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1983

Emergency Pheasant Feeding Program



Department of Natural Resources



Department of Natural Resources
Division of Fish and Wildlife
Section of Wildlife
500 Lafayette Road
St. Paul, MN 55146

Produced by the Bureau of
Information and Education

1983

Emergency Pheasant Feeding Program

During the unprecedented winter of 1983-84, the Section of Wildlife and hundreds of volunteers devoted thousands of hours for winter pheasant feeding effort. About \$100,000 of Section of Wildlife money was used, in addition to several hundred thousand dollars worth of donated corn and manpower. Public awareness of farmland wildlife issues was heightened by this remarkable blend of public and private cooperation.

The 1984 pheasant population declined by 49% from the preceding year, but probably would have dropped even more without this effort. By creating public awareness and concern, more habitat development and protection will occur.

Each fall we should be fully prepared to meet winter with food plots, feeder cribs and winter cover plantings so winter losses are reduced. Emergency feeding like that of last winter is rarely needed, but when similar conditions arise again, the Section of Wildlife will act. This booklet will provide the necessary historical data and techniques for such an effort.

Roger Holmes - Chief
Section of Wildlife

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SUMMARY OF 1983-84 FARMLAND WINTER FEEDING EMERGENCY

On December 22, 1983 the Department of Natural Resources declared a "pheasant winter feeding emergency" for the first time since 1962. A tremendous amount of time, money, and effort was spent during the course of this emergency in the distribution of corn and other grain to both pheasants and deer. A large amount of information was gathered together and much was learned regarding winter feeding of wildlife. This report attempts to summarize some of this information so that if or when another feeding emergency is announced, a reference will be available.

Late November and December, 1983 brought record snowfalls over much of Minnesota which persisted until mid-March, as indicated by the November 30 thru April 11 weekly snow depth maps distributed by the State Climatology Office (Figure 1). Extremely cold temperatures and blowing snow combined with the record snowfalls to produce hazardous conditions for pheasants and other farmland wildlife. This prompted the Section of Wildlife to declare a pheasant winter feeding emergency in an attempt to get food to as many of the pheasant concentrations as possible. A December 23 memo (Attachment 1) was sent to all wildlife personnel outlining plans and procedures to be followed through the emergency. DNR offices were swamped with phone calls from the public during this period as a result of newspaper articles and press coverage and it became obvious that a large amount of grain was required.

On the same day that the emergency was declared, Commissioner Alexander requested and received from the Commodity Credit Corporation (CCC) the release of 15,000 bushels of surplus corn (Attachment 2). The authority for this release

came from Public Law 87-152 and a 1962 Memorandum of Agreement between the state and CCC (Attachment 3). The request was coordinated with the United States Fish and Wildlife Service (USFWS), the Agricultural Stabilization and Conservation Service (ASCS) and the CCC. On January 10, an additional 50,000 bushels of corn was requested from the CCC as it soon became apparent that the initial allocation would run short. (Attachment 4).

Bids were secured from grain elevators and farm co-ops to haul the corn from the depot (Victoria Grain Co., Minneapolis), bag it in 50 pound sacks, and ship it to area wildlife offices or distribution centers. Later the firms were also asked to mark each bag with the following label: DNR GRAIN WILDLIFE FEEDING PURPOSES ONLY. It was estimated that each bagging firm would, at most, be able to bag and ship one truckload of corn (20-24 tons) per day. Thus, 2 separate firms were contracted to do the bagging so that corn shipments could keep up with anticipated demand. Bagging contracts were awarded to Anson Bros. Grain Company from Hastings and E.J. Houle, Inc., from Forest Lake. Anson's then made their own arrangements for transporting the corn, while Michael Peterson from Chisago City secured a separate bid to do the trucking for Houle's. Attachment 5 shows copies of the bids from Anson, Houle and Peterson.

Area managers were asked to locate corn storage depots in their work area from which bagged corn could be distributed. The first load of bagged corn was delivered on December 30, 1983, and deliveries continued until the final load on March 13, 1984. Tables 1 and 2 summarize the Anson and Houle bagging and delivery operations. Note that in addition to CCC corn, 4,000 bushels of mixed small grains was donated by Fritz Rahr of Shakopee. This was mixed in with the corn (50-50 ratio) and bagged also. Table 3 summarizes corn deliveries while Table 4 shows costs associated with the bagging and shipping operations.

The quality of the corn varied quite a bit from shipment to shipment. Generally, whenever Victoria Grain Company started in on a new bin, the first few loads from that bin were of very poor quality. Quality also differed from bin to bin. The overall quality of the first 15,000 bushels was about 40% damaged. the quality of the second allotment (50,000 bushels) was much improved and ran about 15-20% damaged. Both deer and pheasants readily ate the corn indicating the palatibility was not a problem. However, there was some concern over the safety of feeding the damaged corn to deer and pheasants and consequently, the Minnesota Department of Agriculture was asked to test the corn for aflatoxin level. This test cost \$135.00 and found that the aflatoxin concentration was well within the safe limits. Livestock and poultry experts from the University of Minnesota were also consulted and it was their opinion that the corn would not harm either pheasants or deer. The grain was low in protein and thus would not have been suitable for feed if weight grain was the primary consideration or if fed during the breeding season. However, for a maintenance diet such as the one planned for wildlife, the food was adequate.

Several news releases were issued by the St. Paul wildlife staff throughout the emergency in an effort to keep the public and the press informed (Attachment 6). In addition, many area managers issued their own releases to suit their needs (Attachment 7). There was a great deal of interest generated by the public over the emergency, especially in the Twin Cities area and around the larger cities of Mankato, Rochester and St. Cloud. Counties with active sportsmen's groups also generated a lot of interest.

Cash donations were received in St. Paul and approximately \$1,500 was collected and placed in a gift account for purchasing grain. Also, 400 bushels of corn was contributed by Cargill from various elevators and terminals throughout the state. Volunteers who called in to the St. Paul office were sent

information on how they could help (Attachment 8) along with instructions on the construction of feeder cribs and pheasant feeding techniques (Attachment 9).

At the start of the emergency, deer were concentrated throughout the farmland zone but they were still in good shape. Thus, most of the corn in January went to pheasants. However, as the winter wore on, it became evident that some deer would eventually require feeding. In fact, a large portion of the corn distributed in February and March was used to feed concentrations of deer and to shortstop depredating deer. Plans were also developed to distribute corn in bulk (using dump trucks) from New Ulm to some of the large deer concentrations, but mild weather made these plans unnecessary. Throughout the winter, pheasant cribs and feeding sites were maintained in most cases.

All of the corn received from CCC was shelled. Cobbed corn would have been preferred, especially for pheasants, and area managers purchased a deal of cobbed corn for their feeders. Shelled corn could not be used well in conventional wire cribs (Attachment 9) but several alternative crib designs were developed (Figure 2). Corn placed on top of a mat of straw or hay also worked well and, in fact, it was found that placing straw or hay near any feeding location seemed to help draw birds to the site.

Attachment 10 is a 1982 memo from Al Berner which outlines food and energy requirements of deer and pheasants during winter weather. As a rule, deer require about 3 pounds of corn per day while pheasants need about 4 ounces per day. Thus, for each month that a feeding program takes place, each deer being fed would require about 90 pounds of corn and each pheasant would need approximately 7.5 pounds. This assumes that corn is the only food being consumed. However, deer in the farmland zone manage best if provided with a combination of corn and high quality legume hay.

As a result of high deer population levels and the severe weather, many

landowners reported deer depredation problems, especially those farmers who had unharvested soybeans. In fact, soybeans were seen as a preferred food for both pheasants and deer. If area managers were contacted early enough in the winter, food plots were purchased in anticipation of further losses. Attachment 11 outlines "Statewide Standards for Emergency Corn Food Plot Purchases" dated November, 1982. An effort was also made to prevent deer from using fields by placing corn near the field to "shortstop" the deer.

Although very little feeding was attempted for forest zone deer in 1983-84, some information was gathered together on this subject in anticipation of a large scale program. Attachment 12 gives the formula used to prepare deer food pellets; Attachment 13 outlines methods for deer feeder protection; and Attachment 14 is a copy of a Manitoba publication entitled "Meals on Wheels for Deer".

Throughout the emergency, an effort was made to collect pheasant and deer carcasses to examine for evidence of starvation. A 1962 memo (Attachment 15) regarding storm mortality and starvation of pheasants shows that healthy adult males normally weigh about 3 pounds while healthy females weigh about 2-1/2 pounds. However, starving birds may only weigh half as much. Malnourished birds have a prominent keel with very little breast muscle, little or no body fat, empty crop or gizzard, and a dark green or black gizzard lining (compared to a normal light green).

Dead deer were easier to find and quite a few were examined. Deer were sent to Madelia Research where they were aged, weighed, and checked for general condition, body fat, kidney fat, and femur marrow fat (Attachment 16). Attachment 17 describes effects and signs of malnutrition in Wyoming ruminants. Much of this information is applicable to Minnesota deer.

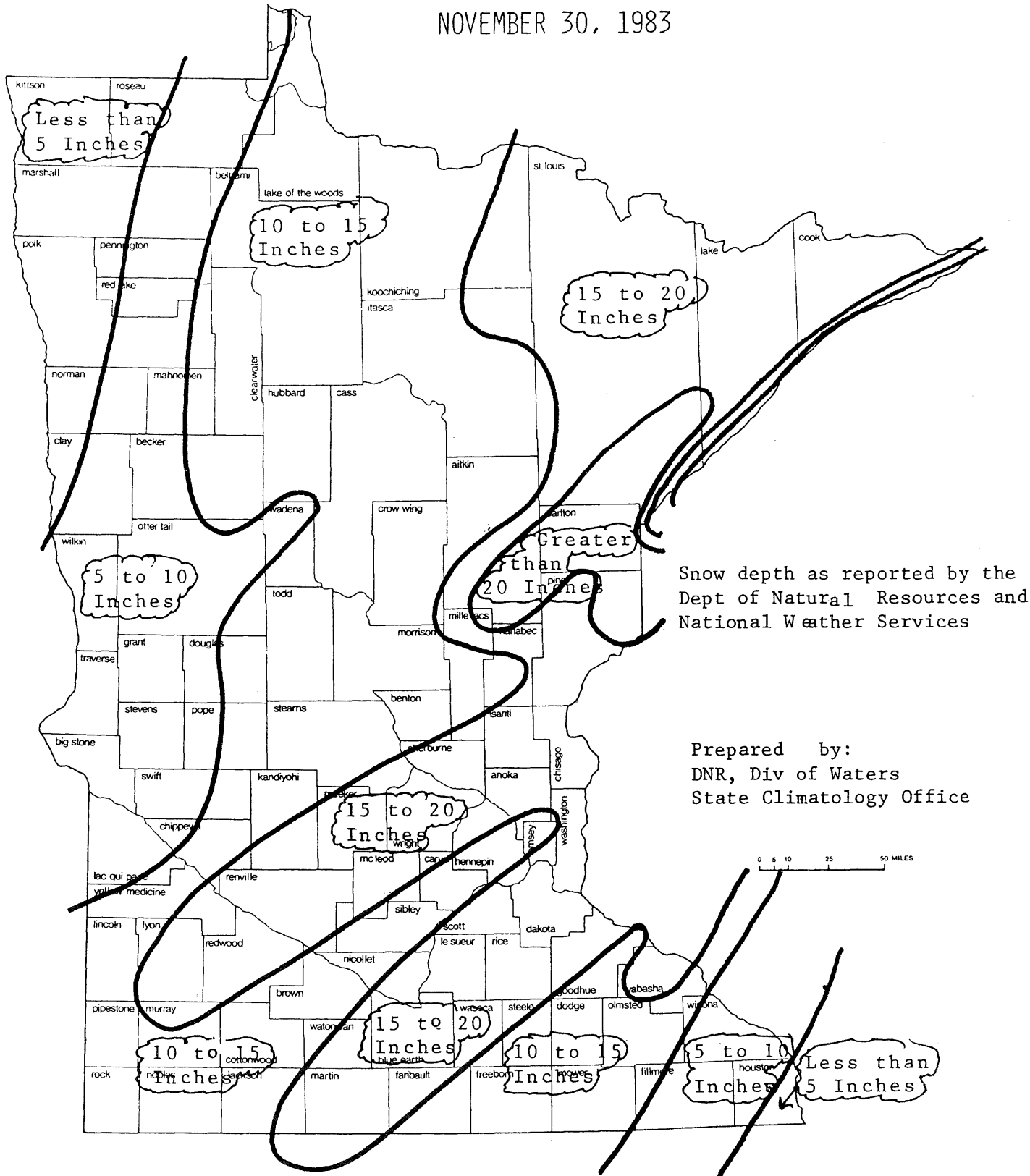
While it is hard to measure the success of the feeding program, some obvious

benefits occurred. As mentioned earlier, the response by the public was tremendous. Many sportsmen's groups became actively involved and worked closely with managers in the feeding efforts. Also, many people became aware of the problem facing farmland wildlife, suggesting that habitat improvement efforts in the future will be more readily accepted. From a public relations standpoint, the program was a success. Finally, although deer and especially pheasant losses did occur, there is little doubt that the emergency feeding efforts did succeed in helping to bring many animals through the severe winter.

- Figure 1. State Climatology Office Weekly Snow Depth Maps
- Att. 1. December 23 emergency feeding memo
- Att. 2. Letter of request for release of CCC corn
- Att. 3. 1962 Memorandum of Agreement between the State of Minnesota and the CCC
- Att. 4. Letter of request for second release of CCC corn
- Att. 5. Bids from bagging and trucking firms
- Table 1. Summary of Anson and Houle bagging operations
- Table 2. Summary of Anson and Houle corn allotments
- Table 3. Summary of corn deliveries
- Table 4. Costs involved with bagging and shipping CCC corn
- Att. 6. News releases issued by St. Paul staff
- Att. 7. Example of news release issued by area managers
- Att. 8. Information sent to volunteers
- Att. 9. Instructions on construction of feeder cribs and pheasant feeding techniques
- Figure 2. Alternative crib designs for shelled corn
- Att. 10. Memo outlining food requirements of deer and pheasants
- Att. 11. Statewide standards for emergency corn food plot purchases
- Att. 12. Formula for deer food pellets
- Att. 13. Methods for deer feed protection
- Att. 14. "Meals on Wheels for Deer" from Manitoba
- Att. 15. 1962 memo on storm mortality and starvation of pheasants
- Att. 16. Summary of deer carcasses examined
- Att. 17. Effects of malnutrition on ruminants in Wyoming

