformity in hours of service records. The need for uniformity was a concern expressed by the States, carriers, drivers, individuals and national organizations such as the IBT, the Professional Drivers Council of Teamsters for a Democratic Union (PCTDU), and the Commercial Vehicle Safety Alliance (CVSA). Commenters pointed out that if differing time records were allowed, enforcement personnel would be required to familiarize themselves with all forms in use thereby increasing the cost of enforcement.

Conclusion

The FHWA has determined that the docket comments to the proposed 10-hour exemption rulemaking that describe potential enforcement and/or audit problems have merit. If time records are required only at the motor carrier's terminal, the State enforcement official, performing a roadside inspection, would be hampered in determining if the driver has exceeded the hours of service. The proposed exemption, as worded, would provide no safeguard against the motor carrier operation where the hours of service are routinely exceeded and the motor carrier routinely claims to be operating

under the 10-hour exemption. If an exemption such as the one described by the ATA was permitted, the enforcement official would have a dual problem in examining a driver's hours of service: (1) The enforcement official would be examining non-uniform time records at motor carrier terminals, and (2) would have no records to examine when performing roadside inspections.

The FHWA published an NPRM in the Federal Register on February 22, 1982 (47 FR 7702) proposing to revise the logging requirements for drivers and motor carriers. Included in the rulemaking was a proposal to withdraw the 10-hour logging exemption. No adverse comments were received.

In view of the above, the FHWA has determined that the proposed 10-hour exemption would impede the enforcement capabilities of both Federal and State agencies. Safeguards necessary to preclude certain type violations of the hours of service rules would be objectionable and burdensome to the motor carriers. Additionally, most of the motor carrier operations being conducted within a period of 10 consecutive hours may avail themselves of the 100 air-mile radius exemption from the required recordkeeping, and the optional drivers record of duty status.

Based on the review of the docket comments and conclusions, the notice of proposed rulemaking published in the Federal Register on December 15, 1980 (45 FR 82291, Docket No. MC-70-2) is hereby withdrawn.

The FHWA has determined that this document does not contain a major rule under Executive Order 12291 or a significant regulation under the regulatory policies and procedures of the Department of Transportation.

List of Subjects in 49 CFR Part 395

Highways and roads, Motor carriers—driver's hours of service, Reporting and recordkeeping requirements.

(49 U.S.C. 3102; 49 CFR 1.46 and 301.60) (Catalog of Federal Domestic Assistance Program Number 20.217, Motor Carrier Safety.)

Issued on: January 10, 1985.

Kenneth L. Pierson,
Director, Bureau of Motor Carrier Safety.

[FR Doc. 85-1248 Filed 1-15-85; 8:45 am]

BILLING CODE 4910-22-M

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 20

Migratory Bird Hunting; Guidelines on Minimum Criteria for Identification of Nontoxic Shot Zones for Waterfowl Hunting

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of draft guidelines.

SUMMARY: This notice contains a draft of specific criteria that would be used in guidelines in determining areas where ingestion of lead pellets is considered to be a significant problem and where nontoxic shot should be used by waterfowl hunters. The ingestion of spent lead pellets by waterfowl while feeding may cause sickness or death. The only nontoxic shot available on the market at this time is steel shot. An analysis would be made after the first year of implementation of these criteria to assess their effectiveness and practicality.

DATES: Comments must be submitted by February 22, 1985. When submitting comments on these guidelines please distinguish between the FWS proposal (Table 2) and the recommendations of the representatives from flyway councils (Table 1).

ADDRESS: Submit comments to Director (FWS/MBMO), U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240. Telephone 202-254-3207.

FOR FURTHER INFORMATION CONTACT: Rollin D. Sparrows, Chief, Office of Migratory Bird Management, Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240. Telephone 202-254-3267.

SUPPLEMENTARY INFORMATION: When eaten by waterfowl, spent lead pellets may have a toxic effect. The only nontoxic shot available to the hunter at this time is steel shot. As indicated in 50 CFR 20.21(j) and 50 CFR 20.108, nontoxic shot is required for hunting waterfowl in certain designated zones. Since 1976, these zones have been selected in a variety of ways; however, since 1973 no nontoxic shot zone could be implemented or enforced by the Fish and Wildlife Service (FWS) without approval of the appropriate authorities in each State affected. The restriction on use of funds by FWS has been contained in the Interior Department Appropriations Bill each year. As a consequence, the FWS has proposed additions and deletions to the

State approval

designated nontoxic shot zones for hunting waterfowl only with the approval of State authorities. The manner in which nontoxic shot zones are selected has varied by region and State and the subject has been controversial.

Current FWS actions are based primarily on the 1976 Environmental Impact Statement (EIS) on steel shot for waterfowl hunting and resulting policies established by the Secretary. The main features are:

1. That lead poisoning of waterfowl should be alleviated wherever it is determined to be a significant problem;

2. States will be provided maximum opportunity to determine the most appropriate application of nontoxic shot zones within their boundaries;

3. FWS will advise and assist the States with recommendations and guidelines to the maximum extent possible; and

4. Use of nontoxic shot on national wildlife refuges and other lands under direct Service jurisdiction will be based on (a) clear evidence that a lead poisoning problem in waterfowl exists in or near the area where waterfowl hunting will take place; or (b) the State wildlife agency requests that FWS lands be included in a nontoxic shot zone established and enforced by the State.

Officials of the Department of the Interior have heard from many interested organizations, States, and individuals concerning the nature, extent, and significance of lead poisoning of waterfowl. Through these discussions it has become clear that States, flyway councils, private organizations, and individuals are seeking greater participation from the FWS in addressing this subject.

On September 25, 1984, the FWS published in the Federal Register a Notice of Intent (49 FR 37672). That Notice solicited comments and recommendations from interested parties as to the specific criteria that should be proposed as guidelines in selecting nontoxic shot zones within the four administrative flyways used in managing the waterfowl resource. Comments were received until October 30, 1984. Thirty-one State wildlife agencies and the four administrative flyway councils offered recommendations on the subject. Seventeen private organizations and twenty-eight individuals submitted suggestions.

After consultations between FWS and a group of State wildlife agency Directors representing each of the four flyway councils, it became apparent that there was no consensus among the administrative flyways regarding

national criteria. Members of one flyway had developed criteria that were preferred by that flyway but were not acceptable to the other three flyways. The various minimum criteria preferred by representatives of the four flyway councils are displayed in Table 1.

Following a review of information on this subject, an analysis of the suggestions provided through public comment, and the criteria recommended by representatives of flyway councils, the FWS has developed a proposal which provides guidance in making decisions on the use of nontoxic shot. This proposal is outlined in Table 2.

The FWS does not imply by this proposal that States with areas not meeting these criteria should be prohibited from nontoxic shot. Individual States or flyways may determine for their own management purposes that the use of lead shot in waterfowl feeding areas in any degree should be prohibited. The FWS will continue to honor States' requests to establish nontoxic shot zones in areas not meeting established minimum Federal criteria.

Table 1 shows the minimum criteria developed by representatives of the four flyway councils and outlines the steps to be taken to determine whether nontoxic shot should be required for hunting waterfowl at a particular location. These procedures would help identify areas where the ingestion of spent lead pellets by ducks, geese, swans, or coots (*Fulica americana*) is considered a significant problem.

Procedures Proposed by Representatives From the Four Flyway Councils

Two levels of criteria are established by the procedures outlined in Table 1: triggering criteria and decision criteria.

1. **Triggering Criteria** identify counties or other designated areas as having a potential for a significant lead poisoning problem in waterfowl. Designated areas are specific units of waterfowl habitat within a county or within several counties, as identified by the State.

A county or designated area will be triggered if it meets either of the criteria below.

- A. **Harvest per square mile**—Counties or other designated areas with a 3-year average annual harvest of 5 ducks and/or geese per square mile would be triggered in the Atlantic, Mississippi, and Central Flyways. This criterion would account for areas where 82 percent of the waterfowl harvest occurs if applied nationwide. As shown in Table 1, the Pacific Flyway criteria differ from those of the other three flyways.

- B. **Number of dead waterfowl diagnosed as dying from lead poisoning**—Counties or designated areas where one or more dead waterfowl were diagnosed to have died from lead poisoning would be identified for further monitoring or proposed as a nontoxic shot zone.

Representatives from three flyways generally felt that once a county or area meets the triggering criteria it should automatically be proposed as a nontoxic shot zone, unless the State notifies the FWS that a monitoring program will be implemented and decision criteria measured. Since others felt that triggering criteria alone do not provide sufficient information to make a determination of whether or not there is a lead poisoning problem in a given area, decision criteria were developed to provide a means for monitoring and validating the existence of a problem within areas identified by the triggering criteria.

- ii. **Decision Criteria**—Criteria used to determine whether or not a significant lead poisoning problem exists in areas meeting either of the triggering criteria.

Four decision criteria are identified in Table 1. A county or area identified by either one of the triggering criteria must then be monitored for at least two of the decision criteria, except in the Pacific Flyway where the decision is based essentially upon the number of dead birds diagnosed as having died from lead poisoning.

Implementation of the triggering and decision criteria as presented in Table 1 could involve large commitments of money and manpower in some States if all triggered counties or areas are monitored. For example, some 840 counties throughout the United States would be triggered at a level of 5 ducks and/or geese harvested per square mile. Some additional counties or areas also may be triggered by the finding of only one dead bird diagnosed as having died from lead poisoning.

Because of the costs and personnel required to monitor areas for the decision criteria, the FWS believes that somewhat less encompassing triggering criteria should be used initially, which would ensure that most areas with potential for a problem will be included.

The following proposal was developed by the FWS and is outlined in Table 2.

Procedures Proposed by FWS Triggering Criteria

A county or area would be triggered if it met either of the two criteria below.

- Harvest per square mile**—The FWS proposes that a harvest level of 10 ducks

and/or geese per square mile be used as this criterion. This would reduce the potential workload and expense imposed upon the States and the Federal government. At a harvest level of 10 birds per square mile, 466 counties would be triggered and the area would be covered when 67 percent of the waterfowl harvest of the United States occurs. By imposing slightly higher harvest levels than those set forth in Table 1, the FWS believes that it will be utilizing more reasonable data in triggering areas to be monitored.

The FWS recognizes that all or a portion of some of these counties are already in nontoxic shot zones. Thus, the number of counties or areas to be monitored would be reduced accordingly.

Number of dead waterfowl diagnosed as having died from lead poisoning— The FWS proposes that this criterion be three dead waterfowl rather than one. The FWS feels that this number is more likely to be representative of a significant problem in that location, since it is therefore likely that the birds picked up the lead in the area where they died. Not only will this focus future efforts on areas where problems are most likely to exist, it will significantly reduce the initial costs associated with monitoring as required under Decision Criteria discussed below.

Decision Criteria

One or more ingested shot in five percent or more of the gizzards examined, 2 ppm lead in five percent or more of the liver tissues sampled (wet weight), and 0.2 ppm lead in five percent or more of the blood samples drawn from hunter-killed or live-trapped waterfowl would serve as decision criteria. An area identified by either of the triggering criteria would then be monitored for ingested shot, and at least one of the other two decision criteria. Gizzard samples would have to be a

part of the monitoring process since shot incidence in gizzards indicates that lead found in tissues and blood is probably from ingested lead shot. The other criterion monitored would be either lead levels in the liver or in blood. Elevated lead in either of these is evidence that birds have been exposed to some type of lead and that lead has been assimilated. When analyzed in combination with the incidence of shot in gizzards, it provides a basis for making decisions on the source and extent of lead poisoning within a given area. A sample size of 100 birds would be required.

Any area meeting the gizzard criterion plus either the liver or blood criterion would be proposed as a nontoxic shot zone.

States must make a commitment to monitor the decision criteria within 90 days of determining that a triggering criterion has been met. They must also advise that monitoring will begin within 1 year. If a State cannot meet that commitment, a schedule for monitoring decision criteria should be submitted to the FWS for approval by the Director. This would enable those States with a large number of areas triggered initially to establish priorities and develop a systematic approach to monitoring, since it may not be practical to monitor all areas the first year. If a State determines that areas covered by triggering criteria should be designated nontoxic shot zones without additional monitoring, FWS will propose an amendment of 50 CFR 21.103 consistent with the State's recommendations to include these areas in nontoxic shot zones.