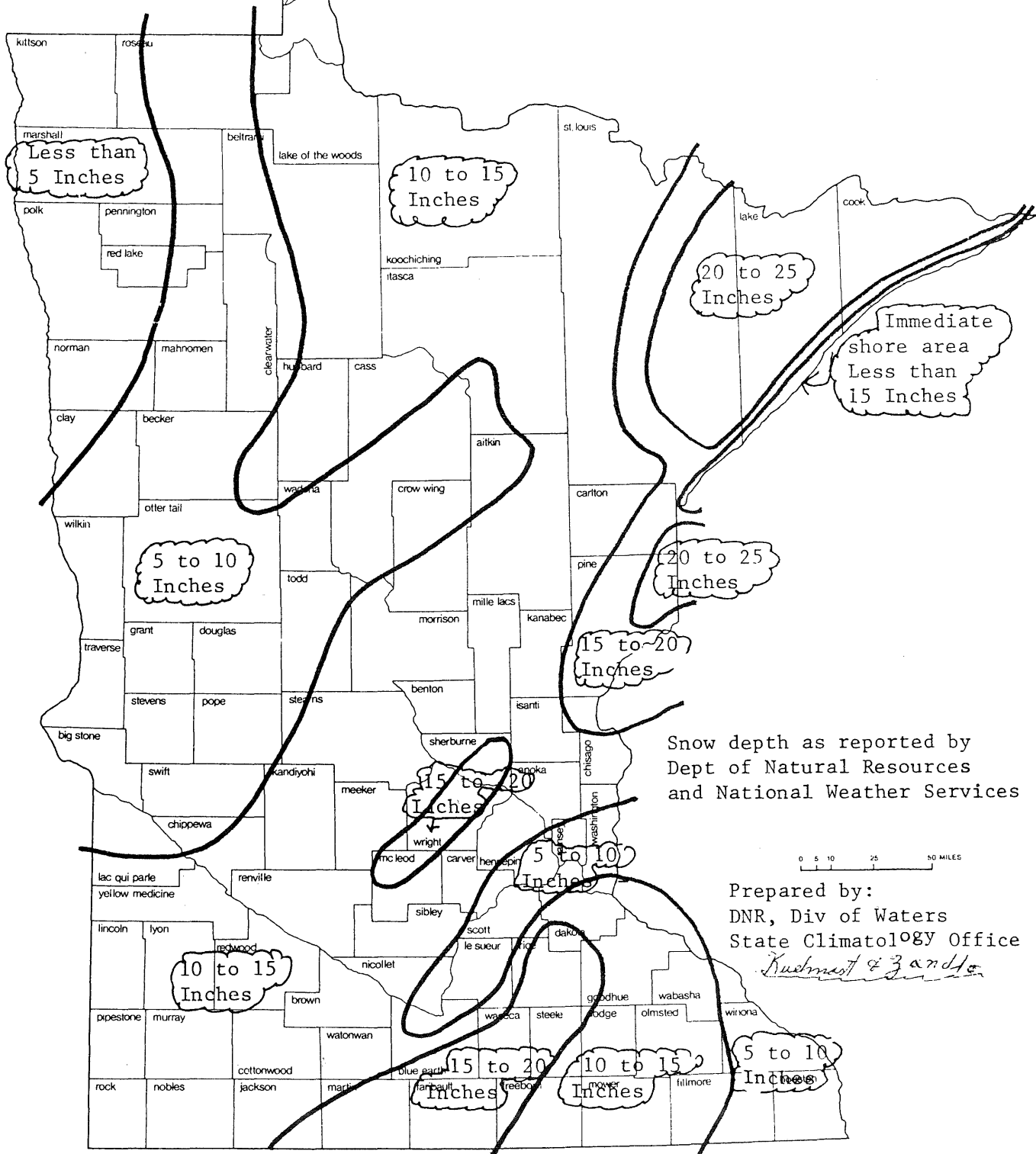
Figure 1

SNOW DEPTH MAP NOVEMBER 30, 1983



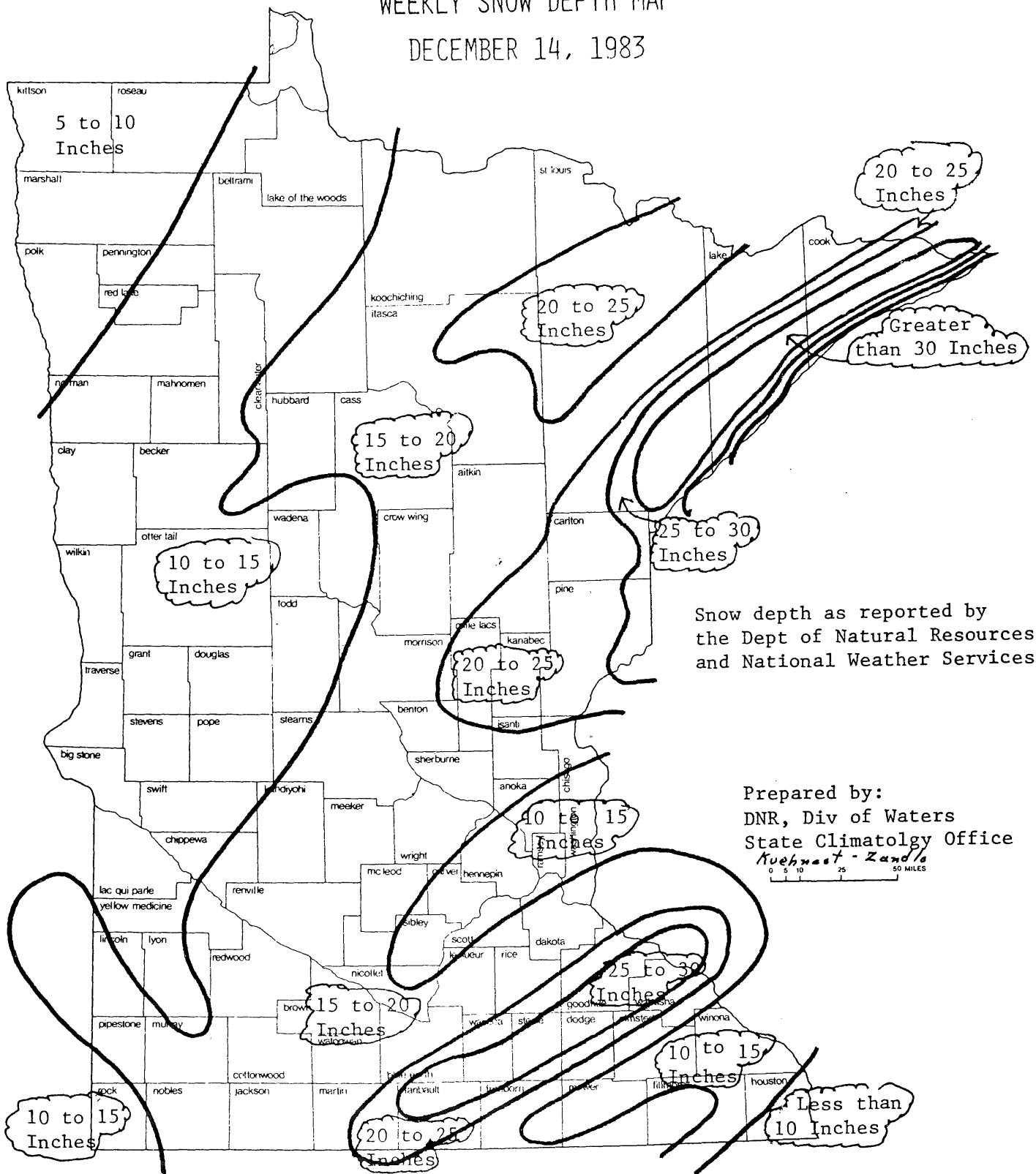
WEEKLY SNOW DEPTH MAP

DECEMBER 7, 1983



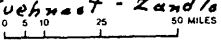
WEEKLY SNOW DEPTH MAP

DECEMBER 14, 1983



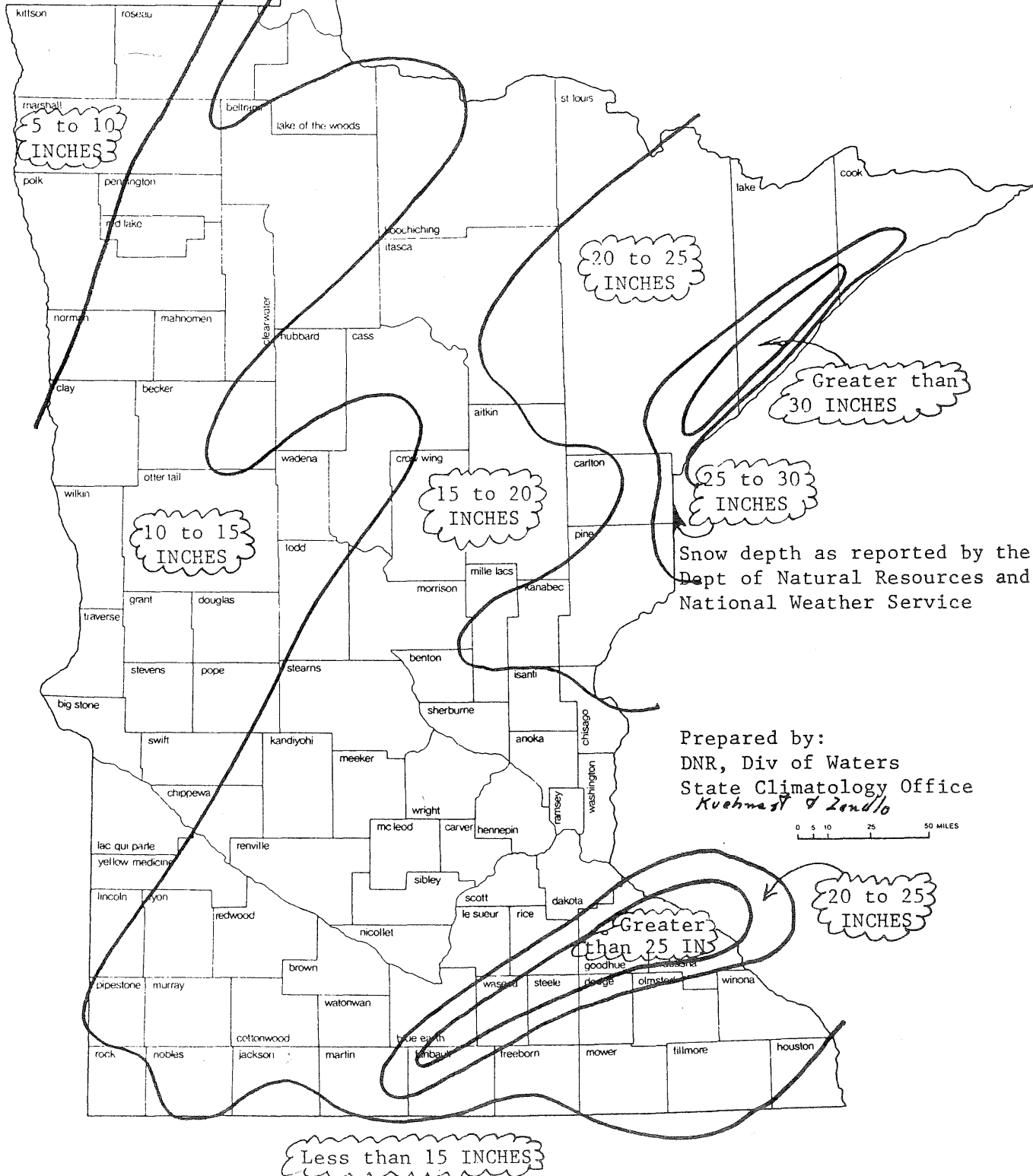
Snow depth as reported by the Dept of Natural Resources and National Weather Services

Prepared by:
DNR, Div of Waters
State Climatolgy Office
Kuehnast-Zandig



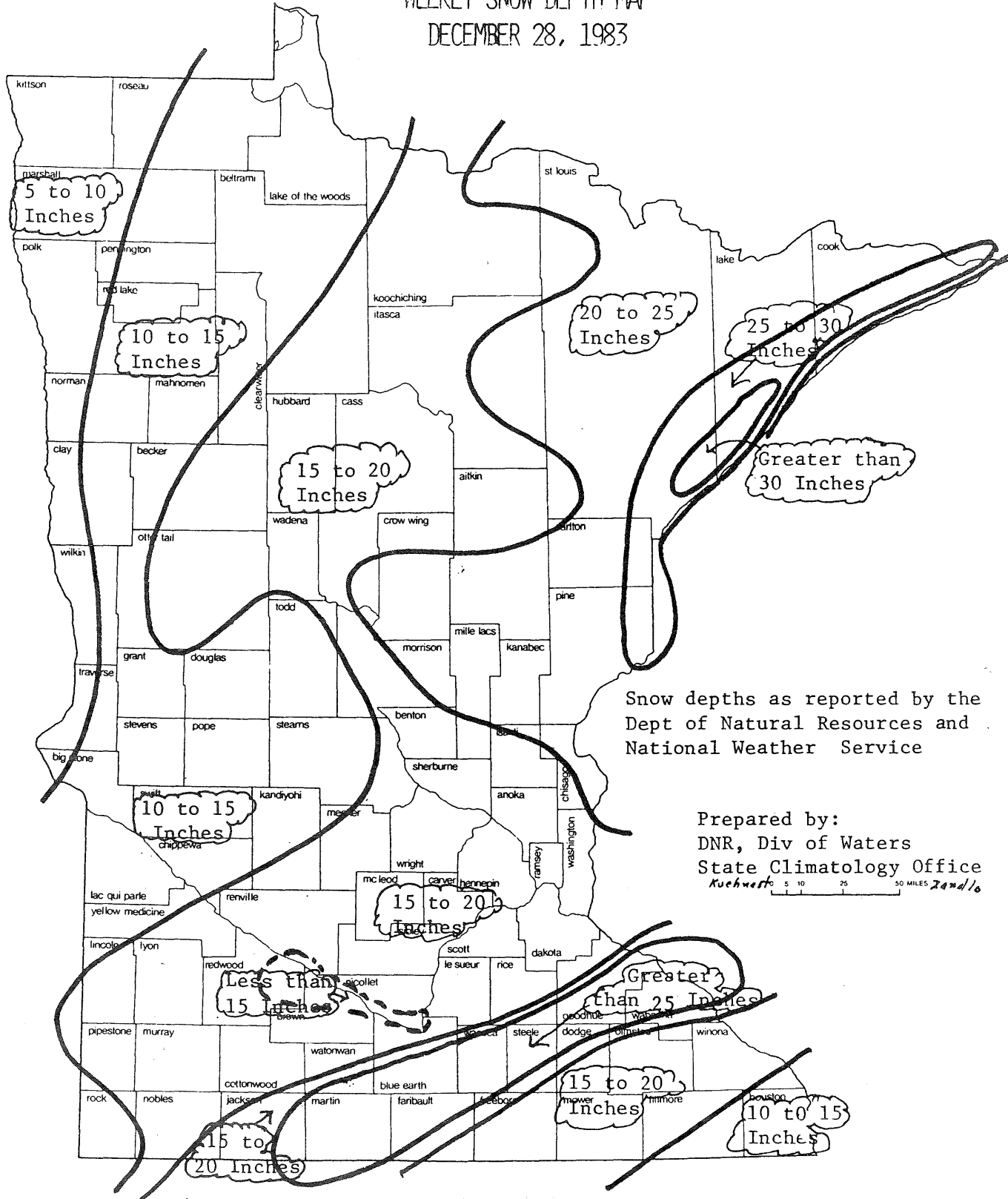
WEEKLY SNOW DEPTH MAP

DECEMBER 21, 1983



WEEKLY SNOW DEPTH MAP

DECEMBER 28, 1983

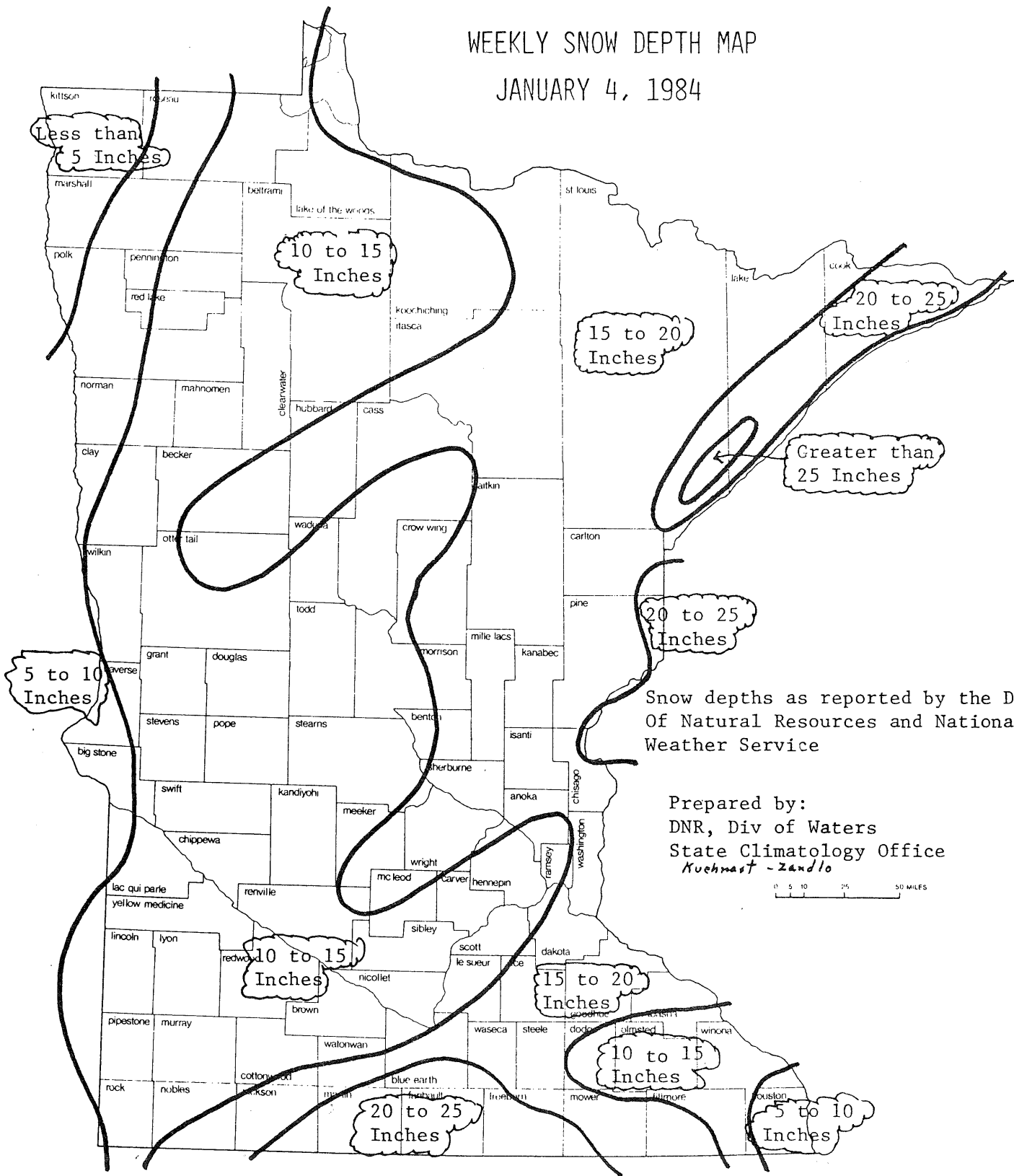


Snow depths as reported by the Dept of Natural Resources and National Weather Service

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 State Climatology Office
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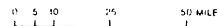
WEEKLY SNOW DEPTH MAP

JANUARY 4, 1984



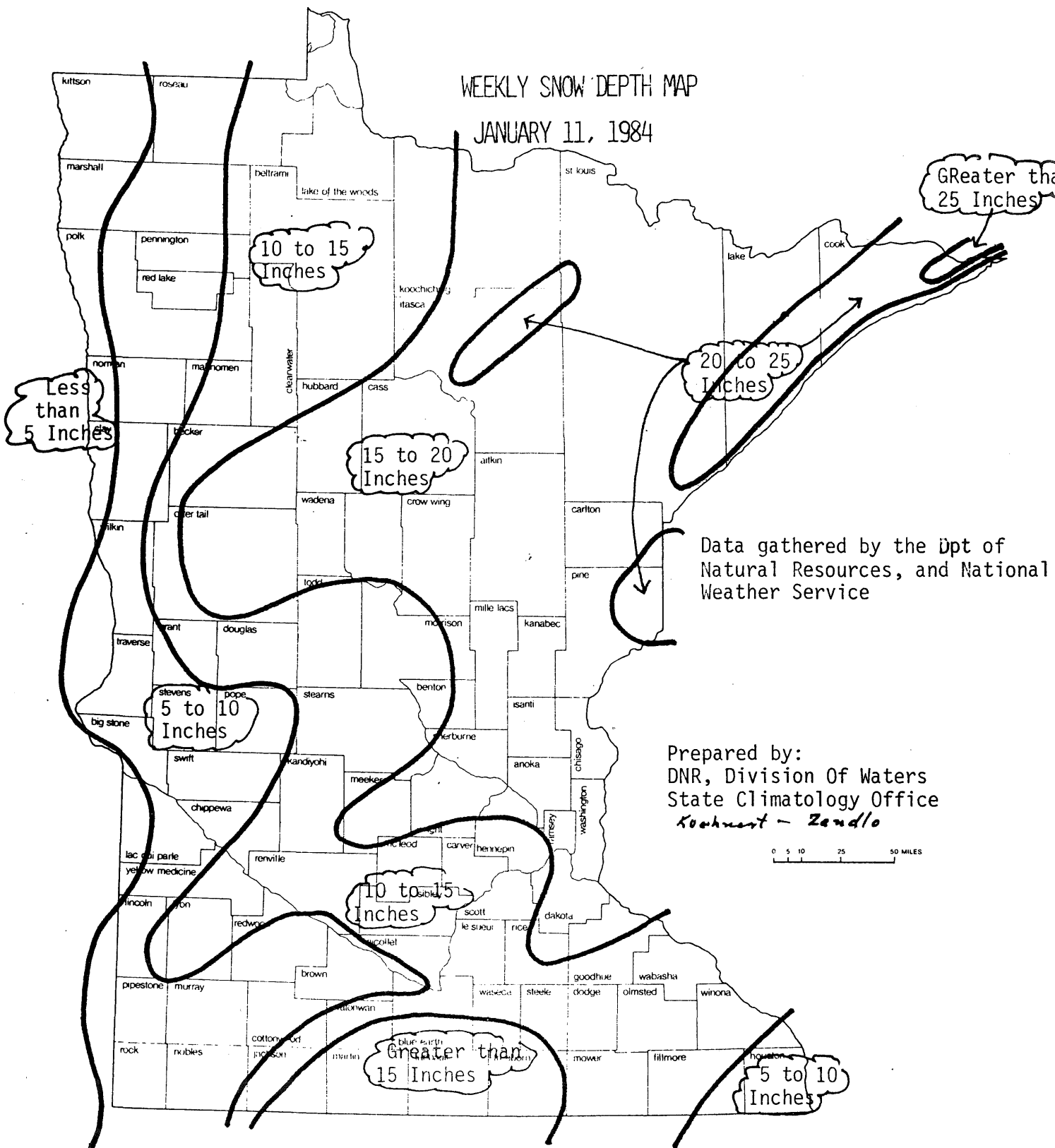
Snow depths as reported by the Dept
Of Natural Resources and National
Weather Service