If monitoring reveals that the decision criteria are not met, a county or designated area would be considered not to have a lead poisoning problem unless, at a subsequent date, three or more dead waterfowl confirmed as lead poisoned are reported from the area, in which event monitoring would be

reinstated. The State may, however, decide to remonitor the county or area for a second successive year or to reschedule it for monitoring at some point in the future when all other counties or areas that have met a triggering criterion have been checked.

Once a State has completed monitoring or other appropriate action on areas with a harvest of 10 ducks and/or geese per square mile, it would be free to monitor areas with lower harvest levels. If at any time, three or more dead waterfowl are reported from a county or other area that has no nontoxic shot zone, it would have to be monitored or included in the State's schedule of areas to be monitored.

In the opinion of FWS, the proposal presented in Table 2 represents a sound approach to area designations within flyways of States. Further, this proposal covers those areas where serious lead poisoning of waterfowl from ingested shot is most likely to occur.

It should be recognized that State wildlife authorities have the authority to require nontoxic shot on any additional areas where they determine that a problem exist by means other than these criteria. It is our desire, however, to establish a set of minimum criteria that are reasonably uniform, scientifically determined, and practical to implement.

*Scheduled review of criteria—*The FWS proposes to analyze the effectiveness and practicality of these procedures after the first year of implementation. At such time, States will be notified and appropriate announcements made in the Federal Register to obtain the benefit of State and public comment for use in this analysis.

Dated: January 10, 1985.

Rolf L. Wallenstrom,
Acting Director.
BILLING CODE 4310-55-M

1. Minimum Criteria or Guidelines for Establishing Nontoxic Shot Zones Based Upon Comments Received From State Wildlife Agencies Directing Representatives of Each Flyway Council

CRITERIA	FLYWAY			
	Atlantic	Mississippi	Central	Pacific
I. Triggering Criteria 1/				
Harvest (by county, per sq. mi. or other designated area as jointly agreed by State and FWS; harvest levels noted are based on a 3-year running average from FWS data)	5 ducks and geese/sq. mi. or +1% State Harvest within area	5 ducks and geese/sq. mi.	5 ducks and geese/sq. mi.	5 ducks and geese/sq. mi.
Dead waterfowl (from confirmed lead poisoning)	1	1	1	1
II. Decision Criteria 2/				
Gizzard (ingested shot)	5% w/1 shot	5% w/1 shot	5% w/1 shot	—
Liver (lead content)	8% w/2 ppm	5% w/2 ppm	5% w/2 ppm	3/
Blood (lead content)	8% w/0.2 ppm	5% w/0.2 ppm	5% w/0.2 ppm	—
Dead waterfowl (from confirmed lead poisoning)				100 (abitat management option retained) 2/
III. Other Conditions				
Sample size (species known to be susceptible to lead poisoning) 3/	100 (hunter killed or trapped)	100 (hunter killed or trapped)	100 (hunter killed or trapped)	500 confirmed lead poisoned waterfowl
Period of Sample	A four week period of time during the latest part of the hunting season, weather permitting, beginning the 1963-64 season.			

- 1/ In areas where any of the triggering criteria are met, the following will occur. 1) If a State does not choose to monitor the area it will be included in the next FWS rulemaking to require nontoxic shot in the subsequent hunting season. 2) If a State does not choose to monitor an area, the State must notify the Director within 90 days of that intention.
- 2/ Any area meeting two of the decision criteria will be proposed for nontoxic shot.
- 3/ To Be Determined.
- 4/ Pacific Flyway includes management options to reduce lead poisoning before implementing nontoxic shot.
- 5/ Applies only to decision criteria, except in Pacific Flyway, where it also applies to triggering criteria.

Table 2. FWS Proposed Minimum Criteria or Guidelines for Establishing Nontoxic Shot Zones

CRITERIA	FLYWAY			
	Atlantic	Mississippi	Central	Pacific
I. Triggering Criteria 1/				
Harvest (by county, per sq. mi. or other designated area as jointly agreed by State and FWS; harvest estimate based on most recent 3-year average from FWS data)	10 or more ducks and geese/sq. mi.	10 or more ducks and geese/sq. mi.	10 or more ducks and geese/sq. mi.	10 or more ducks and geese/sq. mi.
Dead waterfowl (individual specimens, confirmed as lead poisoned)	3	3	3	3
II. Decision Criteria 2/				
Gizzard (ingested shot)	1 or more shot in 5%	1 or more shot in 5%	1 or more shot in 5%	1 or more shot in 5%
Liver (lead content)	2 ppm wet weight in 5%	2 ppm wet weight in 5%	2 ppm wet weight in 5%	2 ppm wet weight in 5%
Blood (lead content)	0.2 ppm in 5%	0.2 ppm in 5%	0.2 ppm in 5%	0.2 ppm in 5%
III. Other Conditions				
Sample size (species known to be susceptible to lead poisoning) 3/	100 (hunter killed or trapped)	100 (hunter killed or trapped)	100 (hunter killed or trapped)	100 (hunter killed or trapped)
Sampling procedures 4/	Most susceptible species only	Most susceptible species only	Most susceptible species only	Most susceptible species only

- 1/ In areas where one or more of the triggering criteria are met, a State must monitor the gizzard criterion and either one of the other two decision criteria. Within 90 days of making a determination that any triggering criterion has been met, the State must provide the FWS with either a commitment to monitor the area within 1 year or submit a proposed schedule for monitoring to begin within one year for approval by the Director.
- 2/ Any area meeting two of the decision criteria will be proposed for nontoxic shot.
- 3/ Applies only to decision criteria.
- 4/ Specimens can be collected by shooting or trapping. No more than 25% of a hunter-killed sample should occur in the first week of the hunting season. At least 50% of a sample of hunter-killed birds should occur in the last half of the waterfowl season.

Any person for his own use may possess, transport, ship, import, and export without a permit the feathers and skins of lawfully taken migratory game birds.

Subpart K—Annual Seasons, Limits, and Shooting Hours Schedules

§ 20.100 General provisions.

(a) The taking, possession, transportation, and other uses of migratory game birds by hunters is generally prohibited unless it is specifically provided for under regulations developed in accordance with the Migratory Bird Treaty Act. Consequently, hunting is prohibited unless regulatory schedules are established for seasons, daily bag and possession limits, and shooting (or harvesting) hours. Migratory game bird population levels, including production and habitat conditions, vary annually. These conditions differ over North America, and within the United States, by flyways, States, and frequently areas within States. Thus, it is necessary to make annual adjustments in the schedules to limit the harvests of migratory game birds to permissible levels.

(b) The development of these schedules involves annual data gathering programs to determine migratory game bird population status and trends, evaluations of habitat conditions, harvest information, and other factors having a bearing on the anticipated size of the fall flights of these birds. The proposed hunting schedules are announced early in the spring, and following consideration of additional information as it becomes available, as well as public comment, they are modified and published as supplemental proposals. These are also open to public comment. Public hearings are held for the purpose of providing additional opportunity for public participation in the rulemaking process.

(16 U.S.C. 701-708h)
[44 FR 7147, Feb. 6, 1979]

Seasons, limits, and shooting hours for Puerto Rico and the Virgin Islands.

This section provides for the annual hunting of certain doves, pigeons, ducks, coots, gallinules, and snipe in Puerto Rico; and for certain doves and pigeons in the Virgin Islands.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7147, Feb. 6, 1979]

§ 20.102 Seasons, limits, and shooting hours for Alaska.

This section provides for the annual hunting of certain waterfowl (ducks, geese, and brant), snipe, and sandhill cranes in Alaska.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7147, Feb. 6, 1979]

§ 20.103 Seasons, limits, and shooting hours for mourning and white-winged doves and wild pigeons.

This section provides for the annual hunting of certain doves and pigeons in the 48 contiguous United States. The mourning dove hunting regulations are arranged by the Eastern, Central, and Western Management Units.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7147, Feb. 6, 1979]

§ 20.104 Seasons, limits, and shooting hours for rails, woodcock, and common (Wilson's) snipe.

This section provides for the annual hunting of certain rails, woodcock, and snipe in the 48 contiguous United States.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7148, Feb. 6, 1979]

§ 20.105 Seasons, limits, and shooting hours for waterfowl, coots, and gallinules.

This section provides for the annual hunting of certain waterfowl (ducks, geese, brant), coots, and gallinules in the 48 contiguous United States. The regulations are arranged by the Atlantic, Mississippi, Central, and Pacific Flyways. These regulations often vary within flyways or States, and by time periods.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7148, Feb. 6, 1979]

§ 20.106 Seasons, limits, and shooting hours for sandhill cranes.

This section provides for the annual hunting of sandhill cranes in designated portions of the Central Flyway.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7148, Feb. 6, 1979]

§ 20.107 Seasons, limits, and shooting hours for whistling swans.

This section provides for the annual hunting of whistling swans in Utah and designated areas in Montana and Nevada.

NOTE: For FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

(16 U.S.C. 701-708h)
[44 FR 7148, Feb. 6, 1979]

§ 20.108 Non-toxic shot zones.

The areas described within the States indicated below are designated for the purpose of § 20.21(j) as non-toxic shot zones for waterfowl hunting.

Connecticut

1. That portion of New Haven and Fairfield Counties bounded by a line beginning at the north end of the breakwater at Milford Point extending south to Stratford Point, north along Prospect Drive and Route 113 to Interstate 95, easterly along I-95 to Naugatuck Avenue, southerly along Naugatuck Avenue and Milford Point Road and continuing along a line extending from the end of Milford Point Road to the north end of the breakwater at Milford Point.

2. That portion of New Haven County along the Quinnipiac River known as the Quinnipiac Meadows beginning at the intersection of Sackett Point Road and I-91, extending south along I-91 to Route 5, northerly along Route 5 to Sackett Point Road, and easterly along Sackett Point Road to I-91.

Delaware

All lakes, ponds, marshes, swamps, bays, rivers, and streams or within 150 yards thereof within the boundaries of the following areas:

1. Chesapeake and Delaware Canal State Wildlife Area.
2. Augustine State Wildlife Area.
3. Woodland Beach State Wildlife Area.
4. Little Creek State Wildlife Area.
5. Prime Hook State Wildlife Area.
6. Bombay Hook National Wildlife Refuge.
7. Prime Hook National Wildlife Refuge.
8. Cape Henlopen and Delaware Seashores State Parks and Assawoman and Gordon's Pond Wildlife Areas.

Florida

That portion of Brevard County lying east of Interstate Highway 95; Osceola, Broward, and Dade Counties; Leon County (exclusive of Lake Talquin and the Ochlockonee River); Lake Miccosukee in Leon and Jefferson Counties; Orange Lake and Lochloosa Lake in Alachua County; the area lying lakeward of, and bounded by the Lake Okeechobee levee, by the State Road 78, Kissimmee River bridge, and by State Road 73 from its intersections with the Lake Okeechobee levee at points near Lakeport and the Old Sportsman's Village site; all of the Occidental phosphate mine pits east of SR 137, Black Still Road and Christie Tower Road, west of SR 135, south of SR 6 and north of White Springs (all located in Township 1 north, Ranges 15 and 16 east, and Township 1 south, Ranges 15 and 16 east, in Hamilton County).

the Kennebec River known as Merrymeeting Bay bounded as follows: from the high tension wires at Chops Point to the first dam on the Androscoggin River, to the first road bridge on the M. Hathance, Abbagasset, and Easterners and the Richmond-Dresden Bridge on the Kennebec River, and within a 150-yard zone of land adjacent to the margins of these waters in the counties of Cumberland, Sagadahoc and Lincoln.

Massachusetts

Essex County: North Boundary—Massachusetts—New Hampshire lines (in the town of Salisbury); *West Boundary*—U.S. Route 1 (in Salisbury) from the State line southward to the Parker River; *South Boundary*—the Parker River and lands 150 yards south of the south bank of the Parker River; *East Boundary*—the Atlantic Ocean and the boundaries of the Parker River National Wildlife Refuge.

Also, the Parker River National Wildlife Refuge and Plum Island, including Plum Island State Park.

Plymouth County: Waters of the Ware, Merrimack and Wewantic Rivers in the towns of Amesbury, Merrimack and Marion and the marshes adjacent to these rivers and within a 150 yard zone of land adjacent to these rivers and marshes, seaward from the first upstream bridge.