Prepared by:
DNR, Div of Waters
State Climatology Office
Kuehnast - Zandlo



WEEKLY SNOW DEPTH MAP

JANUARY 11, 1984



Greater than 25 Inches

10 to 15 Inches

20 to 25 Inches

Less than 5 Inches

15 to 20 Inches

5 to 10 Inches

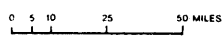
10 to 15 Inches

Greater than 15 Inches

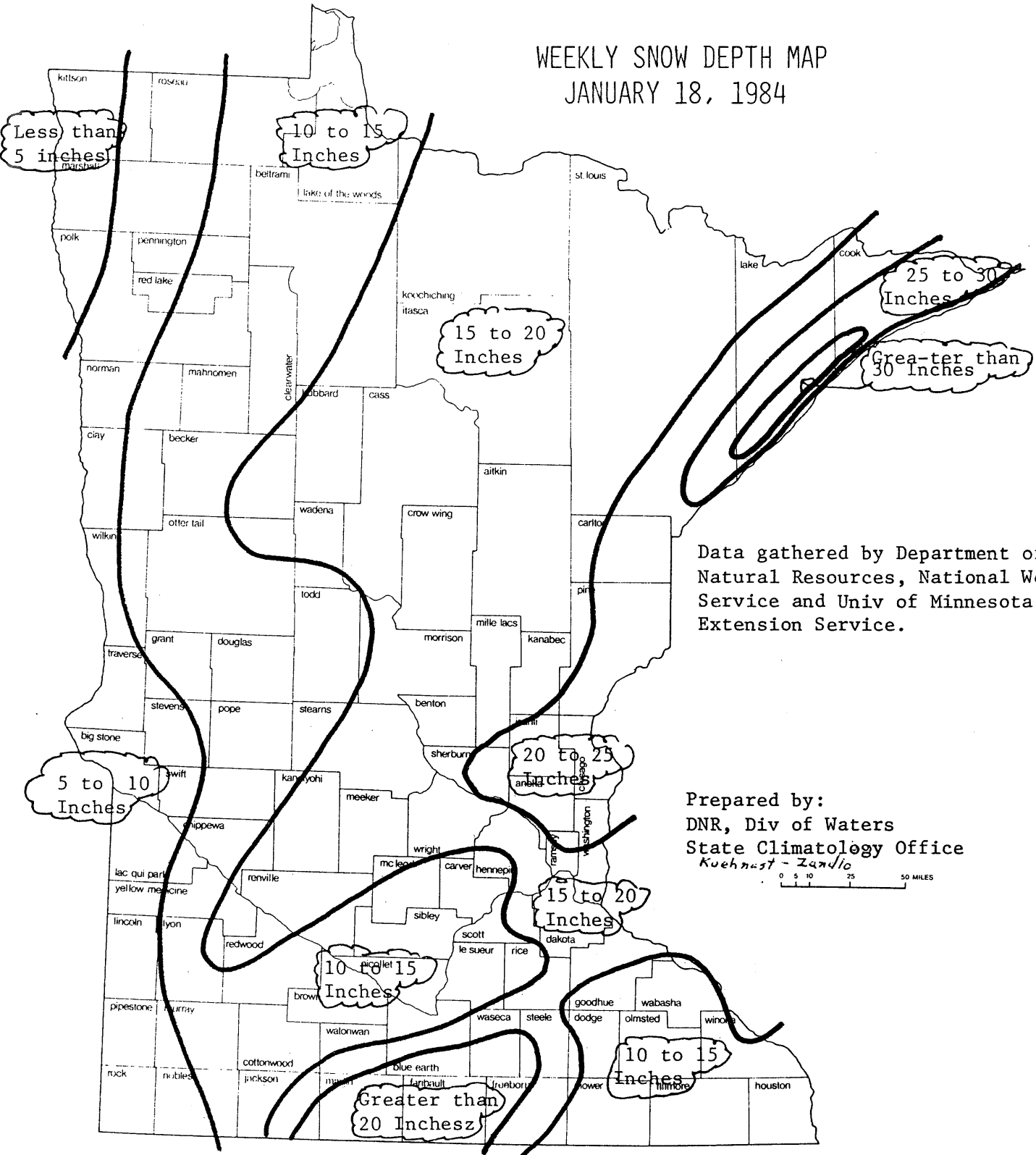
5 to 10 Inches

Data gathered by the Dept of Natural Resources, and National Weather Service

Prepared by:
DNR, Division Of Waters
State Climatology Office
Koehnert - Zandlo

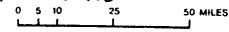


WEEKLY SNOW DEPTH MAP
JANUARY 18, 1984

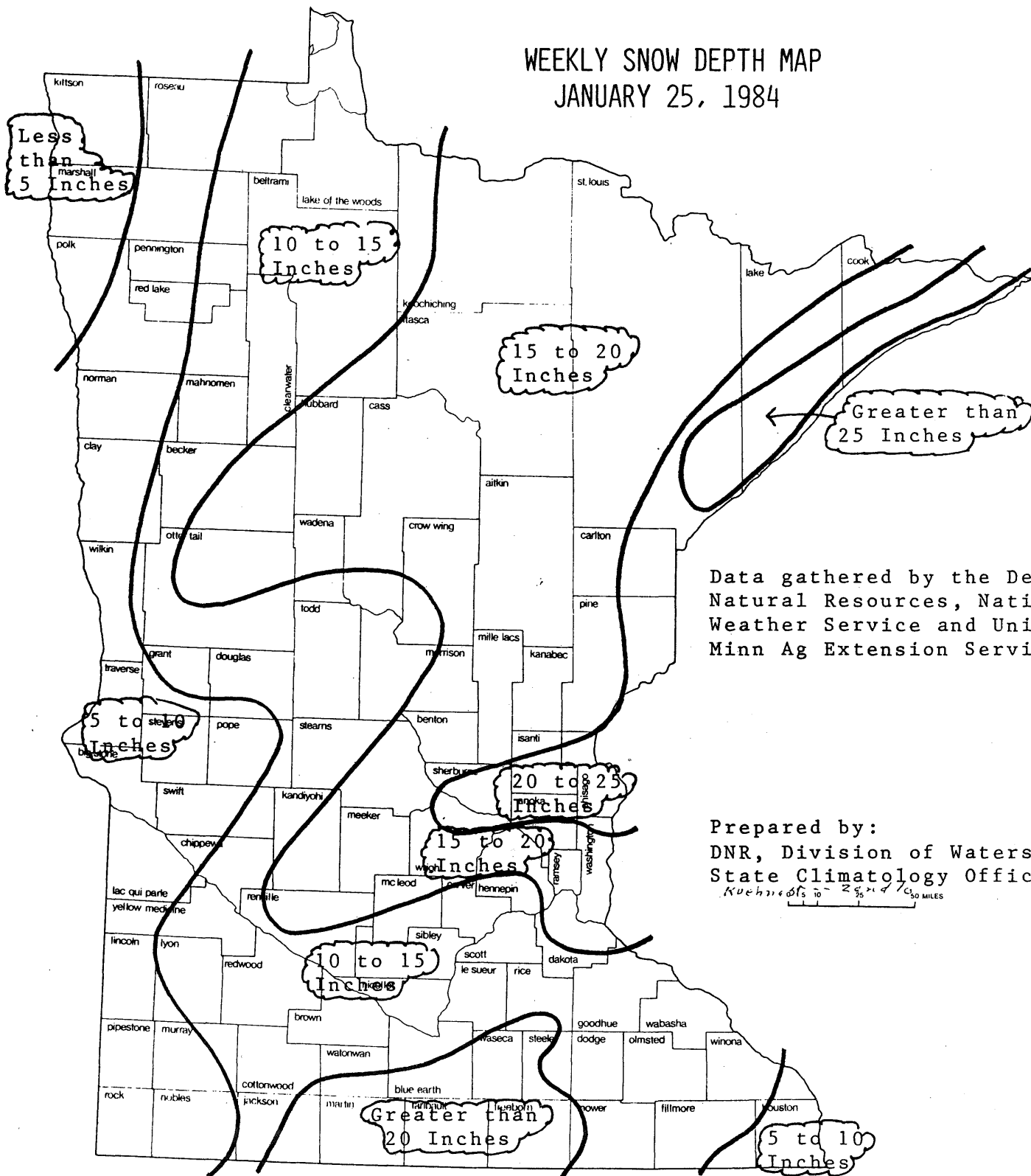


Data gathered by Department of Natural Resources, National Weather Service and Univ of Minnesota Ag Extension Service.

Prepared by:
DNR, Div of Waters
State Climatology Office
Kuehnst - Zandio



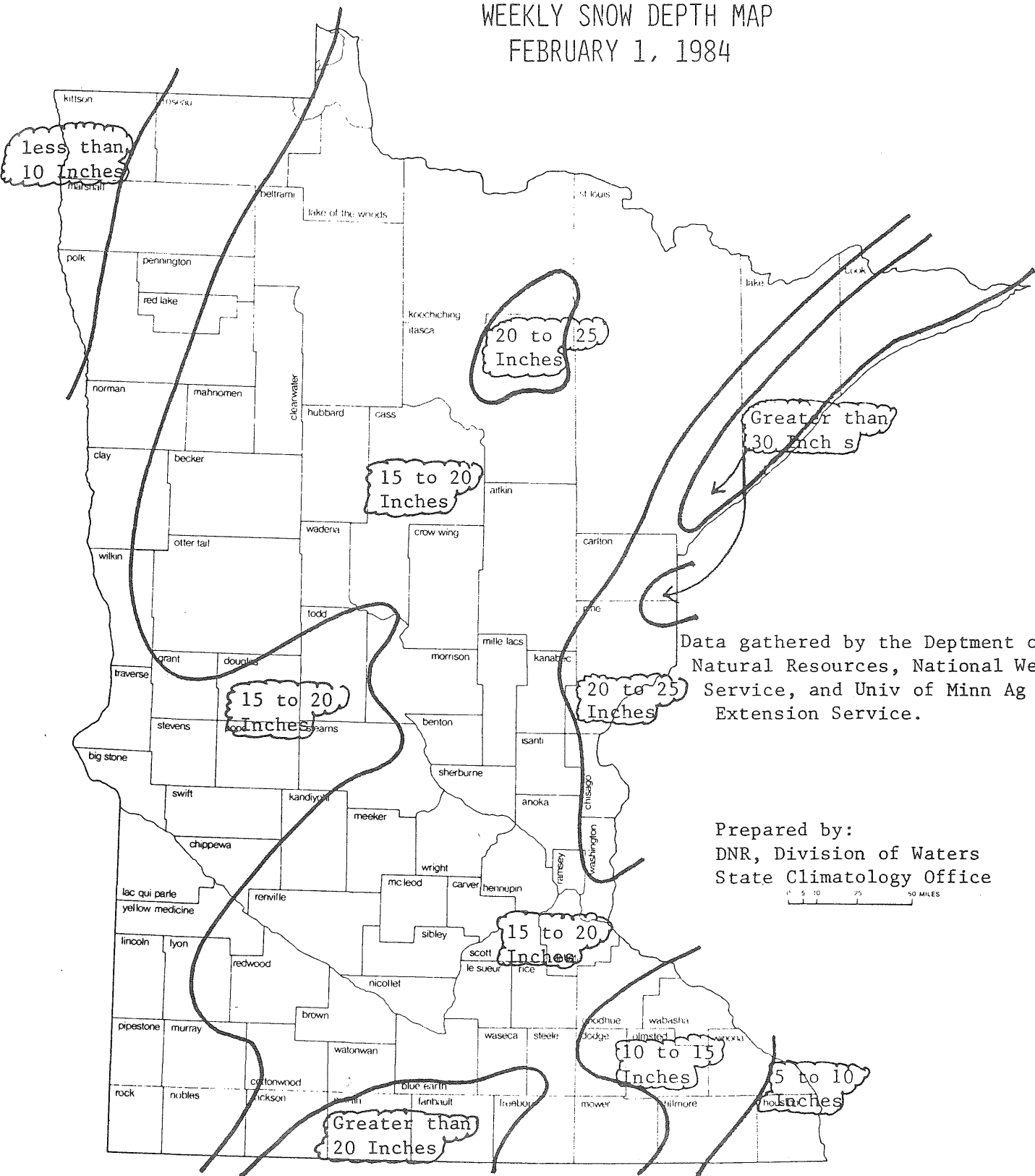
WEEKLY SNOW DEPTH MAP JANUARY 25, 1984



Data gathered by the Dept of Natural Resources, National Weather Service and Univ of Minn Ag Extension Service.

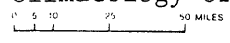
Prepared by:
DNR, Division of Waters
State Climatology Office
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WEEKLY SNOW DEPTH MAP FEBRUARY 1, 1984

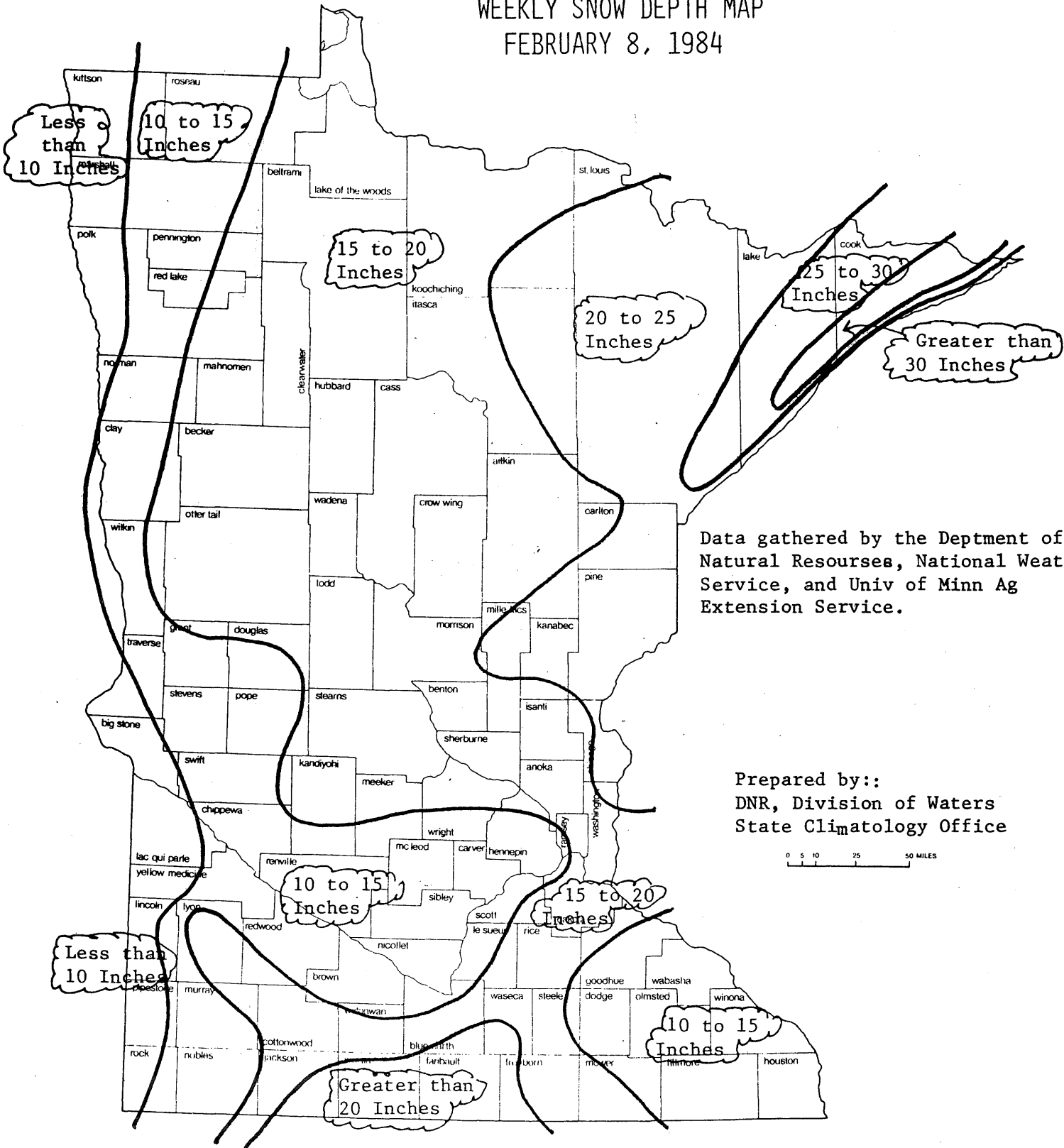


Data gathered by the Deptment of Natural Resources, National Weather Service, and Univ of Minn Ag Extension Service.

Prepared by:
DNR, Division of Waters
State Climatology Office

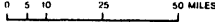


WEEKLY SNOW DEPTH MAP FEBRUARY 8, 1984

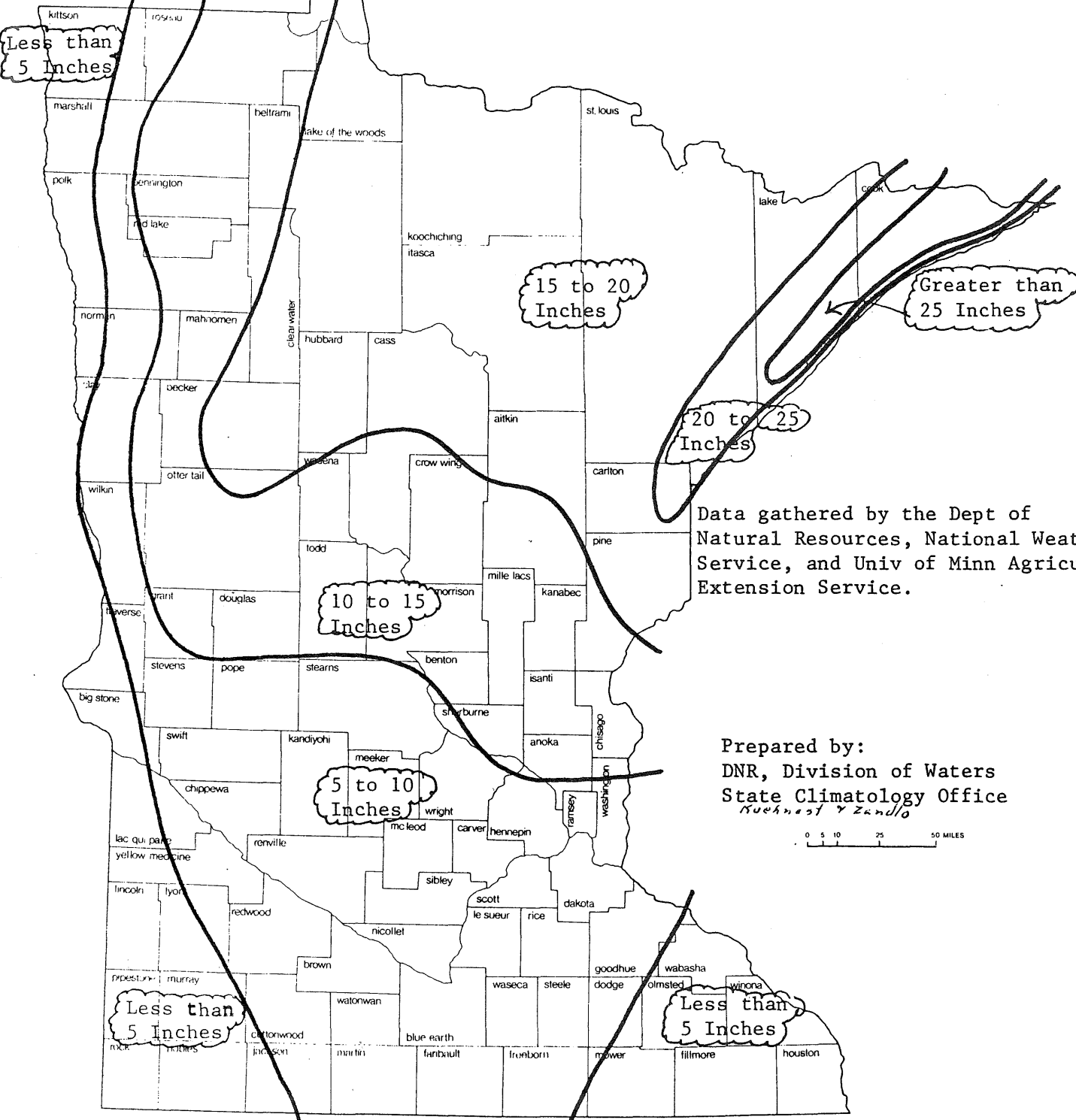


Data gathered by the Deptment of Natural Resources, National Weath Service, and Univ of Minn Ag Extension Service.

Prepared by::
DNR, Division of Waters
State Climatology Office

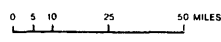


WEEKLY SNOW DEPTH MAP FEBRUARY 15, 1984



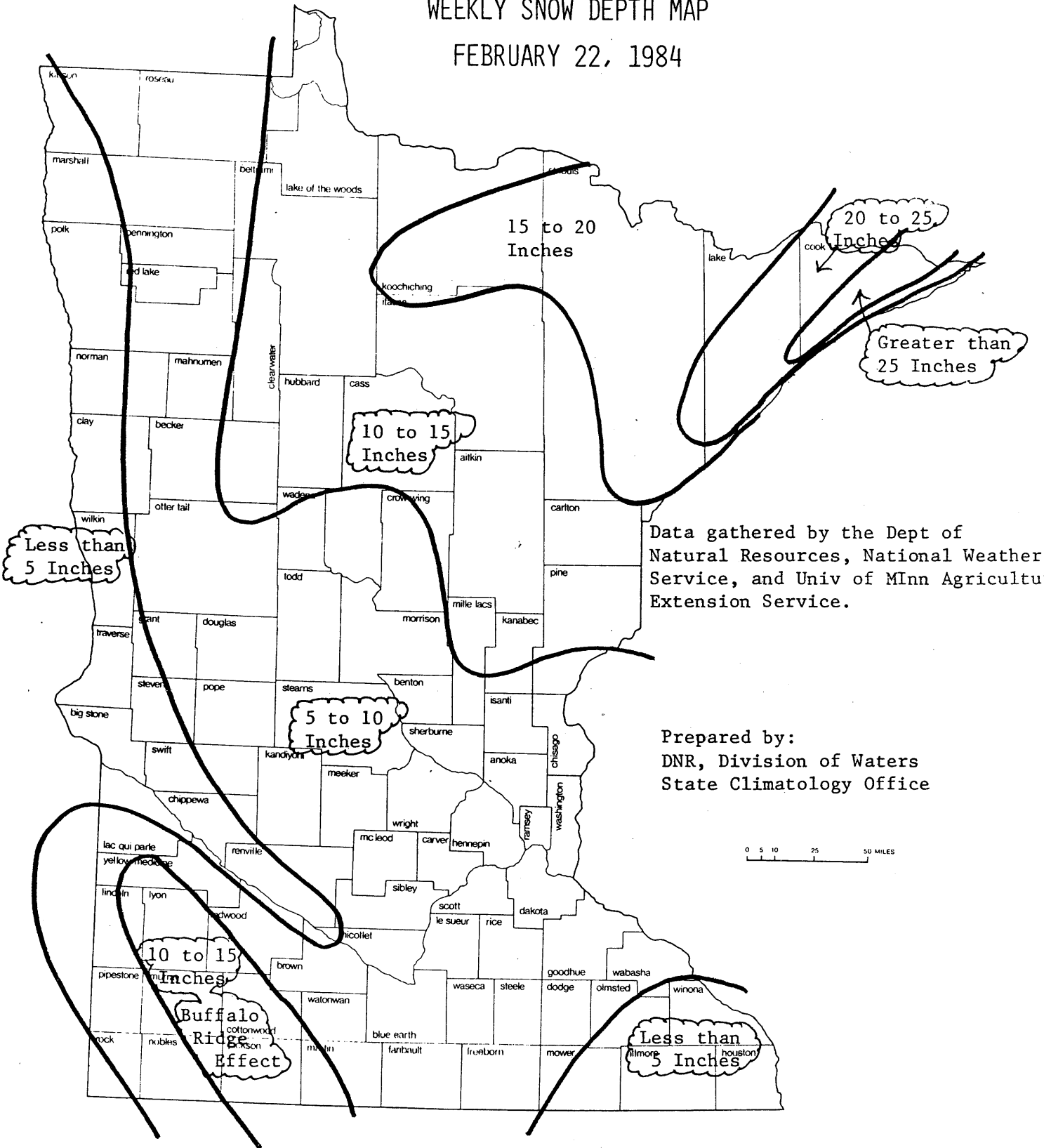
Data gathered by the Dept of Natural Resources, National Weather Service, and Univ of Minn Agriculture Extension Service.

Prepared by:
DNR, Division of Waters
State Climatology Office
Ruehnert & Zand/o

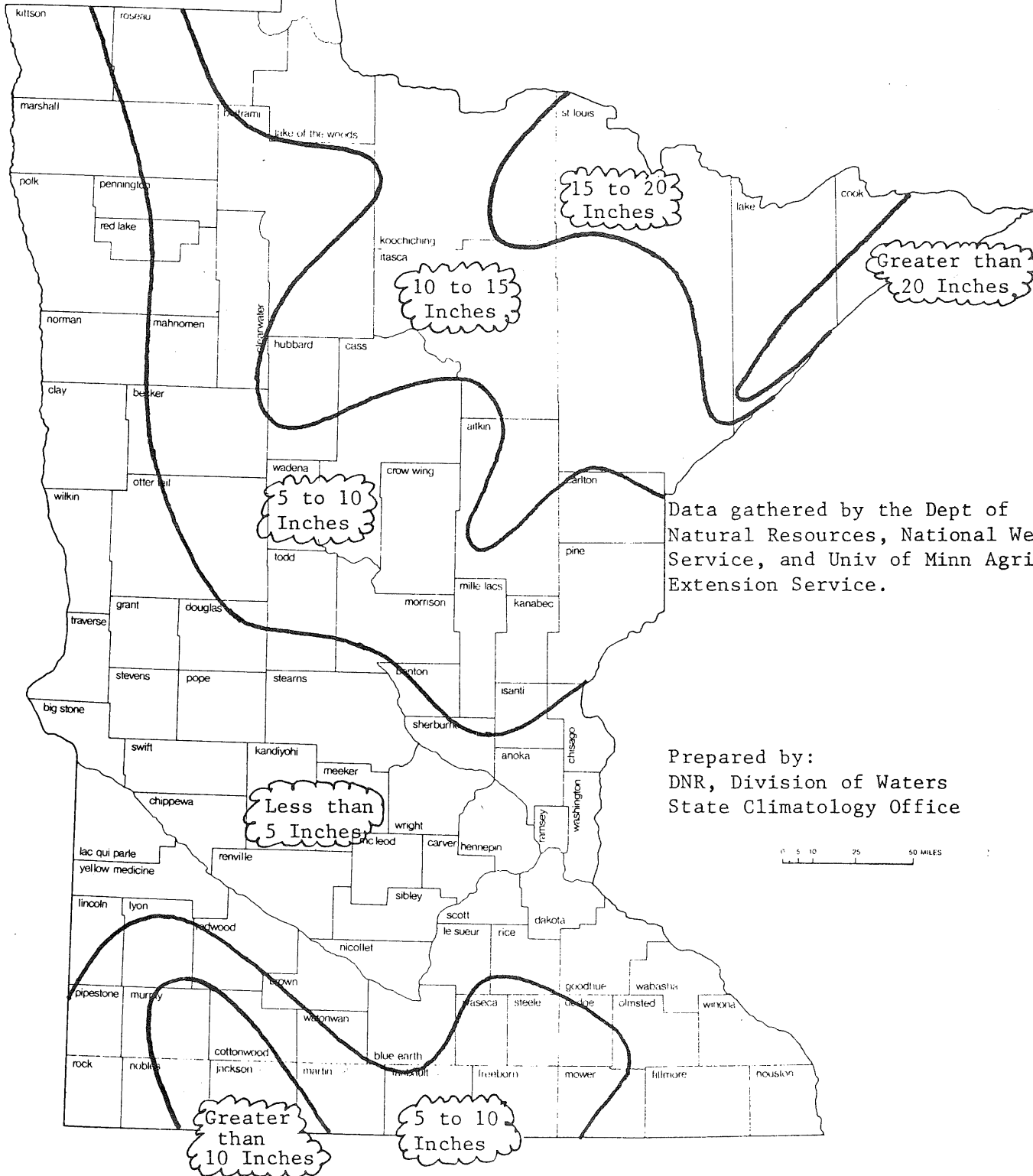


WEEKLY SNOW DEPTH MAP

FEBRUARY 22, 1984

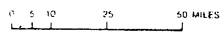


WEEKLY SNOW DEPTH MAP FEBRUARY 29, 1984

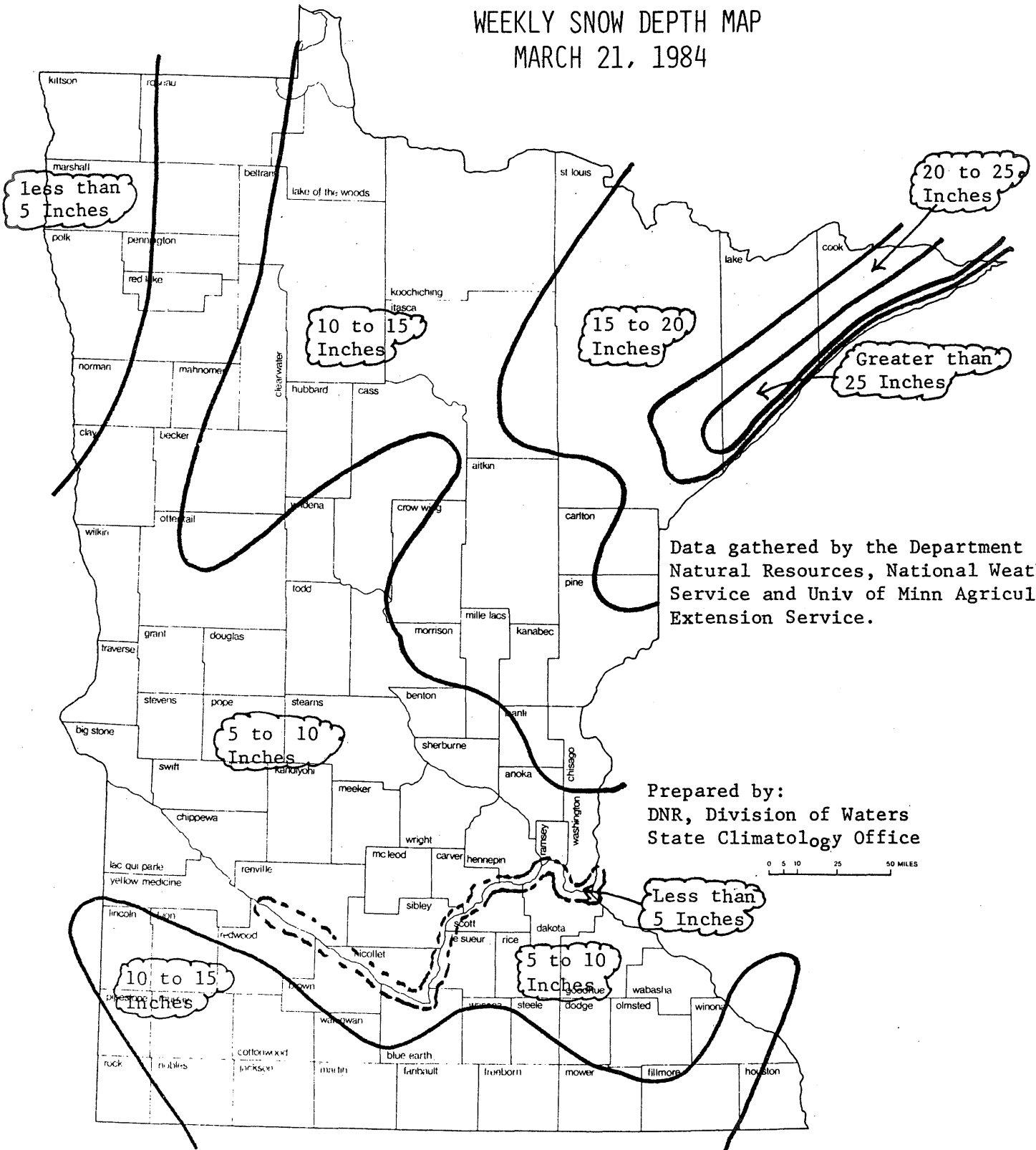


Data gathered by the Dept of Natural Resources, National Weather Service, and Univ of Minn Agriculture Extension Service.

Prepared by:
DNR, Division of Waters
State Climatology Office

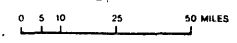


WEEKLY SNOW DEPTH MAP MARCH 21, 1984



Data gathered by the Department of Natural Resources, National Weather Service and Univ of Minn Agriculture Extension Service.

Prepared by:
DNR, Division of Waters
State Climatology Office



DEPARTMENT Natural Resources - Wildlife

Office Memorandum

TO: All Wildlife Personnel

DATE: 12-23-83

FROM: Roger Holmes

PHONE: 296-3344

SUBJECT: Winter Wildlife Emergency

Pheasants

On December 22 as you have probably already learned from the media, we declared a pheasant feeding emergency in the Southwest, South Central and Central portions of Minnesota. A news release is attached explaining the severity of the situation and volunteer nature of the program. The program will very likely expand to the entire pheasant range so all those managers should be prepared to be involved.

To date this what has occurred:

1. The Commissioner requested and received an initial release of 15,000 bushels of corn from the Commodity Credit Corporation. This grain will be bagged and shipped at DNR expense beginning Tuesday, December 27, to locations to be selected by Area Managers. Please decide on your depot site by Tuesday. Area offices might be best. The grain can be piled outside on the lawn or parking lot if no inside storage is available. It will probably be sacked in 50 pound bags. Contact Tim Bremicker after you decide on drop off points in Regions 1, III, IV, V and Metro.
2. The St. Paul and Minneapolis papers will be running large articles on pheasant feeding Sunday, December 25. Other state papers will be notified by news releases plus photos of crib feeders as designed by Scharf. KSTP, KSMP, WCCO and WTCN were also present at the news conference on December 22.
3. Pheasants Forever has established a gift account at the Commercial State Bank of St. Paul for donations. This money will be used to purchase corn. Their membership will be coordinating gifts as well as feeding programs. If you have an active pheasant group in your area, please contact them as soon as possible.
4. Free grain is still being solicited. As offers come into St. Paul, information will be passed to area managers.

These steps will be followed by Section field people in the pheasant range:

1. PHIP funds and donations will be made available for shelled or ear corn purchase. (Gifts to DNR should be made to "Minnesota State Treasurer - Pheasant Fund" and mailed to the Central Office.) Please verify the amount you anticipate needing with Regional Supervisors, who in turn should notify Tim.
2. Contact grain or feed elevators or farmers (if they can supply ear corn) to purchase corn and set up delivery points at key sites. Volunteers will be permitted to pick up corn from these vendors only after clearance from you. A signed voucher or telephone call to the elevator should suffice. Because we must control the flow of corn, permission to volunteers is mandatory. Elevators should be requested by you to maintain records of grain transfers. Volunteers should show some identification and also sign for corn delivered. I would recommend that you monitor transfers daily for the first several weeks. Vendor numbers for elevators will be required prior to payment, so please provide regional business managers with:

Companies -- Federal Identification #
-- State Identification #
-- Address

Farmers -- Name, Address and Soc. Sec. # (Must have S.S. #to become vendor)

Regional Supervisors and Wilma should also be notified as to names and vendors.

3. Media involvement should be maximized stressing the needs of long-term feeding, volunteer efforts, donated corn, and of course pheasant habitat requirements. Photos of feeders are enclosed for newspaper usage.
4. Please report stressed and dead birds to regional office as well as St. Paul. We need further documentation.
5. If you feel it is necessary, rent a snowmobile so you can assess pheasant wintering conditions. They should rent for about \$250/month. Sleds to haul corn may also be part of the package. Contact your Regional Business Managers for assistance in processing requests.

Deer

The situation for deer is not critical yet, but we are planning for problems later. Three levels of involvement exist: monitoring, depredations and starvation.

1. Increased monitoring is necessary this winter to locate deer concentrations. Private aircraft rental to intensify surveys is permissible although attempt to use Department aircraft first. Use annual survey formats wherever possible.
2. Depredations will be handled pursuant to Standards for Emergency Corn Food Plot Purchase issued on 11/5/82 (attached). The payment schedules (also attached) are those developed in 1982. These rates still repre-

sent a fair estimate of the input costs. Use these same rates when purchasing corn or other food to short stop a herd. You are authorized to use PHIP funds for these purchases. Please be very judicious in their expenditure and seek regional approval prior to utilization. Send an extra copy of the food plot agreement to St. Paul. PHIP expenditures made for this purpose will be summarized and reconciled with the deer program later.