New Jersey

That portion of the State bounded on the north by the Shark River, on the west by the Garden State Parkway, on the south by the Cape May Canal, and on the east by the Atlantic Ocean.

New York

All waters (including bays, lakes, ponds, marshes, swamps, rivers, streams, and ocean waters but not including temporary or sheet water) and all land areas within 150 yards of all waters of the following portions of New York:

West of Interstate Highway 81 and east of the New York State Thruway (Interstate Highway 90) with the following exceptions: waters of Lake Ontario, outside the barrier bench, from Tibbets Point in Jefferson County to the mouth of the Niagara River in Niagara County and the waters of the Niagara River from its mouth in Niagara County upstream to the Peace Bridge in the City of Buffalo are excluded from the non-toxic shot requirement. However, this exclusion does not include the Henderson Bay-Black River Bay area which shall continue to require non-toxic shot. The Henderson Bay-Black River Bay area is described as the area east of a line running from Snowshoe Point on Henderson Harbor

the Pillar Point Peninsula.

2. In those portions of Nassau County bounded on the south by the Long Island shoreline from the Wantagh Parkway west to the Nassau County-New York City line; on the west by the Nassau County-New York City line northward from the Lone Island shoreline to the Sunrise Highway (Route 27); on the north by the Sunrise Highway (Route 27) eastward to its junction with the Wantagh Parkway; on the east by the Wantagh Parkway southward to the Long Island shoreline.

3. An area including and adjacent to Oneida Lake bounded on the north by route 49, on the east by route 13, on the south by route 31 and on the west by Interstate route 81.

4. Wilson Hill Wildlife Management area in St. Lawrence County.

5. Upper and Lower Lakes Wildlife Management area in St. Lawrence County.

6. An area including and adjacent to the Hudson River bounded on the north by the New York State Thruway (Interstate Highway 90); on the east by route 9J from the New York Thruway south to its junction with route 9, south along route 9 to its junction with route 9G in the city of Hudson, then south along route 9G to route 199; on the south by route 199; on the west by route 32 from route 199 north to its junction with route 9W, then north along route 9W to route 385, then along route 385 to Lawrence Street in Cossackie then along Lawrence Street to Nubbell Street, along Nubbell Street to county road 61, then north along county road 61 to route 144, then along route 144 to the New York State Thruway (Interstate 90).

North Carolina

All waters (including sounds, lakes, ponds, marshes, swamps, rivers, and streams) of Currituck, Dare, and Pamlico Counties and within a 150-yard zone of land in these counties adjacent to the margins of such waters. Drainage ditches and temporary sheet water more than 150 yards from the waters described above are excluded from the steel shot requirement.

Pennsylvania

Crawford County, Middle Creek Wildlife Management Area in Lancaster and Lebanon Counties, and the waters of the Susquehanna River beginning at the confluence of the North and West branches at Northumberland and continuing southward to the Maryland-Pennsylvania State boundary and including a 25-yard zone of land adjacent to the waters of the Susquehanna River that are described above.

That portion of Washington County lying south and east of U.S. Route 1 but excluding Block Island and the waters of Block Island Sound and Narragansett Bay.

South Carolina

Georgetown, Colleton, Charleston, and Beaufort Counties.

Virginia

All waters and a 150-yard zone of land adjacent to these waters in the City of Virginia Beach and in an area between the York River and the James River bounded on the north by U.S. Highway 60, on the west by Highway 155, and on the south by Highway 5.

MISSISSIPPI FLYWAY

Illinois

Oakwood Bottoms Greentree Reservoir, Rice Lake Public Hunting Area, Union County Public Hunting Area, Horseshoe Lake, Rend Lake and related subimpoundments and all adjacent lands managed by the U.S. Army Corps of Engineers and the Illinois Department of Conservation.

Indiana

1. On all waters of Lake, Porter, LaPorte, Newton, Jasper, Starke, Elkhart, Kosciusko, LaGrange, Steuben, and Posey Counties and within 150-yard zone of land in these counties adjacent to the margins of these waters. This include lakes, ponds, marshes, swamps, rivers, streams, and seasonally flooded areas of all types. Excluded from these provisions are the waters of Lake Michigan and drainage ditches and temporary sheet water that are more than 150 yards from the waters described above.

2. Within the boundaries of the following State-owned or State-operated properties: Jasper-Pulaski Fish and Wildlife Area in Pulaski County, Mallard Roost Wetland Conservation Area in Noble County, Monroe Reservoir in Monroe and Brown Counties, and Glendale Fish and Wildlife Area in Daviess County, and the Tri-County Fish and Wildlife Area in Noble and Kosciusko Counties.

3. Within the proposed boundaries of the Menominee Wetlands Conservation Area in Marshall County.

Iowa

1. In Fremont and Mills Counties on all waters and a 150-yard zone of land in these two counties adjacent to waters. The waters referred to above include lakes, ponds, marshes, swamps, rivers, streams, and seasonally flooded areas of all types. Excluded from these provisions are the waters of the

temporary sheet water that are more than 150 yards from the waters described above.

2. All waters and a 150 yard zone of land adjacent to these waters on the following public hunting areas under the jurisdiction of the State Conservation Commission:

Sweet Marsh in Bremer County
Big Marsh in Butler County
Green Island Area in Jackson County
Princeton Area in Scott County

Ohio

The Maumee River in Wood county and on all waters of Erie, Ottawa, Sandusky, Cuyahoga, Wayne, Holmes, and Lucas Counties and when hunting waterfowl within a 150-yard zone of land adjacent to the margins of these waters. These waters mentioned in this paragraph include lakes, ponds, marshes, swamps, rivers, streams, and seasonally flooded areas of all types. Drainage ditches and temporary sheet water more than 150 yards from the water areas described in this paragraph are excluded from the nontoxic shot requirements.

Michigan

A. Eastern Upper Peninsula

1. That area of Chippewa County encompassed by a line from the tip of Conley's Point (Section 4, T44N R2E) southeasterly to the tip of Winter Point (Section 14, T44N R2E) to the tip of Rocky Point (Section 25, T44N R2E); then south on Rocky Point Road and west on Gogomain Road to the Town of Pickford; north on M-129 to the junction with 15-Mile Road (Section 19, T45N R1E); to the Village of Neebish; then south on the paved road from Neebish (Scenic Drive) to the point of beginning at Conley's Point.

2. The waters of Potagannissing Flooding on Drummond Island.

B. Houghton Lake

That area of water and land encompassing Houghton Lake, Roscommon County, described by road boundaries as follows: south of Meads Landing Road, County 300 and County 100; west of M-18; north of M-55; and east of US-27.

C. Saginaw Bay

1. That area of Arenac, Bay, Tuscola, and Huron counties south of US-23; east of M-13; north of M-25; south of Crescent Beach Road (Caseville Township, Huron County); and southwest of a line from the tip of Sand Point (Section 11, T17N R9E, Huron County) to Point Lookout (Section 13, T19N R7E, Arenac County) and Shore Road (Sims Township, Arenac County).

- Federal management areas.
- a. Crow Island State Game Area--Bay and Saginaw counties.
 - b. Shiawassee River State Game Area--Saginaw County.
 - c. Shiawassee National Wildlife Refuge--Saginaw County.

D. Southern Michigan

1. That area of Jackson County north of I-94 and east of M-106; Ingham County (east of M-106/M-52 and south of M-36); Livingston County (south of M-36, east of M-155, and south of M-59); Oakland County (south of M-59, west of US-24 (Telegraph Road), north of I-96, and west of I-275); Wayne County (west of I-275 and north of M-14); Washtenaw County (north of M-14 and I-94); and St. Clair, Macomb, Wayne and Monroe counties east of I-94 and I-75 including the U.S. waters of the St. Clair River, Lake St. Clair, and Detroit River, and Lake Erie.

On all lands and waters within the posted boundaries of the U.S. Fish and Wildlife Service Waterfowl Production Area located in Section 6, T3S R2E of Cass Lake Township, Jackson County.

E. Southern Michigan

1. Muskegon, Charlevoix, Allegan and Kalamazoo counties, including Lake Michigan lakeward for one-half mile from the shore. All county boundary waters and lakes partially within a non-toxic shot zone are totally included.

2. All lands and waters within the posted boundary of the Muskegon County Wastewater System, Muskegon County.

Minnesota

1. All State Wildlife Management Areas and all Federal Waterfowl Production Areas.

2. On the waters on Swan and Middle Lakes in Nicollet County, North and South Union Lakes in Jackson County, Pelican Lake in Wright County, Bear Lake in Freeborn County, and Christina Lake in Douglas and Grant Counties and within a 150-yard zone of land adjacent to the margins of the above lakes.

3. Beginning at the intersection of the midline of the Mississippi River and U.S. Highway 61 at Hastings, thence southerly along U.S. Highway 61 to U.S. Highway 16 at LaCrescent, thence southerly along U.S. Highway 16 to State Trunk Highway 26, thence southerly along State Trunk Highway 26 to the southern boundary of the State; thence along the southern and eastern boundaries of the State to the confluence of the St. Croix and Mississippi Rivers.

4. *Lac qui Parle Zone*: Beginning at the intersection of U.S. Highway 212 and County State Aid Highway (CSAH) 27, Lac qui Parle County; thence along CSAH 27 to CSAH 20, Lac qui Parle County, thence along CSAH 20 to State Trunk Highway (STH) 40; thence along STH 40 to STH 119; thence along STH 119 to CSAH 34, Lac qui Parle County; thence along CSAH 34 to CSAH 19, Lac qui Parle County; thence along CSAH 19 to CSAH 38, Lac qui Parle County; thence along CSAH 38 to U.S. Highway 75; thence along U.S. Highway 75 to STH 7; thence along STH 7 to CSAH 6, Swift County; thence along CSAH 6 to County Road 65, Swift County; thence along County Road 65 to County Road 34, Chippewa County; thence along County Road 34 to CSAH 12, Chippewa County; thence along CSAH 12 to CSAH 9, Chippewa County; thence along CSAH 9 to STH 7; thence along STH 7 to Montevideo; thence along the municipal boundary of Montevideo to U.S. Highway 212; thence along U.S. Highway 212 to the point of beginning.

Missouri

Montrose Wildlife Management Area, Duck Creek Wildlife Management Area, Schell-Osage Wildlife Management Area, Fountain Grove Wildlife Management Area, Ted Shanks Wildlife Management Area, Marais Temps Clair Wildlife Management Area, Otter Slough Wildlife Management Area, and those parts of the Swan Lake and Mingo National Wildlife Refuges in which hunting of waterfowl is authorized.

Wisconsin

1. In that portion of the State lying west of the Burlington Northern Railway in Pierce, Pepin, Buffalo, Trempealeau, La Crosse, Vernon, Crawford and Grant Counties and all signed federal lands lying east of such railway in these same counties.

2. On all waters in the counties of Calumet, Columbia, Dodge, Fond du Lac, Green Lake, Jefferson, Manitowoc, Marquette, Milwaukee, Outagamie, Ozaukee, Racine, Sheboygan, Walworth, Waukesha, Winnebago, Washington, Waupaca and those portions of Oconto and Marinette Counties east of U.S. Highway 41, and that portion of Brown County lying northwest of the Fox River and east of U.S. Highway 141, and the Brown County islands in Green Bay and within a 150-yard zone of land adjacent to the margins of these waters, except that in the Horizon and Central goose management zones, non-toxic shot will be required for all waterfowl hunting. The waters referred to above include lakes, ponds, marshes, swamps, rivers, streams and seasonally

river to the point of beginning.

3. On any State wildlife area within the zones described in (2), steel shot is required for hunting waterfowl anywhere on State-owned lands or waters within the boundaries of said wildlife area and on the following State-owned wildlife areas which are not within the zones described in (2): Mead Wildlife Area in Marathon, Wood and Portage Counties, Wood County Wildlife Area and Sandhill Wildlife Area in Wood County, Meadow Valley Wildlife Area in Juneau and Monroe Counties.

CENTRAL FLYWAY

Kansas

Barton County: The Cheyenne Bottoms Wildlife Area except the south 200 yards west of U.S. 156 and east of the north-south centerline of S36, T18S, R13W in Barton County and that area west of U.S. 281 commonly known as the inlet canal.

Linn County: All of the Marais des Cygnes Wildlife Areas.

Montgomery County: All of the Elk City Reservoir and Wildlife Area including all lands and waters managed by the U.S. Corps of Engineers and the Kansas Forestry, Fish and Game Commission.

Neosho County: All of the Neosho Wildlife Area.

Reno County: All of the Cheney Reservoir and Wildlife Area including all lands managed by the U.S. Bureau of Reclamation and the Kansas Forestry, Fish and Game Commission. Also, that portion of Quivira National Wildlife Refuge in Reno County.

Stafford County: That portion of the Quivira National Wildlife Refuge in Stafford County.

Rice County: That portion of the Quivira National Wildlife Refuge in Rice County.

Nebraska

Clay and Fillmore Counties and in Kearney and Phelps Counties except on the waters of the Platte River.

New Mexico

That area bounded by a line beginning at the junction of U.S. Highway 60 and Interstate Highway 25 and running south along Interstate 25 approximately 13.5 miles to the San Acacia overpass; thence east along a paved and dirt road to the west bank of the Rio Grande at the San Acacia diversion; thence northeast along the west bank of the Rio Grande to U.S. Highway 60; thence west

along U.S. Highway 60 to its junction with Interstate Highway 25.

Texas

That area lying within boundaries beginning at the Louisiana State line, thence westward along IH 10 to the junction of U.S. Highway 90 and IH 10 to Beaumont, thence westward along U.S. 90 to its junction with IH 610 in Houston, thence north and west along IH 610 to its junction with U.S. Highway 290 in Houston, thence westward along U.S. Highway 290 to its junction with State Highway 159 in Hempstead, thence southwestward along State Highway 159 to its junction with State Highway 36 in Bellville, thence eastward along State Highway 36 to its junction with FM 2429, thence southward along FM 2429 to its junction with FM 949, thence southwestward along FM 949 to its junction with IH 10, thence westward along IH 10 to its junction with U.S. Highway 77 at Schulenburg, thence southward along U.S. Highway 77 to its junction with the U.S.-Mexico international boundary at Brownsville, thence eastward along the U.S.-Mexico international boundary to the Gulf of Mexico, thence east and seaward to the three marine league limit, thence northeastward along the three marine league limit to the Louisiana State line, thence northward along the Texas-Louisiana State line to its junction with IH 10.

PACIFIC FLYWAY

Oregon

Sauvie Island Wildlife Management Area.

Washington

1. Beginning at Interstate 5 and Highway 20 at Burlington, thence easterly along Highway 20 to Highway 9 at Sedro Woolley; thence southerly along Highway 9 to Highway 538 at Big Rock; thence westerly along Highway 538 to Mt. Vernon and Interstate 5; thence northerly along Interstate 5 to the point of origin.

(40 Stat. 755; 16 U.S.C. 703 et seq.)

[46 FR 40881, Aug. 13, 1981, as amended at 48 FR 26458, June 2, 1983]

\$20,109 Extended seasons, limits, and hours for taking migratory game birds by falconry.

This section provides annual regulations by which falconers may take permitted migratory game birds.

NOTE: FOR FEDERAL REGISTER citations affecting annual regulatory schedules for this section, see *List of CFR Sections Affected*.

"Closed season" means the days on which migratory game birds shall not be taken.

"Daily bag limit" means the maximum number of migratory game birds permitted to be taken by one person in any one day during the open season in any one specified geographic area for which a daily bag limit is prescribed.

"Aggregate daily bag limit" means the maximum number of migratory game birds permitted to be taken by one person in any one day during the open season when such person hunts in more than one specified geographic area for which a daily bag limit is prescribed. The aggregate daily bag limit is equal to, but shall not exceed, the largest daily bag limit prescribed for any one of the specified geographic areas in which taking occurs.

"Possession limit" means the maximum number of migratory game birds permitted to be possessed by any one person when lawfully taken in the United States in any one specified geographic area for which a possession limit is prescribed.

"Aggregate possession limit" means the maximum number of migratory game birds taken in the United States, permitted to be possessed by any one person when taking and possession occurs in more than one specified geographic area for which a possession limit is prescribed. The aggregate possession limit is equal to, but shall not exceed, the largest possession limit prescribed for any one of the specified geographic areas in which taking and possession occurs.

"Personal abode" means one's principal or ordinary home or dwelling place, as distinguished from his temporary or transient place of abode or dwelling such as a hunting club, or any club house, cabin, tent, or trailer house used as a hunting club, or any hotel, motel, or rooming house used during a hunting, pleasure, or business trip.

"Migratory bird preservation facility" means:

(i) Any person who, at his residence or place of business and for hire or other consideration; or

(ii) Any taxidermist, cold-storage facility, or locker plant which, for hire or other consideration; or

(iii) Any hunting club which, in the normal course of operations; receives, possesses, or has in custody any migratory game birds belong to another person for purposes of picking, cleaning, freezing, processing, storage, or shipment.

"Paraplegic" means an individual afflicted with paralysis of the lower half of the body with involvement of both legs usually due to disease of or injury to the spinal cord.

[38 FR 22021, Aug. 15, 1973, as amended at 38 FR 23312, Aug. 29, 1973; 41 FR 31536, July 29, 1976; 42 FR 39667, Aug. 5, 1977; 45 FR 70275, Oct. 23, 1980]

Subpart C—Taking

§ 20.21 Hunting methods.

Migratory birds on which open seasons are prescribed in this part may be taken by any method except those prohibited in this section. No person shall take migratory game birds:

(a) With a trap, snare, net, crossbow, rifle, pistol, swivel gun, shotgun larger than 10 gauge, punt gun, battery gun, machinegun, fish hook, poison, drug, explosive, or stupefying substance;

(b) With a shotgun of any description capable of holding more than three shells, unless it is plugged with a one-piece filler, incapable of removal without disassembling the gun, so its total capacity does not exceed three shells;

(c) From or by means, aid, or use of a sinkbox or any other type of low floating device, having a depression affording the hunter a means of concealment beneath the surface of the water;

(d) From or by means, aid, or use of any motor vehicle, motor-driven land conveyance, or aircraft of any kind, except that paraplegics and persons missing one or both legs may take from any stationary motor vehicle or stationary motor-driven land conveyance;

(e) From or by means of any motorboat or other craft having a motor attached, or any sailboat, unless the motor has been completely shut off and/or the sails furled, and its progress therefrom has ceased: *Provided*, That a craft under power may be used

to retrieve dead or crippled birds; however, crippled birds may not be shot from such craft under power except in the seaduck area as permitted in Subpart K of this part;

(f) By the use or aid of live birds as decoys; although not limited to, it shall be a violation of this paragraph for any person to take migratory waterfowl on an area where tame or captive live ducks or geese are present unless such birds are and have been for a period of 10 consecutive days prior to such taking, confined within an enclosure which substantially reduces the audibility of their calls and totally conceals such birds from the sight of wild migratory waterfowl;

(g) By the use or aid of recorded or electrically amplified bird calls or sounds, or recorded or electrically amplified imitations of bird calls or sounds;

(h) By means or aid of any motordriven land, water, or air conveyance, or any sailboat used for the purpose of or resulting in the concentrating, driving, rallying, or stirring up of any migratory bird;

(i) By the aid of baiting, or on or over any baited area. As used in this paragraph, "baiting" shall mean the placing, exposing, depositing, distributing, or scattering of shelled, shucked, or unshucked corn, wheat or other grain, salt, or other feed so as to constitute for such birds a lure, attraction or enticement to, on, or over any areas where hunters are attempting to take them; and "baited area" means any area where shelled, shucked, or unshucked corn, wheat or other grain, salt, or other feed whatsoever capable of luring, attracting, or enticing such birds is directly or indirectly placed, exposed, deposited, distributed, or scattered; and such area shall remain a baited area for 10 days following complete removal of all such corn, wheat or other grain, salt, or other feed. However, nothing in this paragraph shall prohibit:

(1) The taking of all migratory game birds, including waterfowl, on or over standing crops, flooded standing crops (including aquatics), flooded harvested croplands, grain crops properly shucked on the field where grown, or grains found scattered solely as the

result of normal agricultural planting or harvesting; and

(2) The taking of all migratory game birds, except waterfowl, on or over any lands where shelled, shucked, or unshucked corn, wheat or other grain, salt, or other feed has been distributed or scattered as the result of *bona fide* agricultural operations or procedures, or as a result of manipulation of a crop or other feed on the land where grown for wildlife management purposes: *Provided*, That manipulation for wildlife management purposes does not include the distributing or scattering of grain or other feed once it has been removed from or stored on the field where grown;

(j) While possessing shotshells loaded with shot other than steel shot or such shot approved as non-toxic by the Director pursuant to procedures set forth in § 20.134. *Provided*, That:

(1) This restriction applies only to the taking of ducks, geese, swans, and coots (*Fulica americana*) in areas described in § 20.108 as non-toxic shot zones; and

(2) Prior to September 1, 1980, this restriction applies only to 12-gauge shotshells.

[38 FR 22021, Aug. 15, 1973, as amended at 38 FR 22896, Aug. 27, 1973; 44 FR 2599, Jan. 12, 1979; 45 FR 70275, Oct. 23, 1980]

§ 20.22 Closed seasons.

No person shall take migratory game birds during the closed season.

§ 20.23 Shooting hours.

No person shall take migratory game birds except during the hours open to shooting as prescribed in Subpart K of this part.

[38 FR 22021, Aug. 15, 1973, as amended at 38 FR 22626, Aug. 23, 1973]

§ 20.24 Daily limit.

No person shall take in any 1 calendar day, more than the daily bag limit or aggregate daily bag limit, whichever applies.

[38 FR 22021, Aug. 15, 1973, as amended at 38 FR 22626, Aug. 23, 1973]

FACT SHEET

Waterfowl were reported dying from lead shot poisoning as early as 1874.

Studies in the early 1900's linked lead shot ingestion to waterfowl mortalities.

Between 1937 and 1957 there were 34 reported waterfowl lead poisoning die-offs, each killing between 100 to 16,000 birds.

In 1959, Bellrose estimated annual nationwide losses due to lead poisoning at two to three percent of the fall population of all waterfowl species.

Fall flights of waterfowl in recent years have ranged between 77 and 120 million ducks and four to six million geese. Based upon these current fall flight estimates between 1.5 and 3.6 million ducks and between 80,000 and 180,000 geese die annually from lead poisoning.

How does lead poisoning kill waterfowl?

Ingested pellets travel to the bird's gizzard along with food. The gizzard grinds its contents as the first step in digestion. (Tests show that a duck is capable of eroding five percent of a lead pellet in a few hours.) A pellet can be completely worn away in 20 days.

The eroded lead becomes a soluble lead salt that is picked up by the digestive system.

This causes severe anemia and dramatically limits the blood's ability to provide oxygen and nutrition to the body.

Within several days, the affected bird loses its vigor and eventually cannot fly. Food intake is reduced and the bird begins a downward health spiral that ends in death.

Weakened birds seek cover in dense vegetation and as the poisoning process continues, they become extremely emaciated and eventually die in the dense cover. Most carcasses are eaten by predators.

Such losses invariably go unnoticed by the public since the weakened birds are adept at hiding.

Does lead shot poisoning affect some predators?

A growing body of evidence indicates that our national symbol, the American bald eagle, is being decimated by lead poisoning.

Eagles are lead poisoned by consuming lead-poisoned or crippled ducks and geese.

The problem is especially severe in areas where waterfowl, hunters, and eagles concentrate in the winter.

Recent research by the U.S.F.&W.S. found that of 650 bald eagles examined, 7.2 percent died of lead poisoning. While these figures are high, they in fact probably underestimate the magnitude of the problem.

All waterfowl hunters alone deposit nearly 3,000 tons of lead in the environment each year in pursuit of the sport.

Are upland game birds affected by lead shot?

Ingestion of lead shot has been documented for bobwhite, scaled quail, pheasants and mourning doves.

Is there a serious lead poisoning problem potential in Wyoming?