3. Unless winter conditions moderate drastically, significant deer starvation will occur this winter. To maximize benefits of any feeding program designed to reduce the effects of starvation, emphasis will be placed on saving adult does. A plan is being developed to start feeding in late winter, if necessary. More information will be sent out later. In the meantime, please advise me of any deer (other than late fawns) at or near starvation that you are aware of.

An emergency deer feeding fund has been established. Checks may be made out to "Minnesota State Treasurer -- Deer Fund".

Attached is a copy of a draft release which provides additional information.

When assessing and providing food resources for deer or pheasant, refer to the graphs that are attached.



STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX , 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55146

DNR INFORMATION
(612) 296-6157

December 22, 1983

Harvey K. Nelson
U.S. Fish and Wildlife Service
Federal Building
Fort Snelling
Twin Cities, MN 55111

Dear Mr. Nelson:

This is to inform you that the Minnesota Department of Natural Resources, has declared a pheasant emergency throughout most of southern Minnesota. The extreme cold, compounded by deep snow, and lack of standing corn left in the field has placed 150,000 birds in extreme peril. This zone is expected to enlarge placing most of Minnesota's pheasant population (600,000) under severe stress.

At present an enormous public volunteer effort is under way to reach pheasants with donated food, however, we anticipate deficits of donated grain within a short period of time. We are, therefore, requesting your assistance in obtaining Commodity Credit Cooperation stored grain. Shelled corn, stored in southern Minnesota is preferred. The Department of Natural Resources is prepared to pay for bagging and shipment, if required. Please request an initial transfer of 15,000 bushels (est. 420 tons).

Upon approval please have U.S. Fish & Wildlife Service and USDA personnel coordinate shipments with MN/DNR - Section of Wildlife Staff member, Timothy Bremicker (612-296-3344).

Thank you for your immediate attention to this matter.

Yours truly,

JOSEPH N. ALEXANDER
Commissioner

JNA:tb

Minnesota
(STATE)

Emergency Resident Wildlife Feeding Program

This Memorandum of Agreement is entered into between the State of Minnesota (hereinafter referred to as the State) and the Commodity Credit Corporation, U.S. Department of Agriculture (hereinafter referred to as CCC) pursuant to Public Law 87-152, 87th Congress, approved August 17, 1961 (75 Stat. 389) (hereinafter referred to as the Act) which authorizes the State to requisition certain Government-owned grain for emergency resident wildlife feeding upon a finding by the Secretary of the Interior that some or all of the State is included in an area that is threatened with serious damage or loss to resident game birds and other resident wildlife from starvation.

1. The State will be represented by the State agency that has fish and game supervisory authority within the State and that has signed this Memorandum of Agreement as the properly authorized representative of the State. The execution of the Agreement will constitute a representation of a proper delegation of authority in the signatory agencies to carry out the provisions thereof.
2. As far in advance of desired shipment as possible, the State will requisition from CCC grain desired for the purpose contemplated in the Act. The requisition may be in the form of a Purchase Order, or other printed form normally used for acquiring materials or services or may be in letter form. The requisition must be numbered and must identify the Act under which the requisition is made and state the quantity and variety of grain desired, alternate varieties that would be acceptable, whether grain is to be in bulk or if in bags, the type and size of the bags, date of delivery desired, name and address of consignee, and proper delivery address if grain is to be made available or delivered at a point different than that of the address of the consignee. Requisitions are to be directed to the Director, Grain Division, Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture, Washington 25, D.C.
3. At the same time (or previous thereto if possible) that application is made to CCC for grain to feed resident wildlife pursuant to the Act, the State must, either by telephone, telegram, or letter, notify the Regional Director at the Regional Office of the Bureau of Sport Fisheries and Wildlife of the U.S. Department of Interior having administrative jurisdiction over Bureau activities in the State concerned that application for such grain has been, or will be made. Such notification must contain information as to the species of wildlife and the area involved, the quantity and kind of grain being requisitioned, the conditions creating the emergency and such other information as to be made by the Secretary of the Interior before the requisition.

tion of the State can be fulfilled. Grain will be made available by CCC only after a finding by the Secretary of the Interior that an area within the State is threatened with serious damage or loss to resident game birds and other resident wildlife, from starvation.

4. CCC will inform the State of the ASCS Commodity Office which will select the storage point at which the grain will be made available or from which the grain will be packaged or shipped if the requisition provides for packaging or delivery. The ASCS Commodity Office will advise consignee directly of the storage location of the grain, if the grain is to be delivered at such location or its expected time of arrival at the delivery point specified.
5. Grain will be made available to the State at no charge to the extent that bulk grain is taken at point of storage where the grain is located at the time the requisition is received. In the event that the State wishes the grain to be bagged or otherwise packaged and delivered to one or more points within the State, CCC will invoice the State for any expenses incurred in the packaging or transportation of such grain and the State agrees to reimburse CCC upon presentation of properly executed invoices.
6. Delivery and passage of title to the grain shall be effected by transfer and delivery of warehouse receipts, bills of lading, or other evidence of title to the person(s) specified in the requisition. Responsibility for all grains accepted by consignees shall pass to the State upon such delivery, including responsibilities for providing, or causing to be provided proper facilities for the handling, storage and disposal of such grains.
7. The State shall use the grain supplied pursuant to requisitions issued hereunder only for the purpose of meeting emergency situations described in Section 1 of the Act. Such grain shall not be sold, exchanged or disposed of in any other manner, unless with the prior approval of CCC.
8. The State shall not reduce its normal commercial purchases of grain, or sell or otherwise commercially dispose of any grain grown or otherwise acquired in conjunction with wildlife feeding programs, as a result of receiving grain from CCC pursuant to the Act.
9. Grain made available by CCC pursuant to this Memorandum of Agreement shall be grain of such qualities as determined by CCC to be available for the purpose of the emergency wildlife feeding program.
10. This Agreement shall be effective as of the date of the last signature hereto, and may be terminated upon written request of either party.

Date _____

Director, Grain Division
Agricultural Stabilization and Conservation
Service

Date _____

(Name, Title and Agency of Authorized
Representative of the State)



STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX , 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55146

DNR INFORMATION
(612) 296-6157

January 10, 1984

Mr. Harvey K. Nelson
U.s. Fish & Wildlife Service
Federal Bldg., Fort Snelling
Twin Cities, MN 55155

Dear Mr. Nelson:

By Friday, January 14, the Section of Wildlife will have supplied each Area Wildlife Manager in the affected pheasant range with approximately 20 tons of shelled corn donated by the Commodity Credit Corporation. This totals 420 tons statewide and consumes our initial request of 15,000 bushels. Public response has been nothing less than fantastic, consequently shortfalls at many feed depots are expected within 5 days or possibly sooner, if weather conditions worsen.

Please, as soon as possible, make the necessary arrangements with Commodity Credit Corporation to release another 50,000 bushels of shelled corn.

We are prepared to accept the full request from the previous supplier (Victoria Grain Company of Minneapolis) as the condition of the corn has improved markedly since the first shipments on Decemeber 27. Earlier loads weight tested well, however, a 50-60% heat damage plus a strong musky/moldy odor was noted. Thankfully this grain tested less than 10 parts per billion for Aflotoxin making it suitable for avian food, although its palatability is possibly diminished. We would prefer not to accept grain exceeding 40% damage nor possessing a moldy order. CCC grain stores in southern and western Minnesota would also be acceptable suppliers.

Your excellent assistance in obtaining the earlier shipment was much appreciated. Please extend our thanks to your staff.

Tim Bremicker (296-3344) should be contacted for coordination.

Yours truly,

JOSEPH N. ALEXANDER
Commissioner

JNA:tb

cc: Roger Holmes

Attachment 5

Grain Hauling, Bagging, and Delivery

Formal Bid

Vendor name: Anson Bros. Grain Co., Inc.
Box 548
Hastings, Minn. 55033

The above vendor agrees to:

- 1) Transport bulk corn from the Victoria Grain Co., 31st and California N.E., Minneapolis, Minn. to his facility in Hastings, Minn. at a rate of 10¢ per bushel.
- 2) Use trucks with a minimum load capacity of twenty (20) tons.
- 3) Be available from 12/29/83 through 4/1/84 with ample notice.
- 4) Provide a Certificate of Insurance covering the period of 12/29/83 through 4/1/84 for the following:
 - Liability, including auto, of \$100,000 per individual and \$500,000 per occurrence
 - Property damage of \$50,000
 - Worker's Compensation as required by State law
- 5) Bag bulk corn in 50 lb. bags at a cost of 55¢ per bushel; supplying bags with no special printing or marking and providing sufficient labor.
- 6) To store corn temporarily at no charge.
- 7) Deliver bagged corn to various sites throughout Minnesota at the following rate:
 - 25¢ per bushel for the first 30 miles
 - Additional 1¢ increments per bushel for each 10 miles after 30 miles.
- 8) Invoice to the State shall be accompanied by mileage logs.

The above conditions agreed to by Mr. Dennis Anson, 12/27/83 per telephone.

(Please send formal acknowledgement upon receipt of this Purchase Order #713813).

Bulk Grain Bagging

Formal Bid

Vendor name: E.J. Houle, Inc.
Box 370
Forest Lake, Minn. 55025

The above vendor agrees to:

- 1) Bag bulk corn in 50 lb. bags at a cost of \$24.60 per ton; supplying bags with no special printing or marking and to provide sufficient labor.
- 2) Provide a Certificate of Insurance showing proof of Worker's Compensation and Property Damage coverage of \$50,000 in force for the period of 12/29/83 through 4/1/84.
- 3) Store corn temporarily at no charge.

The vendor also requires from the State any compensation for damaged and/or non-returned pallets.

The above conditions agreed to by Mr. Willard Houle, 12/27/83 per telephone.
(Please send formal acknowledgement upon receipt of this Purchase Order #713815).

Bulk Corn Pick-up and Delivery;
Bagged Corn Pick-up and Delivery

Formal Bid

Vendor: Michael Peterson
8350 Wyoming Trail
Chisago City, MN 55013

The above vendor agrees to:

- 1) Transport bulk corn from the Victoria Grain Co., 31st and California NE Minneapolis, Minn. to the E.J. Houle Co., Inc., Forest Lake, Minn. at a rate of 30¢ per 100 wt.
- 2) Use trucks with a minimum load capacity of twenty (20) tons.
- 3) Be available from 12/29/83 through 4/1/84 with ample notice.
- 4) Transport bagged corn from the E.J. Houle Co., Inc., Forest Lake, Minn. to various sites throughout Minnesota at a rate of \$1.80 per running mile for the same time period; using trucks with a minimum load capacity of twenty (20) tons.
- 5) Provide a Certificate of Insurance covering the period of 12/29/83 through 4/1/84 for the following:
 - Liability, including auto, of \$100,000 per individual and \$500,000 per occurrence
 - Property damage of \$50,000
- 6) Invoices to the State shall be accompanied by mileage logs.

The above conditions agreed to by Mr. Willard Houle on behalf of Michael Peterson, 12/27/83 per telephone.

(Please send formal acknowledgement upon receipt of this Purchase Order #713816).

Table 1. Summary of Anson and Houle bagging operations

Bagged and delivered by:	<u>Anson</u>	<u>Houle's</u>	<u>Total</u>
Loads	31	20	51
Tons	756	455	1,211
Pounds	1,512,000	910,000	2,422,000
Bushels	27,000	16,250	43,250

Table 2. Summary of Anson and Houle grain allotments.

Grain Shipments To:	<u>Ansons</u>	<u>Houles</u>	<u>Total</u>
CCC Corn (bushels)	8,000	7,000	15,000
CCC Corn (bushels)	15,000	15,000 ^A	30,000
CCC Corn (bushels)	5,000 ^B	5,000 ^B	10,000
Rahr mixed grains (bushels)	<u>4,000</u>	<u>-0-</u>	<u>4,000</u>

A. Only part-used

B. Not used at all-transferred from New Ulm. An additional 8,000 bushels of CCC Corn was released at New Ulm for use in bulk deliveries, but this was not used.

Table 3

<u>Manager</u>	<u>Work Area</u>	<u>Load 1</u>	<u>Load 2</u>	<u>Load 3</u>	<u>Load 4</u>	<u>Load 5</u>	<u>Load 6</u>
Rob Naplin	Chippewa Kandiyohi Meeker	Jan. 6	Jan. 24	Jan. 24	Feb. 6	Feb. 13	Mar. 13
Larry Nelson	Region 4	Jan. 9	Jan. 23	Feb. 1	Feb. 15		
LeRoy Dahlke	Lac qui Parle Yellow Medicine	Jan. 5	Jan. 20	Jan. 27	Feb. 14		
Dave Soehren	Swift Big Stone	Jan. 5	Jan. 20	Jan. 27	Feb. 14		
Bob Meyer	Lincoln Lyon	Jan. 5	Jan. 20	Jan. 26	Feb. 2		
Roy Nelson	LeSueur Blue Earth Faribault Waseca	Jan. 4	Jan. 19	Jan. 25	Feb. 10		
Lloyd Knudson	Anoka Ramsey Washington	Dec. 30	Jan. 17	Feb. 10 (1/2)			
Gordy Gust	Hennepin Carver Scott Dakota	Jan. 3	Jan. 17	Feb. 10 (1/2)			
Ken Bonnema	Renville Redwood	Jan. 3	Jan. 19	Feb. 8			
John Idstrom	Dodge Freeborn Rice Steele	Jan. 10	Jan. 18	Feb. 7			
Jack Heather	Goodhue Mower Olmsted	Jan. 6	Jan. 18				
Paul Bremer	McCleod Nicollet Sibley	Jan. 9	Feb. 3				
Mike Mauer	Sherburne Stearns Wright	Jan. 11	Feb. 9 (1/2)				
Gordy Neilsen	Clay Ottertail Wilken	Jan. 11	Feb. 14				
Jerry Larson	Douglas Pope	Jan. 13	Feb. 7				
John Scharf	Grant Stevens Traverse	Jan. 13	Feb. 7				
Gary Johnson	Benton Morrison Todd	Jan. 17	Feb. 9 (1/2)				
Madelia Doug Wells	Region 4 Cottonwood Jackson Martin Watowan	Jan. 31 Jan. 4	Feb. 16				

P. Loegering	Murray	Jan. 10		
	Nobles			
	Pipestone			
	Rock			
Nick Gulden	Fillmore	Jan. 12		
	Houston			
	Winona			
Carlos Avery (Storage)	Region 6	Feb. 28	Mar. 1	Mar. 2

<u>Source of Money</u>	<u>Amount</u>	<u>Use</u>
Gift Account	\$ 1,447	Purchase corn, volunteers
PHIP	53,941	Bagging and Shipping

Table 4. Summary of costs associated with bagging and hauling of CCC corn.

IMMEDIATE RELEASEDNR ANNOUNCES PHEASANT FEEDING PROGRAM

According to Department of Natural Resources officials, deep drifting snows and sub-zero temperatures, intensified by wind, are creating severe problems for wildlife in parts of Minnesota. The area most affected lies west of U.S. Highway 52 and south of I-94.

Wintering conditions for pheasants, Hungarian partridge and most songbirds are now rated as very poor and the birds in most areas are having difficulty finding food and shelter. Pheasants and Huns have already suffered some weight loss and may be expected to lose weight more quickly as snow and cold weather continues.

The condition of Minnesota's deer herd is at this time rated good; however, monitoring is being intensified, particularly in the south central, southwest and west central portions of the state. More information on Minnesota's deer herd will be provided throughout the winter.

Officials said it is very unusual for pheasants to encounter starvation problems, and the last feeding emergency was in 1962. But the extended, evenly distributed deep snows and cold temperatures experienced this year are unprecedented. Birds are normally able to exist on a variety of small grains and weed seeds and can usually find food under average winter conditions, but deep snow compounded by extensive early fall plowing covered many food sources.

Sportsmen's clubs, farmers and individuals wishing to feed pheasants, Huns and other wildlife are still being urged by the DNR to feed in known problem areas. Officials stressed that the food be placed in or near cover known to contain pheasants and that the food not be placed near roads because of traffic mortality. Once started, a feeding program must be continued until spring, officials cautioned.

The preferred technique is putting ear corn in elevated cylindrical cribs made of fencing. Each pheasant will require about 1/2 bushel of corn for the four months of winter. A 2 foot diameter, 4 foot high crib will hold about 5 bushels of ear corn. This will feed 20 pheasants for 60 days. More will be required if deer, squirrels and other wild animals are also present.

Cribs should be located at sites where wind will sweep them free of snow, but they must also be near good winter shelter. Plans for feeder cribs are available from DNR Wildlife field offices.

If ear corn is not available, shelled corn can be used. It should be put in a feeder, or at least put on a straw mat or cardboard.

"In some areas pheasants appear to be finding sufficient food from corn plots established on Wildlife Management Areas, other public lands and on private lands cost-shared through the DNR Wildlife Habitat Improvement Program," said Roger Holmes, Chief of the Section of Wildlife.

"Although we have established about 11,000 acres of food plots for wildlife this winter, this is only one food plot per 10 square miles. Ideally we should have a food plot for every 2.5 square miles, or 20,000 food plots.

"If food plots are depleted, Area Wildlife Managers will be replenishing them soon. Consequently, volunteers should be concentrating on pheasant feeding on private lands. Remember to contact landowners before entering private lands."

Officials also emphasize that winter is normally the critical time of year for most wildlife species. The best way to manage for winter is by developing and maintaining permanent wildlife habitat, which includes adequate cover and food resources.

The Department of Natural Resources will be providing corn through a network of grain elevator and supply depots. Corn to be supplied at Area Wildlife Office depots was supplied free, as provided for in federal law, by the Commodity Credit Corporation, a subsidiary of the U.S. Department of Agriculture.

Corn available at elevators was purchased by the Department of Natural Resources with Pheasant Habitat Stamp funds. Supplies will be made available to sportsmen clubs, FFA Chapters, 4-H Groups, and individuals upon approval of Area Wildlife Managers.

These steps should be followed:

- (1) Area Wildlife Managers should be contacted to verify need, location of feeding site and number of birds to be fed.
- (2) Area Wildlife Manager will approve grain pickup at elevator or supply depot.
- (3) The organization or individual will sign a voucher at the grain elevator or depot indicating volume of grain picked up.
- (4) Those unable to contact an Area Manager may use the DNR toll free number 1-800-652-9747, 296-6157, or 296-4799. These requests will be forwarded to the field.