During a three-year period in the late 1970's the migratory bird section examined waterfowl gizzards that were collected from various areas of the state. We found that for the most part the ingestion of lead pellets by waterfowl was not a wide-spread problem. However, this does not mean that lead shot poisoning does not exist. In some areas of the state lead shot is being deposited in the environment at fairly high annual rates. 1 Pound

For example, on the Springer Wildlife Management Unit in 1981 there were approximately 2,000 man days of recreation during the special put and take pheasant hunt. Let's assume that for each man day of recreation a total of eight shells of 1 1/8 oz. number 6 shot were fired in an attempt to get the four-bird limit (this is probably a low estimate). This means that for each man day of recreation, 1,976 lead pellets were deposited on unit lands. Therefore, the 2,000 man days expended multiplied by 1,976 lead pellets equals 3,952,000 pellets deposited on the unit annually. If you divide 3,952,000 by the number of acres on the Springer Wildlife Management Unit (1,180 acres) it appears that 3,349 pellets per acre are deposited in just one year. The special Springer pheasant hunt has been conducted for about 10 years. This means that accumulations of over 33,000 lead pellets per acre could exist on unit land. Also, it should be realized that this figure does not take into consideration lead pellets that could be deposited from waterfowl, dove and other hunting activities. Similar accumulations could exist on other wildlife management units (Ocean Lake, Sand Mesa, Yellowtail).

Studies in other states have indicated that the threshold for lead shot poisoning die-offs for waterfowl appears to be about 20,000 pellets per acre.

Non-toxic shot could eliminate the continued deposition of lead shot in the environment and decrease the potential for lead poisoning.

Does steel shot cripple more birds than lead shot?

At least 15 controlled, semi-controlled, and field shooting tests have been completed comparing crippling rates between different steel loads and lead shot loads. Results consistently demonstrate that ballistically equivalent loads of lead and steel shot produce no statistically significant differences in crippling rates.

Does steel shot damage firearms?

A series of studies conducted by the arms and ammunitions industry addressed this important question. They concluded that firing steel shot from modern American-made single-barrel shotguns with full chokes either caused no expansion or else expansion of chokes was so slight that it had no measurable effect on shooting performance.

Industry spokesmen also noted that choke expansion had been observed in guns from which only lead shot had been fired.

News Release

#83068 For immediate release
June 29, 1983

Contact: Laurie Baker Walden



Editors: The story makes reference to an eagle lead poisoning problem in the following states:

Arkansas, California, Illinois, Iowa, Kansas, Kentucky, Maryland, Missouri, Nebraska, New Mexico, Oklahoma, Oregon, Tennessee, Texas, Utah and Washington.

LEAD POISONING THREATENS BALD EAGLES, SAYS WILDLIFE GROUP

The bald eagle, the nation's endangered symbol, first gained public fame as a vanishing species over two decades ago when use of the pesticides DDT and dieldrin caused a decline in the bird's population from eggshell thinning.

Today, the eagle is being threatened by poisoning of a different sort: consumption of waterfowl crippled or poisoned by lead shotgun pellets.

A recent study by the U.S. Fish and Wildlife Service (FWS) shows that over 7 percent of the deaths of bald eagles recovered between 1967 and 1982 were linked to lead poisoning.

The contamination problem is probably even greater than the study suggests, according to NWF raptor biologist Brian Millsap, "because eagles poisoned by lead are apt to die in secluded areas and are thus less likely to be found than eagles which die on highways or along powerlines."

The ramifications of the lead poisoning may be even greater if it is found that lead affects the reproductive success of the bird.

"The point is we don't know," Millsap said.

Lead contamination of eagles is particularly a problem in regions where waterfowl



(over)

and hunters congregate, frequently on state and national wildlife refuges. Preliminary data released in June by NWF shows that large numbers of eagles and waterfowl winter in the following national wildlife refuges: Holla Bend and White River, Ark.; Lower Klamath and Tule Lake, Calif.; Chautauqua and Crab Orchard, Ill.; De Soto, on the border of Iowa and Nebraska; Flint Hills and Quivira, Kan.; Reelfoot, on the border of Kentucky and Tennessee; Blackwater, Md.; Mingo, Squaw Creek and Swan Lake, Mo.; Maxwell, N.M.; Salt Plains, Sequoyah, Tishomingo, Okl.; Lewis and Clark, Ore.; Umatilla, on the border of Oregon and Washington; Upper Klamath, Ore.; Tennessee, Tenn.; Buffalo Lake, Tex.; and Bear River, Utah. At least 46 other wildlife refuges where waterfowl concentrate are used by eagles.

Of the refuges listed, only Crab Orchard, De Soto, Bear River, Sequoyah, Umatilla and White River require hunters to use non-toxic steel shot on at least portions of the refuge, an FWS spokesman said. Buffalo Lake, Salt Plains, Maxwell, Squaw Creek and Reelfoot allow no waterfowl hunting at all. The Federation supports the establishment of non-toxic steel shot zones where waterfowl lead poisoning is a problem.

In an effort to determine the extent of bald eagle lead contamination, NWF in June called for a formal consultation by federal authorities. NWF Executive Vice President Jay D. Hair asked the FWS to determine if the use of lead shot in areas of high waterfowl concentrations may "jeopardize the continued existence" of the bald eagle.

He also asked the Service to take necessary management steps to avoid such jeopardy if proven.

Section 7 of the Endangered Species Act requires consultation among federal offices and agencies on federally-sponsored actions -- such as issuing hunting regulations -- which may adversely impact endangered or threatened species.

If a "jeopardy" situation is found, the FWS may require the establishment of steel shot zones in certain problem areas, but such changes would probably come no sooner than the 1984-85 hunting season.

The FWS has not responded to Hair's letter.

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Federal and Power-Belt are registered in the U.S. Patent Office.
Federal Cartridge Corporation, Minneapolis, Minnesota, U.S.A.

received for the benefit of the hospital shall be by a board of trustees composed of at least five (5) but not more than eleven (11) competent and responsible citizens of the county appointed by the board of county commissioners. The number of members of any board of trustees shall be an odd number determined by the county commissioners. The first board of trustees, or additional members to a board of trustees, as soon as appointed shall draw lots for the purpose of determining the term of each member of the board. Up to two (2) members of the original board or additional members of the board shall serve for a term of one (1) year, up to two (2) for a term of two (2) years, up to two (2) for a term of three (3) years, up to two (2) for a term of four (4) years and up to two (2) for a term of five (5) years after their appointment. Terms thereafter shall be consecutively staggered. Each trustee shall serve until the first Monday of July following the expiration of their term and the board of county commissioners annually at their meeting in June shall appoint a successor to the trustee or trustees whose term expires. As soon as the original board has determined the terms of its members they shall organize by electing a president, secretary and treasurer of the board. As soon as they are organized they shall file with the county clerk and the secretary of state a certificate showing their organization, for which filing no fee or charge shall be paid. Upon filing the certificate the board of trustees is a body corporate with power to sue and be sued under the name of "Board of Trustees of the Memorial Hospital of County". No individual member of the board of trustees is personally liable for any action or procedure of the board. The corporation has perpetual existence and it is not necessary to file any other or further certificate than that filed upon the original organization of the board of trustees.

Section 2. This act is effective May 23, 1985.

Approved February 12, 1985.

CHAPTER 53

Original Senate File No. 145

LEAD SHOT — GAME BIRDS

AN ACT to amend W.S. 23-1-302 by creating a new subsection (b) relating to game and fish; prohibiting the game and fish commission from banning the use of lead shot except in specified areas; and providing for an effective date.

Be It Enacted by the Legislature of the State of Wyoming:

Section 1. W.S. 23-1-302 by creating a new subsection (b) is amended to read:

of trustees
competent and
county com-
shall be an
first board of
as soon as
term of each
al board or
(1) year, up
of three (3)
for a term
shall be con-
Monday of
county com-
successor to
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by electing
s they are
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or charge
is a body
"Board of
l member
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necessary
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12, 1985.

and fish;
except in

ended

23-1-302. Powers and duties.

(b) Notwithstanding subsection (a) of this section, the commission shall not ban the use of lead shot except in areas where shotgun shell pellets will exceed twenty thousand (20,000) per acre as determined by sampling methods approved by the commission. Banned lead shot areas shall not exceed areas reasonably necessary for practical enforcement of the ban.

Section 2. This act is effective May 23, 1985.

Approved February 12, 1985.

CHAPTER 54

Original Senate File No. 127

TELEPHONE AND TELEGRAPH COMPANIES

AN ACT to repeal W.S. 39-2-205 relating to taxation; eliminating a gross revenue factor to be used in valuing telephone and telegraph companies; and providing for an effective date.

Be It Enacted by the Legislature of the State of Wyoming:

Section 1. W.S. 39-2-205 is repealed.

Section 2. This act is effective immediately upon completion of all acts necessary for a bill to become law as provided by Article 4, Section 8 of the Wyoming Constitution.


Approved February 13, 1985.

CHAPTER 55

Original Senate File No. 229

SNOWMOBILE GASOLINE TAX DISTRIBUTION

AN ACT to amend W.S. 39-6-210(c)(v) and by creating a new paragraph (vi) relating to gasoline taxes; providing such taxes from gasoline used in snowmobiles shall be used to improve snowmobile trails; and providing for an effective date.



THE LACASSINE STORY

Unlike some past studies, recent field research indicates there may be greater crippling-rate differences in the use of lead/steel shot than previously thought.

by Frank G. Harris III

Why has there been so much controversy over such a sober scientific study of interest to waterfowlers? The completion of the Lacassine Shooting Study, early in 1982, closed one of the most interesting chapters to date on the steel-shot, lead-shot controversy. The test demonstrated that a trade-off in crippling, with steel shot, is present.

Waterfowlers are indebted to Louisiana U.S. Senator J. Bennett Johnston, Jr. and former Secretary of Interior Cecil Andrus, for starting the study; to Dr. John Rogers, chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service (FWS); Alaska U.S. Senator Ted Stevens; J. Burton Angelle, former secretary of the Louisiana Department of Wildlife and Fisheries; to the Louisiana Wildlife and Fisheries Commission; and to the Louisiana Department of Wildlife and Fisheries (LDWF) professional staff under the supervision of John D. Newsom, for maintaining the flexibility necessary to attain the goals of the study during two difficult waterfowl seasons. Gratitude is also owed Assistant Interior Secretary for Fish and Wildlife and Parks G. Ray Arnett, for providing the additional funding necessary to complete the Lacassine Study.

Background

The Louisiana Wildlife and Fisheries Commission held a public hearing in Lafayette, Louisiana, on October 28, 1978, to gain input on the question of whether or not non-toxic steel shot would be substituted for lead shot for hunting waterfowl over vast areas in Louisiana. During the previous 1977-78 season, a "hotspot" of over two million acres, covering portions of six parishes (counties) in south, southwest and central Louisiana, had been restricted by the FWS against the pleading of LDWF professionals. Strong, overwhelming public outcry surfaced over this broad-brush approach, a definite departure from originally stated federal policy. A substantial majority of concerned waterfowlers, conservationists and conservation organizations statewide voiced a consensus concern that such indiscriminate substitution of steel shot (with indication of in-

creased crippling loss in states such as Illinois) might well cause more wasted waterfowl than it could possibly save from lead die-off loss in Louisiana.

Wisely, the Commission recognized that satisfying legitimate concerns of waterfowlers is of substantial importance to the best interest of the resource, an often forgotten point until one stops to consider the hunters' monumental support of the resource (their financial contributions have protected vast amounts of critical wetland habitat acreage nationwide). Pursuant to the "Stevens Amendment," the commissioners thus voted unanimously to oppose use of steel shot during the 1978-79 waterfowl season. The Commission again opposed steel shot for the 1979-80 season.

This series of events, involving great public interest, caused Louisiana U.S. Senator J. Bennett Johnston, Jr. to appoint a four-man ad hoc advisory committee on steel shot composed of: William J. Atkins, Gordon H. Lambert, Jacques L. Wiener, Jr. and the author. This group of sportsmen has over 170 accumulated years of waterfowling experience, in and out of state. All are longtime sponsors of Ducks Unlimited, with three of the four being life sponsors.

On July 10, 1979, this ad hoc committee met in Washington, D.C. with Senator Johnston, then Secretary of Interior Cecil Andrus and Assistant Secretary of Interior Robert Herbst. Federal steel-shot policy was reviewed, pros and cons were discussed, and plans were instigated to federally fund steel-shot investigations in Louisiana. A follow-up session was held in Shreveport, Louisiana, on February 5, 1980. Present were Dr. Robert Smith of the FWS, J. Burton Angelle, then secretary of the LDWF; Larry Soileau, professional biologist with the LDWF; and ad hoc committee members. The public shooting area at Lacassine National Wildlife Refuge in southwest Louisiana was chosen as the site to conduct a shooting test. The cooperating groups for the study were: the U.S. Fish and Wildlife Service; the Louisiana Cooperative Wildlife Research Unit at

continued on page 24

Louisiana State University, Baton Rouge; and the Louisiana Department of Wildlife and Fisheries. This was the birth of the Lacassine Study.

A shotgun-shell survey, conducted by the LDWF, determined the lead load most extensively used by Louisiana duck hunters to be a standard 2 $\frac{3}{4}$ inch, 3 $\frac{3}{4}$ dram equivalent, 12-gauge shell containing 1 $\frac{1}{4}$ ounces of number six shot. Ballistic data furnished by Olin-Winchester Corporation confirmed the most ballistically comparable 12-gauge steel shot load to be the most modern version of a standard 2 $\frac{3}{4}$ inch shell, containing 1 $\frac{1}{4}$ ounces of number four steel shot. This load was also selected because of its widespread availability to waterfowlers. A cooperative agreement outlining a budget of over \$180,000 in federal funds was submitted by the FWS.

An important planning meeting, hosted by the LDWF on July 21, 1980, was held in Baton Rouge, Louisiana. Noted participants were Dr. John Rogers, and Dr. Don W. Hayne, professor of Statistics and Zoology, North Carolina State University, and consultant to the LDWF. Others present were Dr. Vernon Wright, Department of Experimental Statistics, LSU Baton Rouge and John D. Newsom, then director of the Louisiana Cooperative Wildlife Research Unit at LSU and now assistant secretary, LDWF (both to be authors of the study) and Dr. Paul Geissler and Dr. Robert Smith of the FWS. Other state and federal wildlife professionals were included along with three members of the ad hoc committee.

Foremost in the minds of this distinguished and dedicated group of wildlife professionals and scientists was the task of designing, conducting and completing a statistically unbiased shooting test *statistically powerful* enough to detect a *significant difference*, if one existed, between comparable lead and steel loads most commonly used by Louisiana waterfowlers, under Louisiana hunting conditions. The discussions involved hunting situation tests, and these were the three previously federally funded shooting tests at Tule Lake, California, in 1977-78 and Union County, Illinois, in 1978, both on geese, and the Missouri Schell-Osage Duck test of 1979. The Illinois test was known to have suffered a paucity of data with only 3,204 shots fired and 618 geese bagged. The Missouri Schell-Osage test was given the closest scrutiny because it was the most recent and was the *only* previous hunting test that had been applied to ducks. The purpose of the close scrutiny of prior shooting tests was given to ferret out flaws or weaknesses in order to exclude them from being passed on to the Lacassine test.

The planning group decided to concentrate the test on comparing one steel load with one lead load and not to scatter the resources in trying to compare several loads, as had been done in past studies (six loads at Tule Lake, three in Illinois and four—two lead and two steel—at the Missouri Schell-Osage test).

Conducting the Test

The test proceeded during the 1980-81 and 1981-82 waterfowl seasons. Trained observers assigned to each hunting blind recorded the data. Both seasons will be remembered as sub-standard, duck-flight years. This, along with drought conditions in the marsh, contributed greatly to the bagging of fewer birds than anticipated during the first segment. On February 19, 1981, Rogers, wrote the ad hoc committee spokesman, Jacques L. Wiener, Jr. of Shreveport, outlining the status of the study; he also requested comments from the committee. These observations and

suggestions of the committee were submitted to Rogers, by letter, from Wiener on March 4, 1981, and virtual recommendations were followed in conducting the season test.

Crippling—Comparison and Results of Loads Tested at Lacassine

The results of the study have astounded many state and federal agency professionals, and have confirmed some widespread suspicions of others, including waterfowlers. Over 1,000 hunters participated, consuming 16,638 shells, provided by Federal Cartridge Company (8,615 number four steel loads and 8,023 number six lead loads). A total of 802 ducks were crippled, 436 with steel and 366 with lead. (A duck visibly hit but not retrieved was classified as a cripple.)

In the report on this study, separate statistical analyses were made for hits per shot and cripples per hit, rather than using the combination of these two values—cripples per shot—as had been done in the previous studies. It will be obvious to most who hunt or professionally manage waterfowl that the hunter must first hit a duck in order to either cripple it or bag it. Of ducks hit, steel recorded a significant 41.5 percent increase in cripples over lead for all distances. There was a 68 percent increase in crippling with steel over lead out to 35 yards. This latter finding alone reversed pre-test opinions, as all previous reports and articles had expressed the belief that steel shot was superior to non-buffered lead loads up to 35 yards. That "old wives tale" was solidly shaken by the test at Lacassine—and a wing shot at 35 yards is the same under any field or marsh hunting situation (see table).

Table one—Number of shots fired, number of ducks bagged and number of ducks crippled for total test and each distance category: (Data reference: The Lacassine Study, Table six, page 28.)

Distance (Yards)	Number Shots Fired	Number Bagged	Number Crippled (Visibly hit, but not retrieved)
STEEL 4			
Out to 35 yds.	4,348	728	269
Beyond 35 yds.	4,267	258	167
LEAD 6			
Out to 35 yds.	4,035	878	188
Beyond 35 yds.	3,988	364	178
Total Both Distances (yards)			
STEEL 4	8,615	986	436
LEAD 6	8,023	1,242	366

Bagging Ducks and Other Considerations

At Lacassine, hunters bagged 2,228 ducks with mallard and gadwall being the most common species. Lead shot bagged 1,242 ducks, while steel shot bagged 986 ducks, even though 592 more steel shot loads were fired than lead. The implications bear consideration. If steel shot is required where substantial lead poisoning problems do not exist, will hunters accept the following? Fewer ducks in the bag per amount of time spent hunting; more shots wasted (missed) per duck bagged; more time spent chasing, shooting at and attempting to retrieve crippled birds while trying to fill their limits during the fleeting moments of that prime-flight period; more cripples lost to the bag

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thus fewer total ducks in the bag.

Lacassine demonstrated the practical inferiority of the most modern 12-gauge steel load using 1 1/8 ounces of number four shot to a standard non-buffered number six lead duck load. Compare this inferiority to the 20-gauge 1 ounce or 3/4 ounce number four steel shot loads being marketed this fall by only one ammunition manufacturer. Such 20-gauge waterfowl shells could be the greatest duck cripples ever offered to the hunter.

Statistical Power to Detect a Difference

The Lacassine test had greater power to detect differences than any of the preceding tests of steel and lead loads.

bias against lead shot. These critics were quick to allege that it is "just another test." Actually, it is the latter - only two major tests conducted on duck shooting under practical hunting conditions. Considering that only such shooting tests have ever been completed on ducks (Missouri Schell-Osage and Lacassine), which one must be an anomaly? Will those unobjective proponents of steel be comfortable in retaining their "ostrich positions" because Lacassine shed some doubt on their pre-conceived ideas and course to promote steel? Objective waterfowlers and professionals alike will recognize the sincerity of the eminent, dedicated scientists who carefully considered the heretofore unseen data of the earlier Missouri Schell-Osage test, and who, through scientific analysis, sought and obtained a progression of improvement in designing the Lacassine test.

Were the previous shooting tests from Tule Lake (1977-

We must recognize that until a better non-toxic shot is developed, steel shot, however inferior, may have to be used in some specific areas.

2 boxes - 10 ducks
Crick Smith

This word "power" is used by statisticians to describe the likelihood that a particular test will detect a defined difference. With tests of low power, differences must be great to be detected, even though they may, in fact, be important. It means very little to state that pre-Lacassine shooting studies showed an "insignificant statistical difference" between the lead and steel loads tested. The important thing is to first know how small a difference each test could detect in comparing lead and steel.

Unfortunately, none of the reports on steel/lead tests to date have stated the difference likely to be detected, if present. An unpublished analysis*, however, has compared such values for the Lacassine and Missouri Schell-Osage tests. This finds that with cripples per hit the Lacassine test could detect a difference of 28 percent in comparing two shells, while the Missouri Schell-Osage study would not detect a difference smaller than 62 percent when comparing any two shells, or 43 percent when comparing the average of two lead loads with the average of two steel loads. Similar figures for cripples per shot were 20 percent for Lacassine and 46 percent and 32 percent for Schell-Osage.

These figures show that the Lacassine study was more powerful by far. Why then, should a weaker test be used in setting waterfowl management policy?

We know nothing about the power of the other studies at Tule Lake or in Illinois. It would be tragic to find that an inability or weakness to detect such critical differences in lead and steel was continued throughout three tests, even through inadvertence, with the waste of hundreds of thousands of dollars in public funds. If so, such precious funding could have been better spent on more important wildfowl priorities such as habitat.

Epilogue

It was inevitable that immediate vociferous criticism of the Lacassine study surfaced, principally from closed minded proponents of steel shot. In the same vein, no one should be surprised that these permanently committed advocates of steel shot would pool their funds to hire, as an outspoken critic of the Lacassine test, the very ones who had profited by planning, conducting and publicizing the results of earlier tests that many suspect have a built-in

78) through Missouri Schell-Osage (1979), out of inadvertence of such low statistical power, incapable of detecting important differences between the lead and steel loads tested? The answers are in the data. We must wait for these answers until a competent statistician has examined all the data and has been cleared to publish the results. There is a mandate now to do this!

The author trusts, in the spirit of seeking scientific truth, that the sincere efforts of the Lacassine authors will not serve merely to polarize those on both sides of the steel-shot, lead-shot controversy. Our challenge is to respect the objective opinions of all who merit it, and out of respect to the resource and the waterfowler, recognize the trade-off in crippling where steel shot is required. We must also recognize that until a better non-toxic shot is developed, steel shot, however inferior, may have to be used in specific areas where significant, lead-caused die-offs have been documented scientifically, and not just suspected from gizzard-content analysis of hunter-killed birds.

In judging, we should leave the field of ballistics expertise to professional ballisticians, statistics to credentialled statisticians, and recognize the contribution of dedicated, objective wildlife professionals and waterfowlers as well. From this standpoint the Lacassine study has everything going in its favor.

Editor's Note. For more than 10 years, Ducks Unlimited magazine has featured articles covering both sides of the lead/steel shot controversy. While DU has, by policy, not taken sides on issues which would divert energies from its habitat construction effort, it makes a point of keeping its members informed. Authors of past Ducks Unlimited articles focusing on the respective pros and cons of lead and steel include a host of professionally aligned spokesmen—Frank C. Bellrose, Grits Gresham, Tom Roster, Herman Bockstruck, Glen C. Sanderson, Ed Lowry are but a few. With this article, Frank G. Harris III joins that group of authors who sincerely want to see the lead/steel shot controversy effectively resolved. Copies of the Lacassine study may be obtained by contacting the Louisiana Department of Wildlife and Fisheries, P.O. Box 14526, Baton Rouge, Louisiana 70898, phone (504) 342-5878. □

Dillon Steel Shot

*Made by Dr. Don W. Hayne, statistical advisor to the LDWF, dated April 15, 1982.