PHEASANT FEEDING PROGRAM (cont'd)

Following is a list of area wildlife managers, the counties they are responsible for, and the supply depots. All these depots should be supplied with corn by January 6th:

<u>Manager</u>	<u>Counties</u>	<u>Location of Corn</u>
Lloyd Knudson 612-464-5200	Washington Ramsey Anoka	Carlos Avery Wildlife Management Area Forest Lake
Gordon Gust 612-464-5200	Hennepin Carver Scott Dakota	Main Street Elevator, Farmington Hennepin Cooperative Feed Exchange, intersection of State Hwy's 101 and 152, Dayton
Dick Tuszynski 612-689-2832	Mille Lacs Isanti Chisago	915 S. Hwy. 65, Cambridge
Mike Maurer 612-255-4279	Wright Sherburne Stearns	DOT Building, 3725 12th St. No., Box 370 St. Cloud
Gary Johnson 612-632-2321	Todd Morrison Benton	Ag. Service Center, 1 mile north of Little Falls on Hwy., 371, Little Falls
Nick Gulden 507-457-5486	Wabasha Winona Fillmore Houston	Whitewater Wildlife Management Area Headquarters
Jack Heather 507-457-5486	Goodhue Olmsted Mower	2300 Silver Creek Rd., NE, Rochester
John Idstrom 507-451-9282	Rice Steele Dodge Freeborn	Parvena Elev., 104 NE 2nd St., Faribault Owatonna Elevator, 605 No.Cedar, Owatonna
Roy Nelson 507-359-6713	LeSueur Blue Earth Waseca Faribault	North Mankato City Maintenance Office, Webster Ave., North Mankato
Paul Bremer 612-237-5274	McCleod Sibley Nicollet	Paul Bremer farm, near intersection of CSAH 9, Sibley County & County Rd. 9

Ken Bonnema 507-637-2320	Renville Redwood Brown	Armory Square Building, Redwood Falls
Larry Nelson 507-354-2196	New Ulm Area	DNR Regional Headquarter, New Ulm
Doug Wells 507-831-2465	Cottonwood Watowan Martin Jackson	Talcot Lake Wildlife Management Area
Bob Meyer 507-537-6250	Lincoln Lyon	1400 E. Lyon, Marshall
Pete Schaefer 507-836-6919	Pipestone Murray Nobles Rock	Talcot Lake Wildlife Management Area
LeRoy Dahlke 612-598-7641	Lac qui Parle Yellow Medicine	Lac qui Parle Wildlife Management Area
Dave Soehren 612-289-2493	Big Stone Swift	Lac qui Parle Wildlife Management Area
Rob Naplin 612-231-5163	Chippewa Kandiyohi Meeker	Near intersection of Kandiyohi Co. Rds. 10 and 8, Spicer
John Scharf 612-589-1030	Traverse Grant Stevens	701 Iowa Avenue, Morris
Gerald Larson 612-634-4573	Douglas Pope	DNR Headquarters, Glenwood
Gordon Nielsen 218-739-7576	Ottertail Clay Wilkin	1221 Fir Ave. E., Fergus Falls

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IMMEDIATE RELEASE

ALEXANDER THANKS ALL WHO
HELP ON PHEASANT EMERGENCY

"Sportsmen and other Minnesotans who value the state's rich wildlife heritage have shown their commitment to conservation during the winter pheasant feeding emergency," Commissioner of Natural Resources Joseph Alexander declared this week.

Thousands of citizen volunteers and DNR employees have distributed 2 1/4 million pounds of corn to Minnesota wildlife so far this winter, said Alexander.

"In fact, I am sure that we do not have an accurate tally of all of the corn put out, since hundreds of persons purchased and distributed the feed at their own expense," he said.

Alexander emphasized that DNR employees alone could never have undertaken such a widespread program and he credited farmers, sportsmen, snowmobile clubs, 4H groups, individuals and Future Farmers of American chapters with making it a success.

He expressed the Department's gratitude to all those who have contributed their time, effort and funds and asked that they continue feeding until the emergency is officially declared over.

"We have another million pounds of corn that will be made available at previously established distribution centers until the end of March," said Alexander.

"Because of repeated severe snowstorms in southwestern Minnesota," he said "feeding will probably need to be extended, unless mild weather quickly eliminates the snow pack.



STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX , 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55146

DNR INFORMATION
(612) 296-6157

January 14, 1984

PHEASANT FEEDING

The response by numerous volunteers to feeding pheasants was tremendous in December when weather conditions were getting tough on the birds. I wish to express my thanks and appreciation to the many individuals and organizations that are taking the time and effort to feed the pheasants. A special thanks to the many individuals who are providing their own corn for the birds.

The melting temperatures in early January were a real blessing in this area for the pheasants as well as other wildlife species. Although pheasants may have temporarily quit feeding on corn placed out for them due to the recent snowmelt, I hope that all of the volunteers will continue to watch and provide ear or shell corn as needed at the sites they have established. As the cold weather and snow returns, conditions for pheasants could rapidly become serious again.

The Minnesota Department of Natural Resources has obtained some shell corn from the Commodity Credit Corporation which is now available in 50 pound sacks to the public for pheasant feeding. The following individuals and businesses have kindly volunteered their services in helping to distribute this corn locally. If you are presently feeding or plan to in areas where pheasants are in need of food please contact your nearest distribution point if you need corn.

Nassau-Farmers Elevator, (Butch Thole) phone: 668-2324
Louisburg-Spencer Jensen (568-2496) 3 miles NW of Louisburg
Madison-GTA Elevator (Ron Leslie) phone: 598-7529
LeRoy Dahlke, Minnesota DNR, phone 598-7641
Dawson-Lloyd Peterson (769-4464) 8 miles SW of Dawson
Canby-Independent Oil Company (Ralph Hentges) phone: 223-5942
Clarkfield-James Peterson (669-7263) 3 miles S. of Clarkfield
Boyd-Greg Koepp (855-2536 8 miles W. of Clarkfield
Granite Falls-Dan's Body Shop (Dan Schafer) phone: 564-3919
Lac qui Parle Wildlife Management Area Headquarters near Watson, phone 734-4451
weekdays from 8:00-4:30.

When picking up corn from any of these sites, please provide your name, where you will be feeding-either township name and section number or miles and direction from nearest town and approximately how many pheasants you will be attempting to feed. At the present time many pheasants are finding adequate sources of food, particularly in soybean stubble fields. However, as a general guideline if you are seeing concentrations of pheasants attempting to feed

between 10:00 a.m. - 3:00 p.m. they are probably having difficulty finding food and feeding should be undertaken in these areas. If they are only out feeding for a short period of time in the morning and late in the afternoon and they are easily spooked, they are apparently finding ample food and feeding is not necessary unless they are already being fed.

The preferred and generally most effective method for emergency feeding of pheasants is putting ear corn in cylindrical cribs made of some type of wire mesh fencing because this keeps the corn readily available. However, since many of you are or will be using shell corn there are several things you can do to improve your chances of providing a successful feeding site. If you are feeding in or near a grove, marsh or brush patch, select either a well protected site in brushy cover or under evergreens where pheasants are congregating or a windblown hilltop where pheasants are actively attempting to feed. Avoid placing corn under tall trees where owls can perch and easily prey on pheasants. Frequent maintenance is required in most feeding sites utilizing shell corn depending on snowfall and drifting. In a windswept site corn can be placed on the ground. Otherwise it is best to find a method elevating the shell corn. This can be accomplished by making a bed of hay or straw a couple inches thick and spreading the corn on top of the straw. Another technique that has worked in some areas is placing corn on top of a small bale of hay and scattering corn out around the bale to get the birds started on feeding in the area. Another method consists of making a round crib for shell corn from 1/2 inch wire mesh fencing. A one foot diameter by two foot high crib will hold a sack of shell corn. Again it is important to spread corn out around the crib in order to get the birds to start feeding in and around the crib. Experimentation is the key, if the pheasants are obviously having problems obtaining food and are not utilizing your feeder within a week, you should relocate the feeder.

It is best to locate feeding sites away from roads to minimize the possibility of vehicles hitting pheasants and to decrease the amount of disturbance and stress on the birds. Please obtain landowner permission before placing corn on his fields.

Remember that once a feeding program is begun, it must be continued until the winter is over. Thank you for your help and cooperation.

LeRoy Dahlke
Area Wildlife Manager

DEPARTMENT Natural Resources

Office Memorandum

TO: Regional Supervisors & Area Managers
Regions III, IV, V & Metro, Scharf, Larson
Nielsen & Berner

DATE: 01-06-84

FROM: Tim Bremicker
Private Lands Coordinator

PHONE: 6-3344

SUBJECT: Pheasant Feeding Volunteer Efforts

Enclosed is the information mailed to 1000+ volunteers who contacted the central office in the last two weeks.

Scharf's article on crib feeders was sent to local sportsmen clubs on December 27th.

TB:djb

cc: Dr. Larry Shannon
Roger Holmes
Tom Isley
Dick Carlson
Dave Schad
Paulette Tichenor



STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX , 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55146

DNR INFORMATION
(612) 296-6157

January 3, 1984

Dear Volunteer Pheasant Feeder:

Minnesota's pheasants will have a better chance of surviving this winter if you and more than several thousand other concerned volunteers have anything to say about it. Our phones have been ringing off the hook with people responding to the request for help.

We promised you more information as it becomes available. A list of corn distribution depots is attached, along with directions on how to get corn. We've also enclosed information on pheasants feeding. We still hope that volunteers will provide their own corn if at all possible.

Several people have called volunteering not only to feed the pheasants, but to help in any way possible -- to build feeders, pick-up or deliver corn, donate cash, etc. Others have called to say that they would like to feed the pheasants but can't get out to get the corn.

As soon as we can get away from the phone long enough to do some planning, we would like to match willing drivers with persons in their area needing corn.

If you are able to volunteer time and service, please call the wildlife manager in your area. He may need people to help unload the grain, to build or stock feeders, etc. A list of wildlife area managers is included.

Several metropolitan sportsmen's clubs are sponsoring projects which include building, placing and stocking feeders as well as soliciting cash donations and establishing (at the local elevator) a free supply of corn for people who are feeding the pheasants. You may wish to contact your local club to see if you can start a similar project.

We are enclosing a list of the local Pheasants Forever chapters. This organization is actively involved in feeding the pheasants, and would be one sportsmen's club you could contact.

PLEASE SAVE THE FOLLOWING INFORMATION:

At the conclusion of the pheasant feeding season, we will send you a follow-up letter requesting information to measure results of the volunteer pheasant feeding program. It would be helpful if you now began to maintain information such as:

- The number of pheasants you fed;
- The number of pheasants you felt survived due to your feeding efforts;
- How many feeders or locations you maintained;
- How much time you devoted to the project;
- How much money you spent on feed and supplies.

Thanks for your generous response, and for your concern for one of Minnesota's very special natural resources -- the ringnecked pheasant.

Sincerely,

TIMOTHY BREMICKER
Private Lands Coordinator

BARB GUSTAFSON
Volunteer Services Coordinator

TB:BG:djb

Enclosures

First of all, if the pheasants in your neighborhood have a reliable food supply, such as standing corn field, they do not need supplemental feeding. However, because of the severity of this winter, many food supplies such as corn stubble and waste grain, have become useless. Therefore, pheasants using these food sources need your help.

There is right way and a wrong way to feed pheasants. The two pictures below both are effective methods for feeding pheasants.

The feeder crib: The crib is made from 4" x 4" or 6" x 6" mesh wire 4 foot high and 2 feet in diameter. This crib is designed to hold 2 bushels of ear corn. The advantage of the crib is that once in place, food will be available, throughout the winter even after a 6 - 10 inch snowfall, and food needs to replenished only every 2 - 3 weeks.

The corn on straw: This is a simple and quick method of getting food to birds in a hurry. Simply make a bed of straw 2" thick, place shell corn on top of the straw. The advantage of this method is that it is easy and shell corn is readily available. The disadvantage of this method is that frequent maintenance is necessary and food must be replenished at least once a week.

A combination of the two methods works well. First, set-up a corn on straw and after a number of pheasants are using the site, switch to a crib feeder.

Using either method the station should be located near brush cover or under conifer trees. Avoid placing feeders near tall trees where owls can perch and prey easily on pheasants.

Remember that once feeding has begun, it must be continued until winters end.

Thank you for your help and cooperation.

CANNED FOOD PLOTS
FOR PHEASANTS

If you've been looking for a way to help save our diminishing pheasant numbers, there is now an effective, affordable tool you can use in aiding them.

By John Scharf

The large drop in pheasant numbers in midwestern states such as Minnesota is primarily a result of land use changes, and the resulting loss of habitat.

Feeder-cribs are simple, inexpensive to construct, fill a definite need, and really work.

This is also why so many individuals and organizations that want to help the pheasant have come away so frustrated. You can't change land use on land you don't control.

Lands in the pheasant range have become extremely expensive. Annual cash rent in portions of Minnesota's pheasant range now exceed \$100 an acre. With that kind of overhead most farmers can't afford to raise pheasants instead of grain on their land.

What all this means is that most programs that would really help pheasants are not economically feasible. Not enough acres of land can be changed without the costs assuming ridiculous proportions.

As far as the pheasant is concerned, these land use changes have been a disaster. Primarily, it has meant a loss of nesting cover, and wintering areas for the pheasants. To be sure there have been many changes, but these two items have had the most staggering impact in Minnesota. Any lasting improvement in raising pheasant numbers will have to consider these two problems.

Since favorable changes in land use would cost a lot of money, there doesn't appear to be anything an individual or club can do to help. Strange as it may seem though, there is a simple device that provides reliable winter food source for pheasants - and is easily affordable.

Land use changes have been disastrous for the pheasant. The loss of nesting cover and wintering areas have had the most impact on Minnesota's pheasants.

Game managers call them "feeder-cribs." They are simple, they are inexpensive, they fill a definite need, and they really work. Managers have been using them successfully in western Minnesota for a number of years. Now that the bugs have been worked out of the technique, sports groups or individuals may want to

give the cribs a try.

Because feeder-cribs are so simple and easy to construct, they can be set up adjacent to existing cover areas. As a result, simple cover can be transformed into a complete and valuable wintering area. And that transformation is oftentimes dramatic. I have seen cover areas that seldom held any birds during the winter months hold over a hundred birds after a feeder-crib was put into operation.

To understand how this can work, perhaps it would be best to briefly review the wintering requirements of a Minnesota pheasant.

First of all, the pheasant needs some cover. Dense woody cover with a good stand of conifers probably provides birds the best protection from blizzards. But pheasants usually prefer a large and dense cattail or canegrass marsh. Such cover is used by the birds for both loafing and roosting.

If you have a large area with both woody and marshy cover, that is best. With cover such as this a pheasant has some chance to survive a winter storm. However, even the best cover areas are sometimes inadequate. Prairie blizzards are devastating on all wildlife.

Secondly, the bird needs a food source by that cover. In the past food was usually available in the form of crop residues.

Thirdly, pheasants need a degree of isolation. The less a bird is disturbed, the more likely it will stick around the area.

When good cover, food and isolation are present at the same site, you have an area capable of wintering pheasants. However, if the food source is far removed from any cover, the birds will not be able to use that food. The opposite is also true. The very best cover area will be devoid of birds if there is no convenient food source. Thus, food and cover go hand-in-hand for good pheasant winter habitat. Isolation enhances the area's suitability. This seems simple enough, but it is often overlooked. The feeder-crib is one way of supplying that food to an existing cover area where such food is missing.

In the past a pheasant's food needs were met almost always by chance. There was usually some soybean or corn stubble in the vicinity that provided the necessary food. But with today's speedy, efficient and clean brand of farming and its fall plowing there are less and less chances for pheasants to find food in the right place.

Modern farming techniques have also contributed to the dwindling supply of cover in the pheasant's world. And many of the remaining cover areas are not even operating at full potential because they do not have a reliable food source of corn, and leaving it by the cover over the winter. However, when this is not possible the feeder-crib can be used.

The exploded drawing shows the details for the construction of a feeder-crib. It is simply a cylinder of old woven-wire fencing stapled to a wooden platform. The fencing holds the corn together, yet allows a pheasant to remove an ear at a time. The platform is set up on some old concrete blocks or rocks to prevent rot, and the extra height helps keep the whole rig above much

of the snow.

Once the crib is built it should be filled with ear-corn. The 4' x 4' crib shown here should provide enough food to last about 30 pheasants through the winter. Cribs can be made larger or smaller depending on needs.

Careful consideration must be given to where the crib is located. Naturally it is going to be placed by an existing cover area - and it will be used best in areas where that cover includes a large cattail or canegrass marsh. It should not be placed in the cover, but out in the open away from the cover. Near the cover yes, but in it, no! This is important.

The pheasant's natural feeding area is open cropland. So it is looking for food in those areas. Attempts should also be made to select a high spot with southern exposure for the crib site. This is also important since if the wrong spot is chosen the birds may never find the feeder - or the crib could get buried under snow.

Another important factor is to have the feeder-crib in place and full of corn as early in the fall as possible. October and November are the months to get the job done. This is extremely important in establishing a successful feeder. As fall plowing progresses birds are forced to look for a new food source other than the field they had been using. They will move until they find that source. If the feeder-crib is not in operation soon enough, they will have no reason to stop.

The use of feeder-cribs is not some sort of an emergency feeding concept. It is a management practice used each and every year at a selected site to provide food next to an existing cover area. With careful planning extensive use of feeder-cribs would make emergency feeding of pheasants unnecessary and a thing of the past.

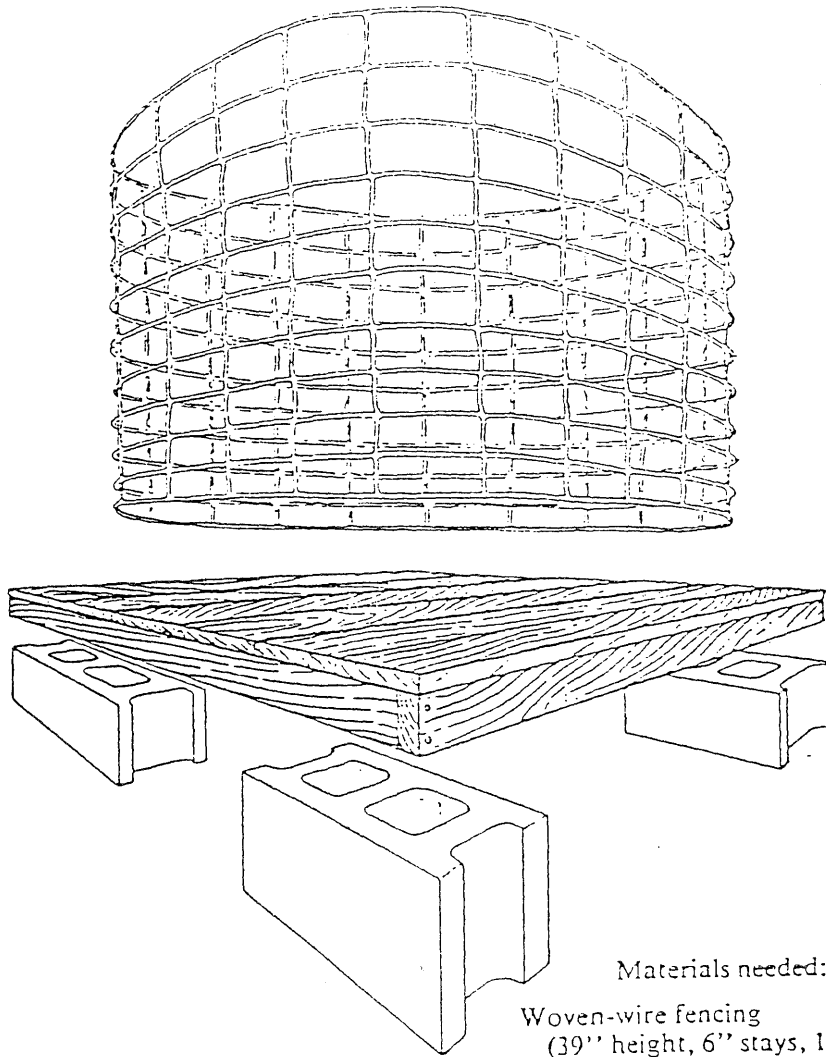
Feeder-cribs are not some simple panacea that will solve all of our pheasant population problems either. They are a tool that can help turn existing cover where food is missing into a pheasant wintering area. Of great importance is the fact that it is a tool that anyone can use.

The following guidelines must be remembered in any feeder-crib project:

- 1) It is a way of putting a reliable food source near an existing cover area where such food is missing.
- 2) Feeder-cribs should be placed out in the open, but near good winter cover such as cattail or canegrass marsh.
- 3) The feeder-cribs should be filled with ear-corn as early as possible in the fall.

Lastly, it must be remembered that the greatest long term problems facing the pheasant are the loss of nesting cover, and the loss of winter cover. Weather conditions are responsible for the short term fluctuations in the pheasant population.

Feeder-cribs can only help improve an existing cover area where lack of winter food is a problem. But where such a condition does exist the response by pheasants can be dramatic. FF



Materials needed:

- Woven-wire fencing
(39'' height, 6'' stays, 12' long)
- Wood platform (4' x 4')
- Cement blocks or rocks
- Fencing staples (4)
- Nails

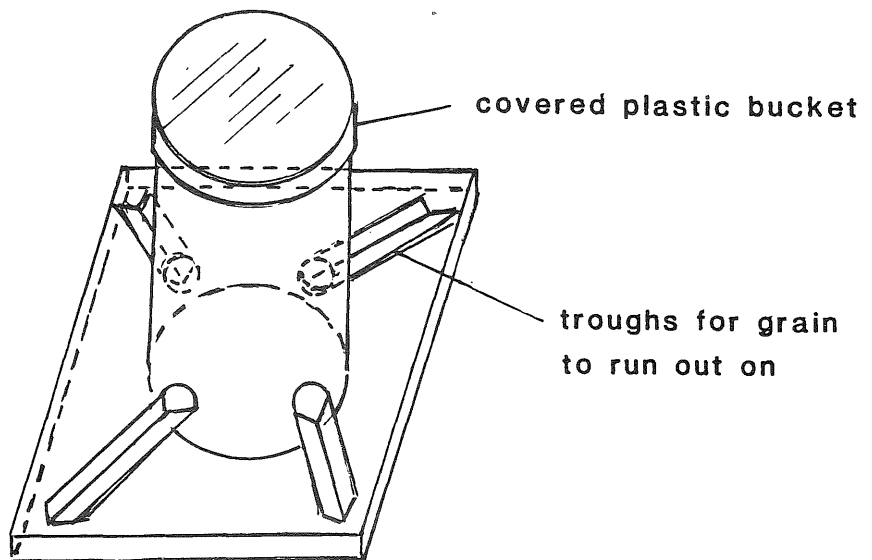
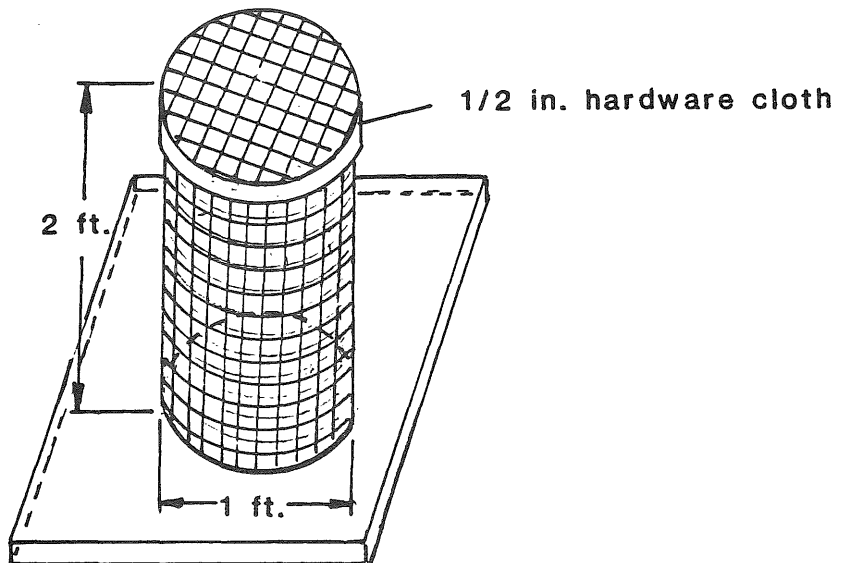
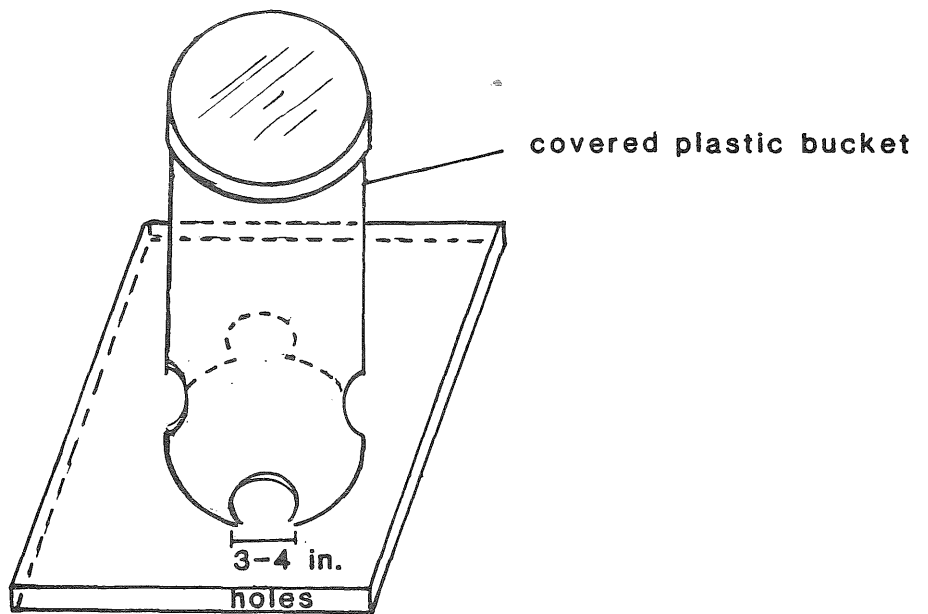


Figure 2. ALTERNATIVE CRIB DESIGNS OF SHELLED CORN

DEPARTMENT Natural Resources

Office Memorandum

TO: Tim Bremicker

DATE: 2-01-82

FROM: Alfred Berner

PHONE: 507-642-8478

SUBJECT: Calculating food needs for deer and pheasants

I have enclosed my 1979 report on "Information on calculating food needs of whitetail deer." This report was sent to all area managers and wildlife area managers in the farmland zone. I am sending a zerox copy so you can make any additional copies you find necessary.

To aid the fieldmen in calculating the amount of corn needed to feed pheasants and deer, I have included a graph for each. I believe the graphs are self-explanatory.

Lastly, I have included an additional figure which allows the fieldmen to determine the size of the feeder-crib to produce a desired bushel capacity.

One other thing the fieldmen should take into consideration is the number of squirrels in the area of the crib. For each acre of mature trees up to approximately ten acres, an additional one to two bushel of corn/acre should be considered as a potential loss due to squirrels. In other words, if you are placing the corn where there is three acres of mature trees, one could estimate a three to six bushel loss due to squirrels over a four-month period.

If you have any additional questions please call and we can discuss it.

AB:jl
Enc.

INFORMATION ON CALCULATING FOOD NEEDS OF WHITE-TAILED DEER

In more than one-half of Minnesota, white-tailed deer populations are dependent on cultivated grains for a large part of their winter food. This winter diet is usually obtained from waste grain in stubble fields or from grain in piles, cribs or standing fields. Presently, very little of the winter feed available is purposely left for deer. But as management is intensified, providing an adequate, dependable winter food source will be one of the first priorities.

The average 125 pound deer requires about 5,200 calories of energy per day during the winter (Karns per comm.). Therefore, about 625,000 calories are needed to sustain a deer in prime condition through 120 days of winter (Dec. 1 to Mar. 31).

From the proximate analysis of a good item, the amount of gross energy can be estimated for various volume and weight measurements (Table 1). The procedure for calculating the number of calories per gm, kilogram, pound and bushel is as follows:

For Corn

<u>Component</u>	<u>Proportion</u>	<u>Calorie/gm</u>
Protein	.101	4
Carbohydrates	.729	4
Fat	.050	7

The proportion for each of the components is multiplied by the corresponding calories per gram.

$$\begin{array}{rcl}
 .101 & \times & 4 = 0.404 \\
 .729 & \times & 4 = 2.916 \\
 .050 & \times & 7 = \underline{0.350} \\
 \\
 & \text{Total} & 3.670
 \end{array}$$

The sum is an estimate of calories per gram for corn. When this estimate is multiplied by 1,000, the energy is expressed as calories per kilogram (eg. $3.67 \times 1000 = 3,670 \text{ cal/kg.}$).

To convert this estimate to calories per pound and per bushel, use the following procedure:

$$\text{Cal/lb.} = \frac{\text{cal/kg.}}{2.2} = \frac{3,670}{2.2} = 1,668$$

$$\text{Cal/bu.} = \text{cal/lb.} \times \text{lb/bu.} = 1,668 \times 56 = 93,418$$

Since an average 125 lb. deer requires about 5,200 calories per day, a bushel of corn could provide, at maximum, enough energy for 18 days ($\frac{93,418}{5,200} = 17.97$). Therefore, one deer would require at least 6.7 bushels of corn during a 120-day winter.

Tables 2,3,4, and 5 and Figure 1 are provided to assist you in determining the amount of various crops needed to sustain an average-sized deer (125 lbs. live weight) through a 120-day winter.

In making the final calculations, the estimate should be increased by at least 25 percent to allow for use of food by other wildlife, particularly squirrels and raccoons.

Table 1. Proximate analysis of six commonly grown grains eaten by deer in Minnesota.
(Expressed in percent of total).

Grain	Crude Protein	Fiber	Carbohydrates		Fat	H ₂ O	Ash
			N-Free Extract				
Corn	10.1	2.0	70.9		5.0	10.5	1.5
Oats	12.4	10.9	59.6		4.4	9.2	3.5
Wheat	13.5	2.4	69.8		2.1	10.4	1.8
Rye	11.8	1.8	73.2		1.8	9.4	2.0
Sunflower	20.4	16.4	16.4		36.2	6.5	4.1
Soybean	36.5	4.3	26.5		17.5	9.9	5.3

Table 2. Estimated amount of gross energy expressed in calories per unit weight or volume for five commonly grown grains eaten by deer in Minnesota.

Grain	Weight				Volume
	Gram	Kilogram	Pound	Ton	Bushel
Corn	3.67	3670	1668	3,336,000	93,408
Oats	3.53	3528	1604	3,208,000	51,328
Wheat	3.58	3575	1625	3,250,000	97,500
Sunflower	4.66	4662	2119		
Soybean	3.94	3943	1792	3,584,000	107,520

Table 3. Average yields expressed in bushels, pounds and kilograms per acre by agricultural regions (Fig. 2) for five common grown grains eaten by deer in Minnesota.

Grain	NW			W			C			EC			SW			SC			SE	
	Bu.	Lbs.	Kg.	Bu.	Lbs.	Kg.	Bu.	Lbs.	Kg.	Bu.	Lbs.	Kg.	Bu.	Lbs.	Kg.	Bu.	Lbs.	Kg.	Bu.	Lbs.
Corn	60	3360	1527	80	4480	2036	85	4760	2164	80	4480	2036	90	5040	2291	100	5600	2545	100	5600
Oats	50	1600	727	50	1600	727	50	1600	727	50	1600	727	50	2016	727	65	2080	945	60	1920
Wheat	36	2160	982	36	2160	982	36	2160	982	30	1800	818	30	1800	818	36	2160	982	36	2160
Sunflower		950	432		1000	450		950	432		900	409		1000	455		1000	455		950
Soybean	22	1320	600	23	1380	627	27	1620	736	23	1380	627	28	1680	764	32	1920	873	27	1620

Table 4. Maximum number of deer that can be sustained on an acre with an average yield for five commonly grown grains in seven agricultural regions of Minnesota.

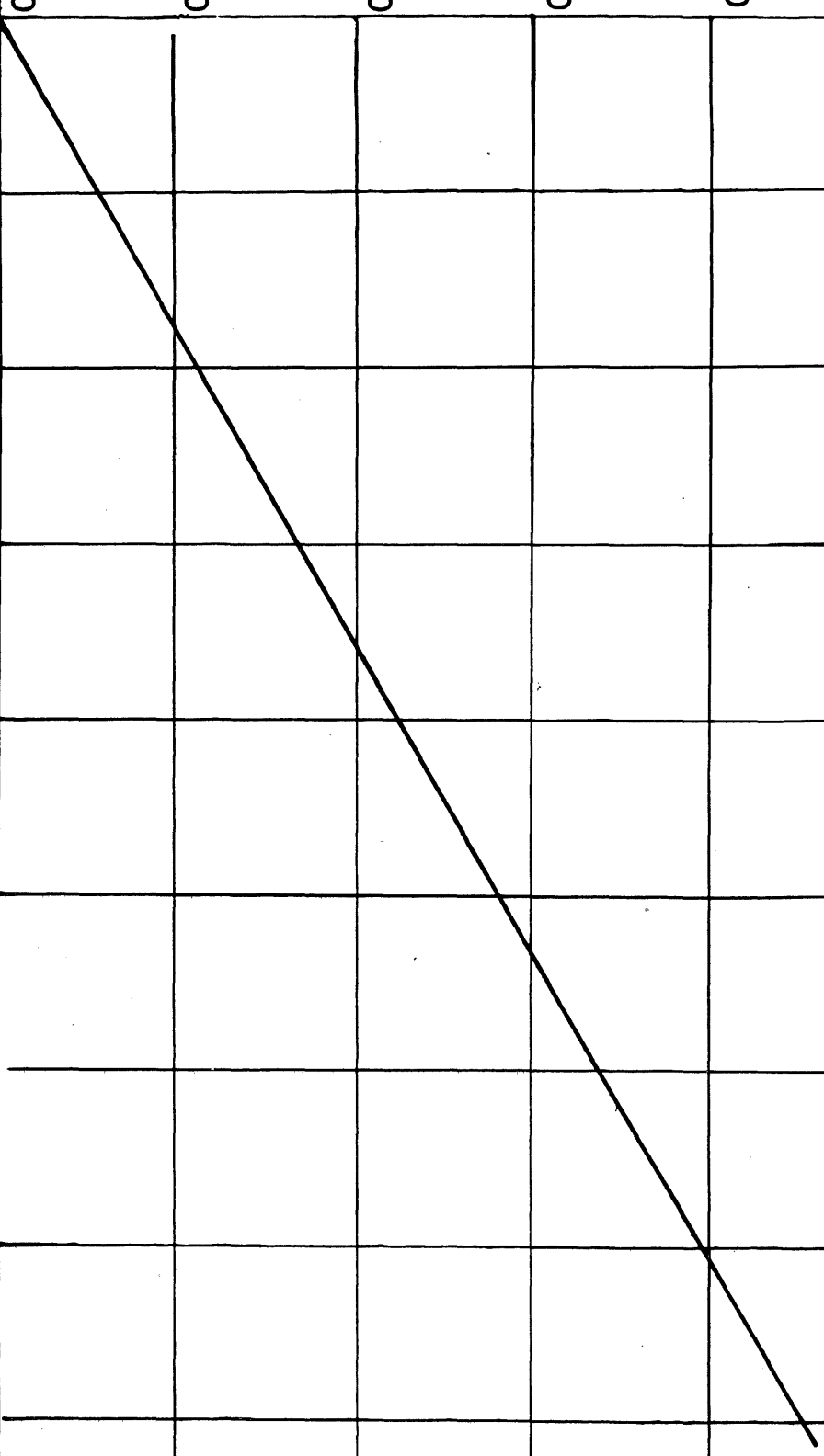
Grain	Region						
	NW	WC	C	EC	SW	SC	SE
Corn	9.0	11.9	12.7	11.9	13.4	14.9	14.9
Oats	4.1	4.1	4.1	4.1	4.1	5.3	4.9
Wheat	5.6	5.6	5.6	4.7	4.7	5.6	5.6
Sunflower	3.2	3.4	3.2	3.0	3.4	3.4	3.2
Soybean	3.8	4.0	4.6	4.0	4.8	5.5	4.6