KANSAS WILDLIFE FEDERATION

Resolution No. 1984-8

Submitted by: The Flint Hills Sportsman Club

Lead Shot Poisoning
in Waterfowl, Bald Eagles,
and Other Wildlife

WHEREAS, lead shot poisoning has been documented in waterfowl for more than a century; and

WHEREAS, an estimated two to three million waterfowl die annually from lead shot poisoning; and

WHEREAS, lead shot poisoning has been documented in a number of other wildlife species including loons, rails, godwits, California gulls, coots, gallinules, scaled and bobwhite quail, ring-necked pheasants, mourning doves, prairie falcons, kestrels, red-tailed hawks, and Andean condors; and

WHEREAS, lead shot poisoning has also been documented in our national symbol, the endangered bald eagle; and

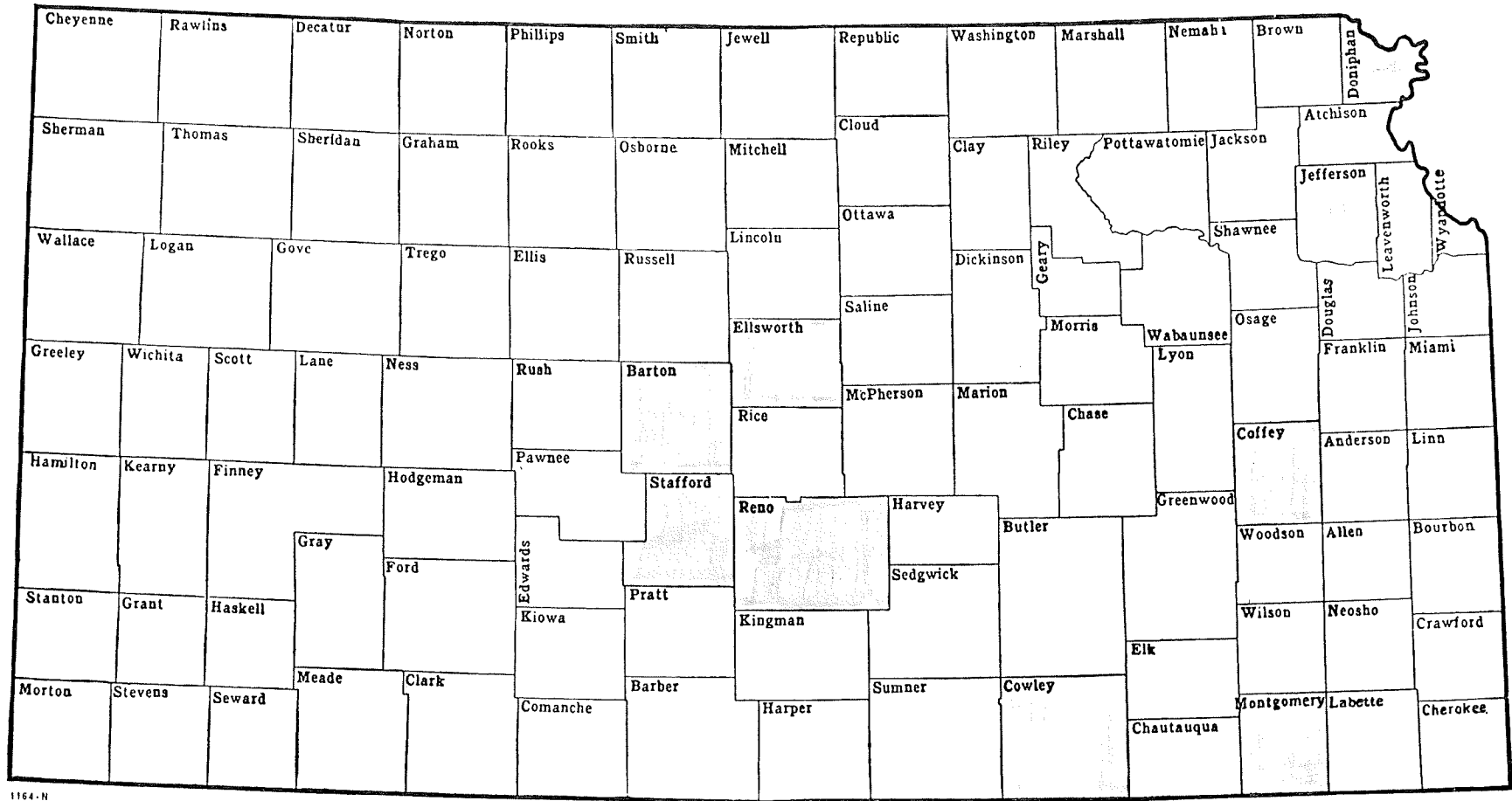
WHEREAS, conversion to nontoxic shot for migratory bird hunting will eliminate the continued and unnecessary loss of waterfowl and other wildlife, including bald eagles, and other endangered species, to lead shot poisoning; and

WHEREAS, the National Wildlife Federation, by resolutions adopted in 1971, 1975, 1979, and 1984 supports the conversion from lead shot to nontoxic shot;

NOW, THEREFORE, BE IT RESOLVED that the Kansas Wildlife Federation, in annual meeting assembled October 13-14, 1984, in Lawrence, Kansas, urges that the U.S. Fish and Wildlife Service and the Kansas Fish and Game Commission take all necessary steps to eliminate lead shot poisoning in waterfowl, bald eagles; and other wildlife including, but not limited to, implementing nontoxic shot hunting zones in any area where lead deposition poses a significant threat to wildlife populations.

Attachment 8

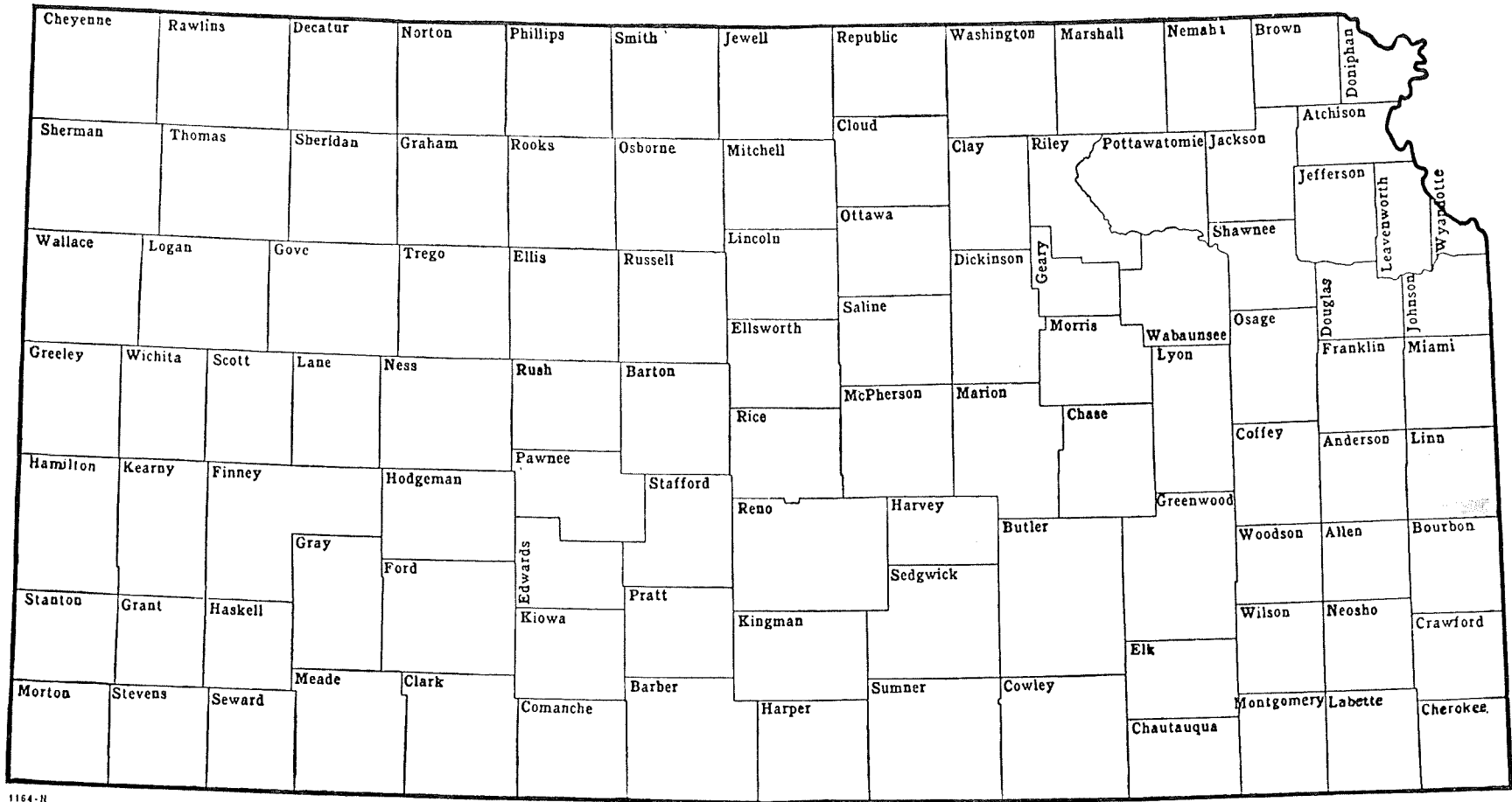
House Energy and Natural Resources 2/25/86



1164-N

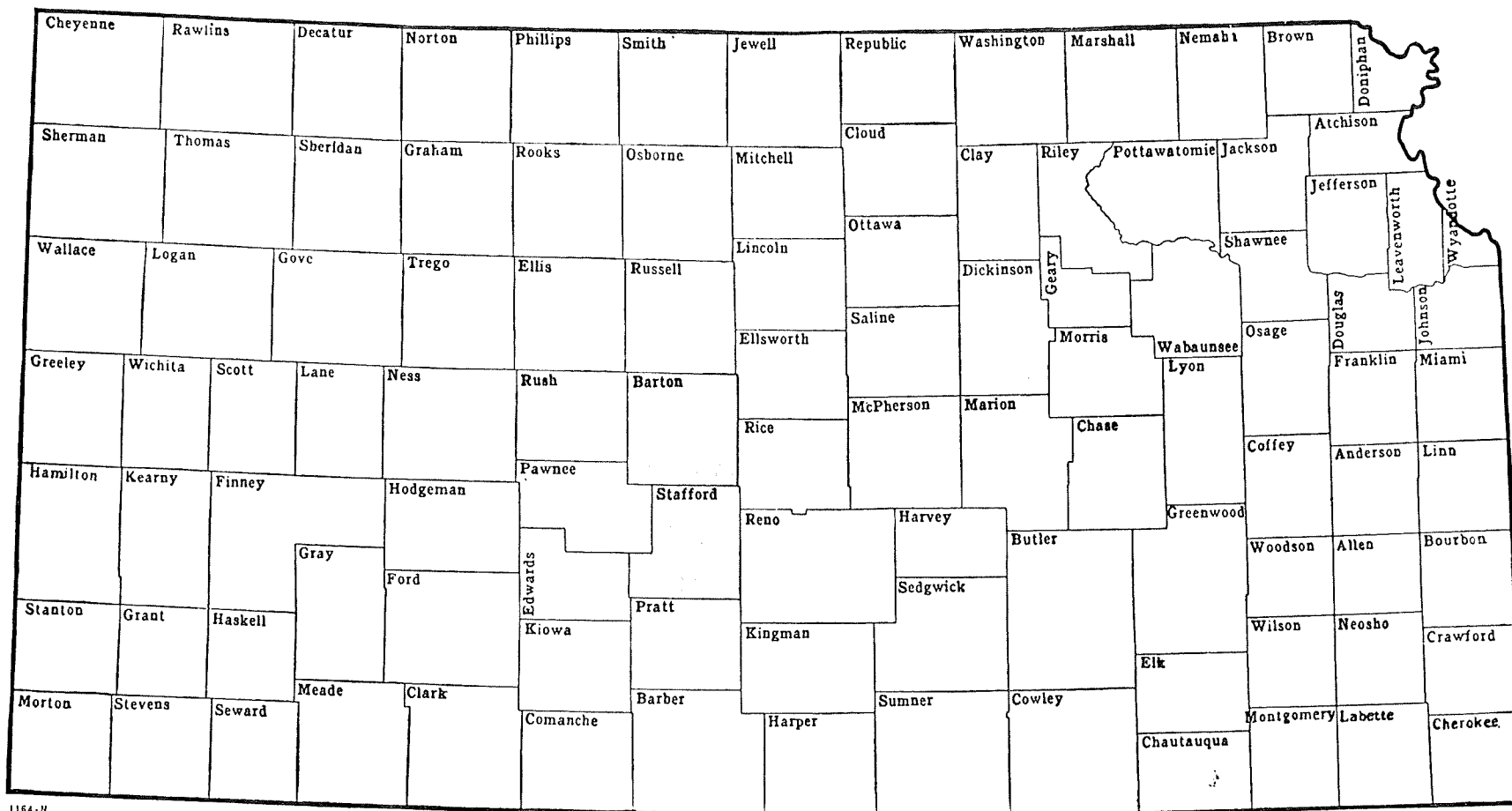
Counties requiring steel shot for waterfowl hunting based on eagle populations and waterfowl harvest. 1986 hunting season.

CRITERIA - 25 or more eagles and 5,000 or more waterfowl harvested.



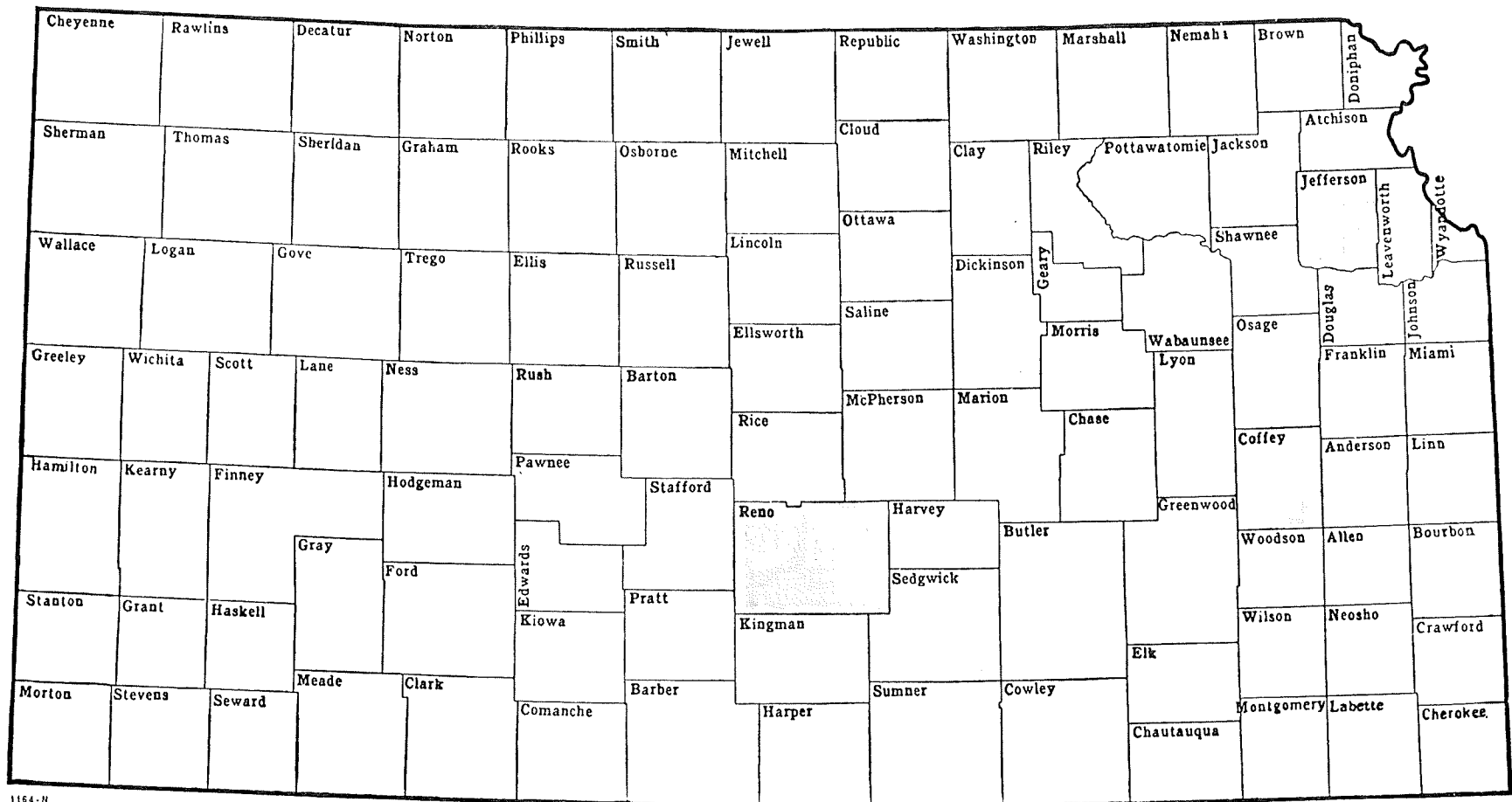
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Counties requiring steel shot for waterfowl hunting based on a county harvest of 20 or more birds per square mile. 1987 hunting season.



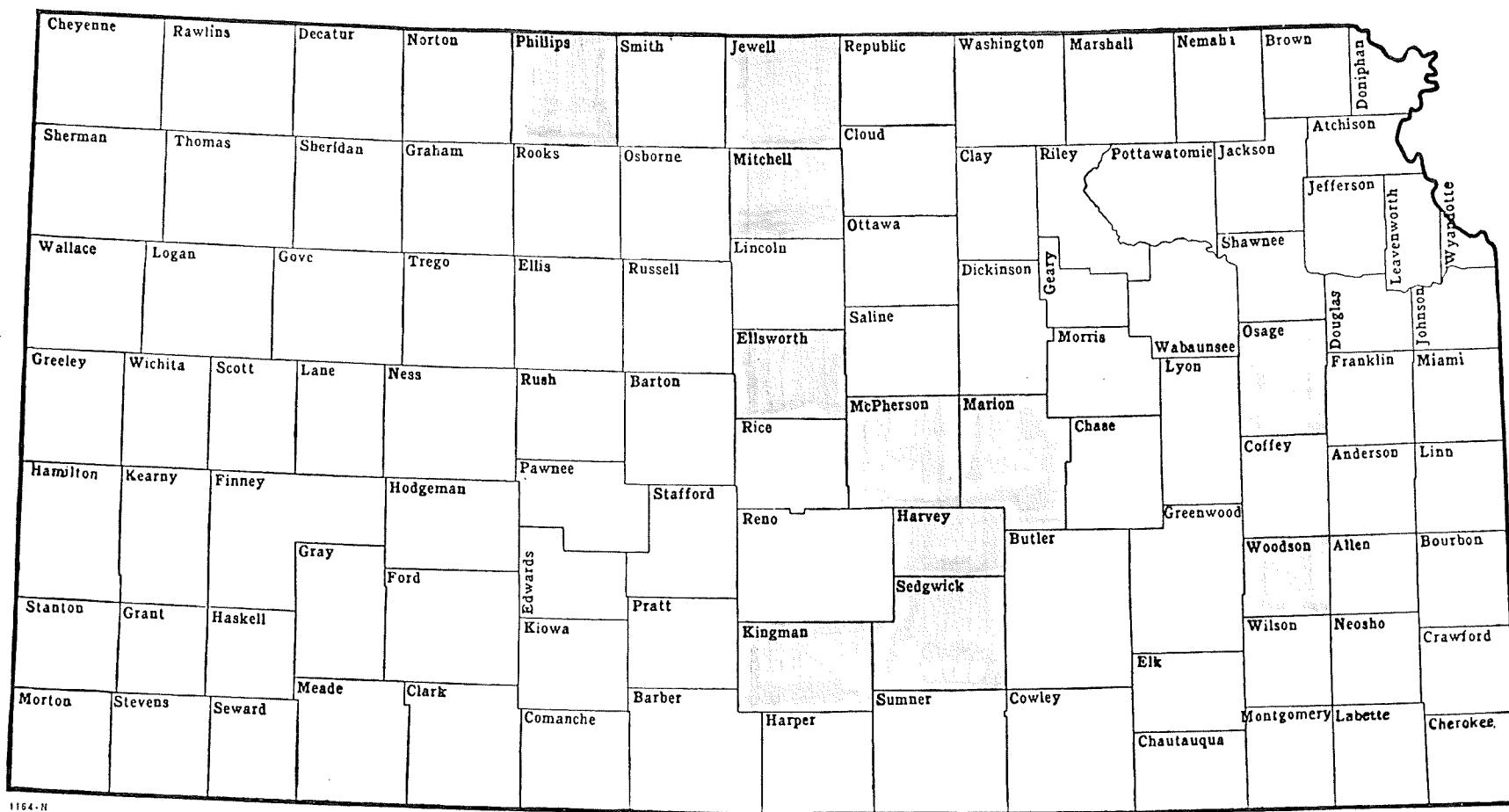
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Counties requiring steel shot for waterfowl hunting based on a county harvest of 15 or more birds per square mile. 1988 hunting season.



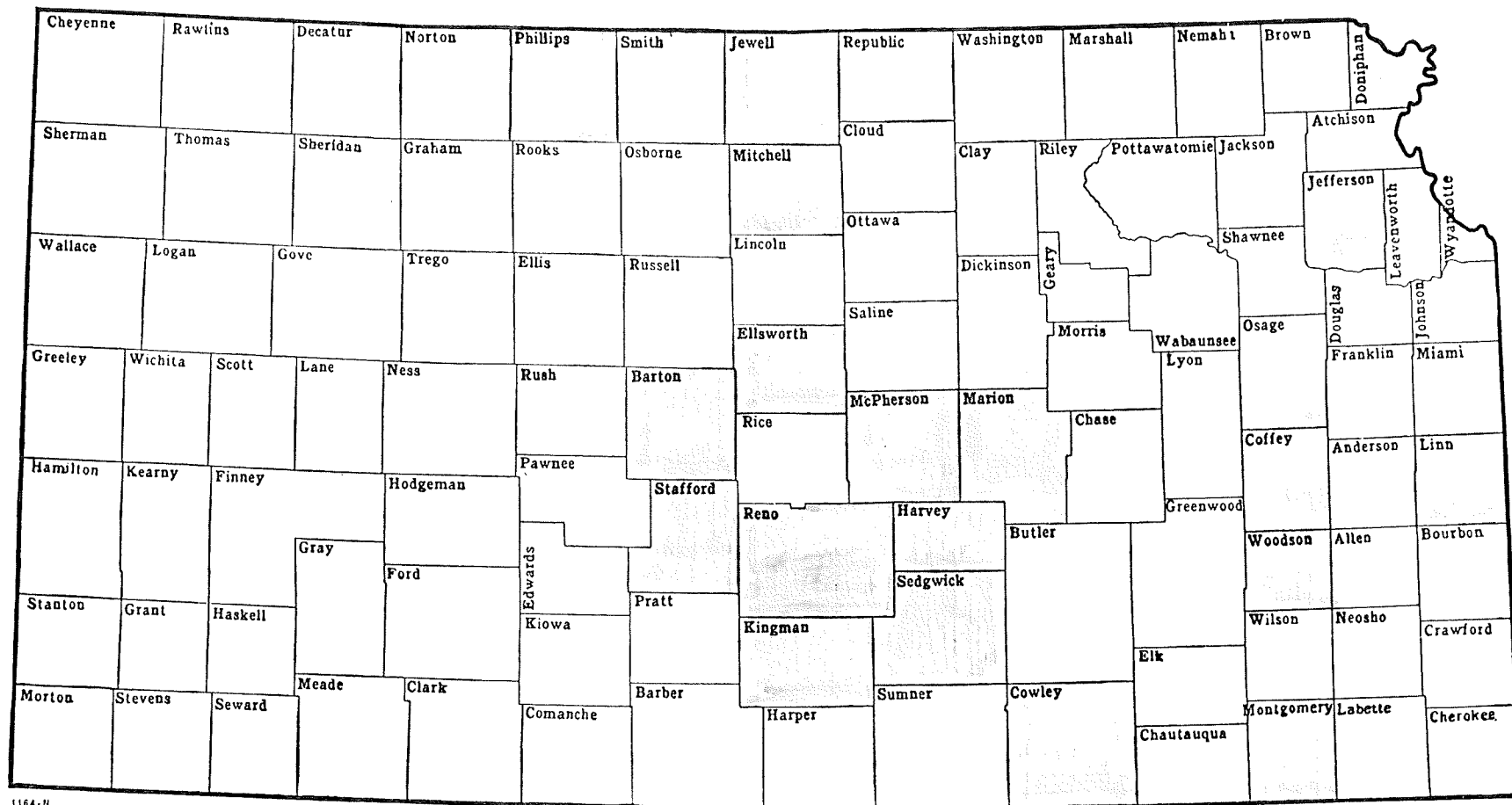
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Counties requiring steel shot for waterfowl hunting based on a county harvest of 10 or more birds per square mile. 1989 hunting season.



1164-N

Counties requiring steel shot for waterfowl hunting based on a county harvest of 5 or more birds per square mile. 1990 hunting season.



1164-II

Composite of prior maps.