No. of Deer to be fed for 120 days

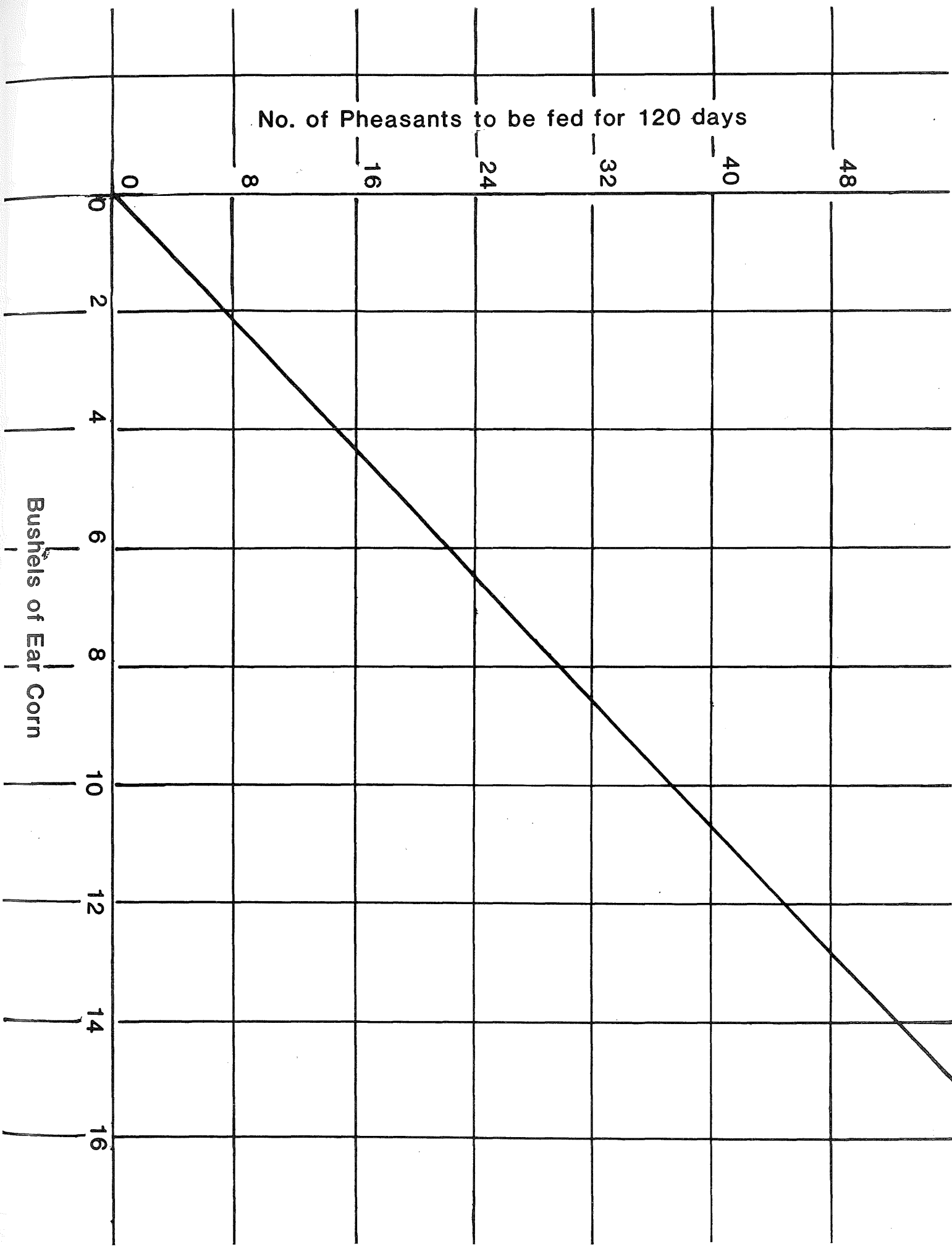
0 10 20 30 40 50

Bushels of Ear Corn

0 40 80 120 160 200 240 280 320

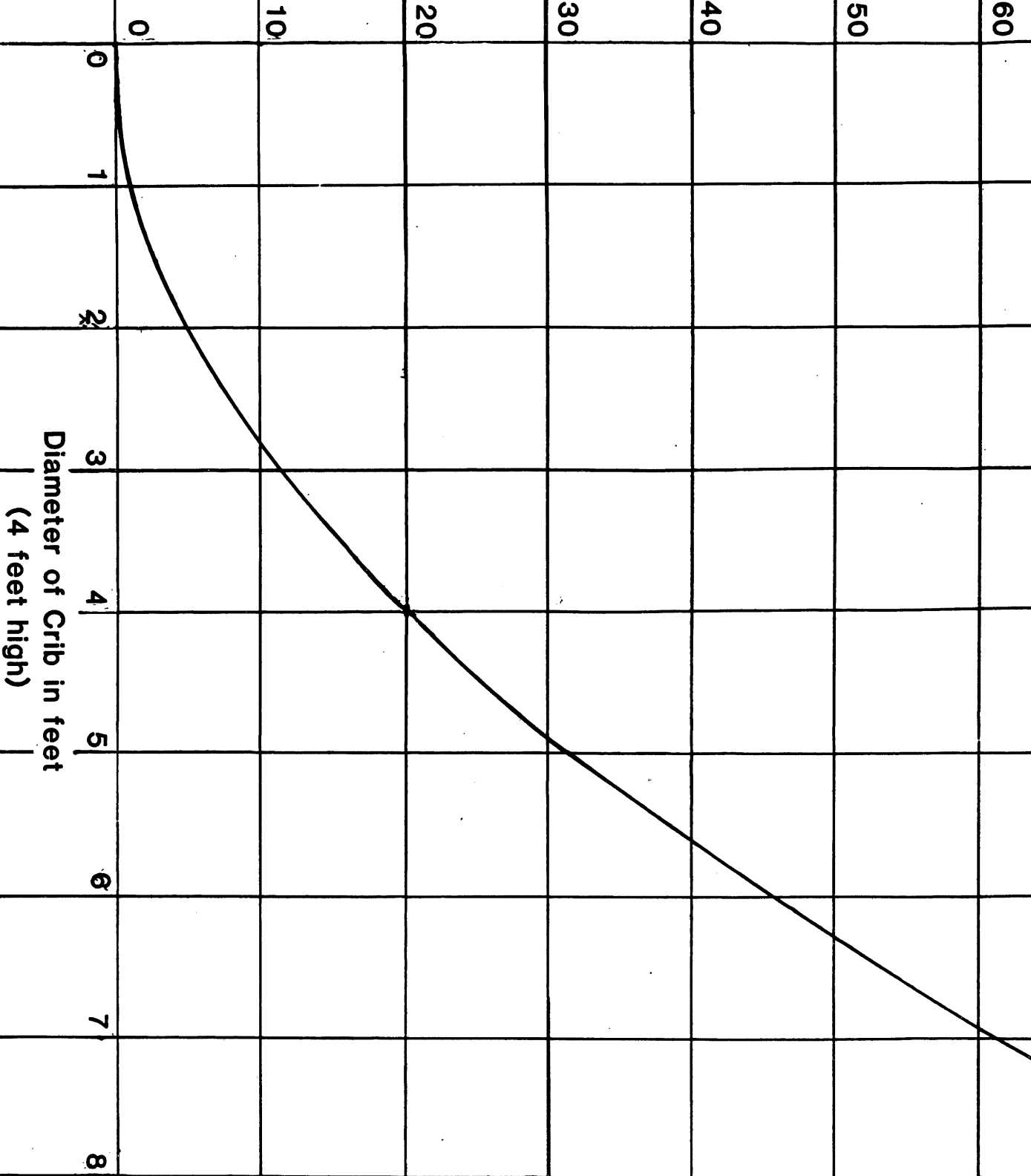


No. of Pheasants to be fed for 120 days



Bushels of Ear Corn

Bushels of Ear Corn



DEPARTMENT Natural Resources - Wildlife

Office Memorandum

TO : Regions 1, 3, 4, 5 & 6 - Regional Supervisors
and Wildlife Fieldmen

THRU : Tom Isley, Assistant Chief
Section of Wildlife

FROM : Tim Bremicker *T.B.*
Private Lands Coordinator

DATE: 02-19-82

PHONE: 6-3344

SUBJECT: Statewide Standards for Emergency Food Plot
Purchases -- Winter 81-82

JUSTIFICATION

The need for preparing and implementing statewide standards for purchasing corn this winter is quite evident even though the existing field latitude under WHIP and DHIP has proved quite effective. The primary difference is that WHIP and DHIP agreements involve cooperators interested in the well-being of the agricultural zone deer herd, whereas, the opposite may be true for deer utilizing corn standing over winter elsewhere.

The current high deer numbers in the agricultural zone, compounded with a potentially responsive legislature to reduced landowner tolerance, expensive corn and a sustained or accumulating emergency deer food plot budget requires that we avoid unfortunate precedents at this time. Consequently, these standards should be implemented within your regions and work areas. Please remember that we are purchasing corn to control depredation and not making depredation payments.

STANDARDS

Crop - cost/acre

The best proposed offer because of limited funding and often extremely high overhead cost that some farmers experience due to type of farming operation is a cash cost/acre retrieval within a broad soil area (see attached sheet). If the landowner feels his costs are less and is satisfied then use his figures. However, if his price exceeds those indicated on the attached sheet he must be informed that listed price is the maximum the state will pay unless very unusual circumstances exist.

The costs provided are based on the best estimated averages of many farms within the respective soil area and data from farms which keep excellent cost analysis records. This approach will probably not compromise payment levels under per existing WHIP and DHIP agreements.

MAXIMUM PAYMENT-to individual landowner/tenant/renter:

This must be left to the discretion of wildlife managers and supervisors since variables do exist.

The depredating herd may represent the overwinter population of a large geographic area and may also be occupying one of the few remaining wintering areas.

Losing landowner support under these conditions could result in wide spread demand to reduce herd, limit opportunity to retain a critical wintering area and/or decrease land and herd management options in the future.

Maximum payments must be reasonable, based upon your best professional judgment, for the long term needs of the deer resource in your work area.

TRANSACTION

- (1) Each transaction must be recorded on the new food plot agreement forms. Additional copies are enclosed.
- (2) Paper flow will be same as WHIP except an additional copy should be made and forwarded to St. Paul from the Regional office.
- (3) Coding will correspond to the WHIP food plot AID number for region.
- (4) Over expenditures of funds will be absorbed by the Wildlife operating budget within the region where incurred, so close contact with Regional Supervisor is necessary.

Funding to Regions 1, 3, 4, 5, & 6 will be allocated based upon request to St. Paul very soon. A total of Twenty thousand (\$20,000) will be retained in St. Paul for shortfalls.

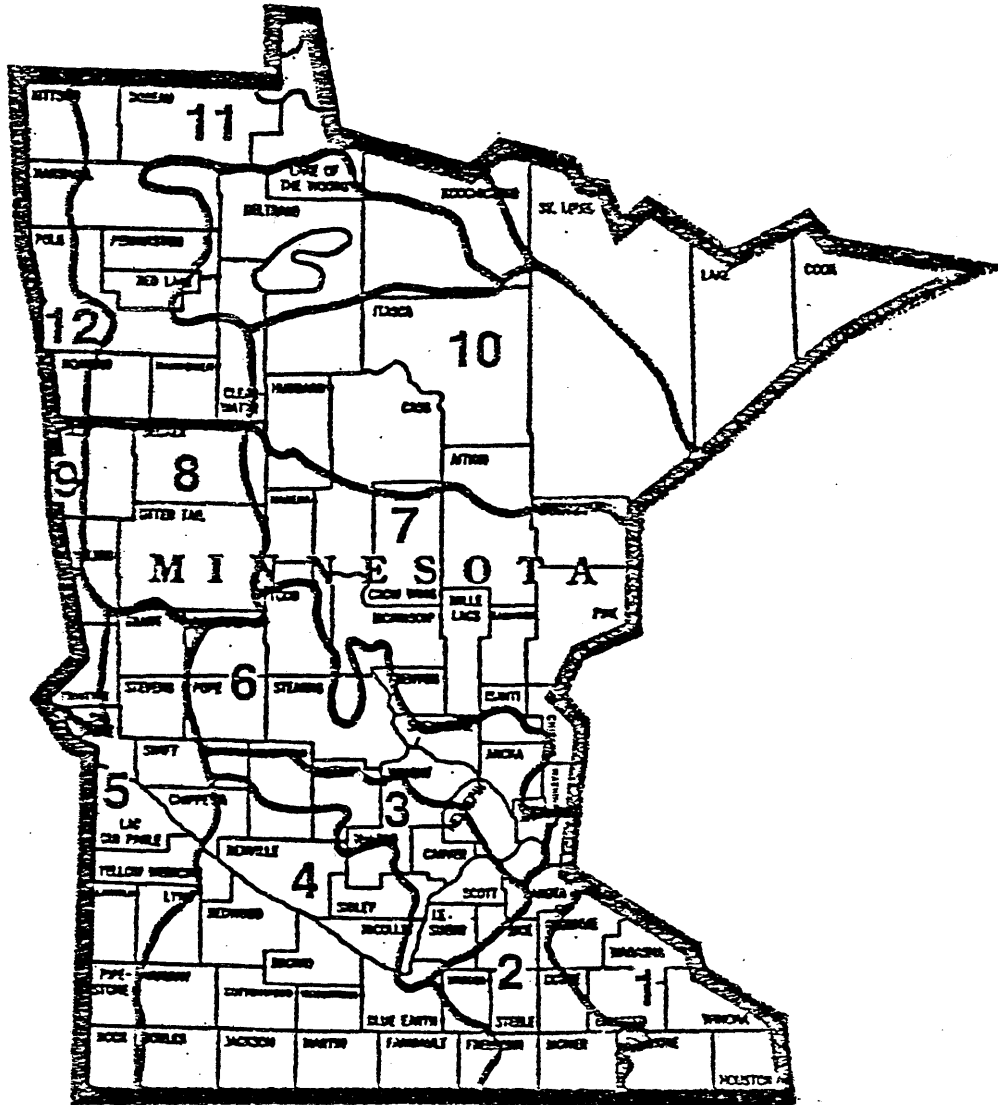
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Enc.

Soil Area

Corn (grain)

1	100.12
2	99.18
3	95.62
4	112.67
5	80.50
6	79.25
7	79.49
8	78.87
9	76.11



Cash cost/acre data on alfalfa with companion oats crop alfalfa, corn silage, oats, wheat, sunflowers, soybeans, flax, barley, irrigated corn, cool season grasses, potatoes, and rye is available from St. Paul -- Private Lands Coordinator.

Attachment 12

SPECIAL DEER FOOD MIX

FOREST WILDLIFE POPULATION AND RESEARCH GROUP
Grand Rapids, MN

1979

Soy meal - 46 percent	110 lbs. per ton
Ground shelled corn	730
Ground oats	200
Red Dog or wheat middlings	330
Alfalfa meal 17 percent	300
Molasses	100
Ground oats screenings	300

2070 lbs.

Dicalciumphosphate	15 lbs. per ton
Calcium carbonate	30
Trace mineral salt	15
Purina Cattle plus - Vit. A and D	2
A - 5 million usp units per lb.	
D - 1 million usp units per lb.	
Urea - none	

62 lbs.

Total 2132 lbs.

PROXIMATE ANALYSIS

Moisture %	Ash %	Crude Protein (N x 6.25)	Fat %	Fiber %	Gross Energy (kcal/q)
10.92	3.98	14.14	3.73	8.08	3.8879

8.5 percent digestible protein

DEPARTMENT Natural Resources - Wildlife

Office Memorandum

TO: Wildlife Field Personnel
BY: LeRoy Rutske
Big Game Specialist
FROM: Roger Holmes, Chief
Section of Wildlife

DATE: 12-30-83

PHONE: 296-3344

SUBJECT: Deer Feeders - Feed Protection

The use of feeding devices can make artificial feeding more efficient by permitting on-site storage and automatic dispensing. Protection from weather is another important consideration especially for pelletized deer feed. Construction and transportation of such devices is a problem and may preclude their use. However, in the interest of doing a better job I urge you to use one of the following means for feeding whenever possible.

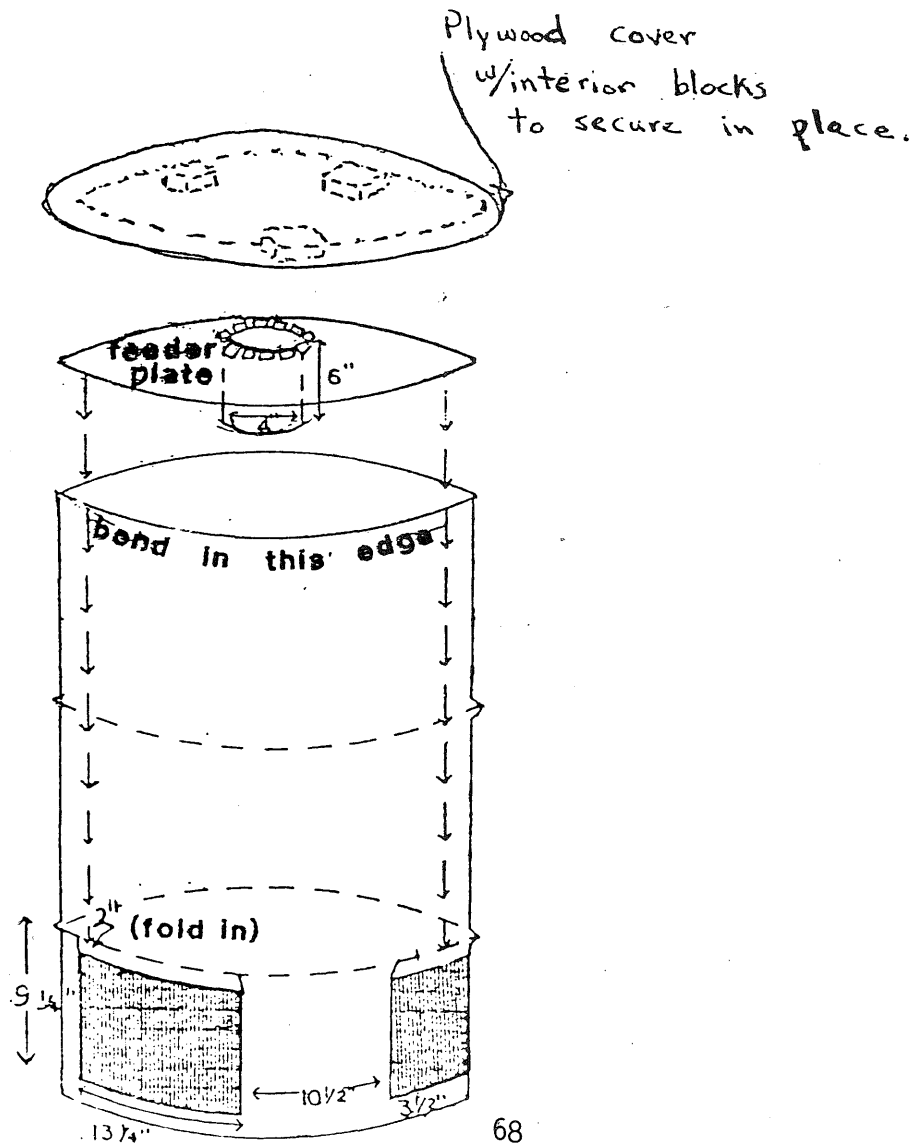
Where pelletized deer food is put out in forested areas, protection from precipitation can be achieved by wiring a piece of 1/4" aspen-chipboard over the opened bag. A 4' x 4' sheet of 1/4" chipboard weighs approximately 15 pounds. Fairly heavy wire could be run through a small hole near (6"?) each corner and fastened to sticks on the underside of the sheet. Sticks running diagonally corner to corner will provide more support and avoid most corner break-off problems. The wires should be fastened to whatever stems or branches are likely to support a snow load until the next visit. I suggest placing the sheet low enough over the sack of pellets so that deer cannot stand under it.

In more accessible areas a simple barrel feeder will facilitate a feeding operation using either shelled corn or deer pellets. How the barrel is modified depends upon whether you have sealed barrels with a bunghole or barrels with a separate cover. In either case you need a cover for the top opening, a feeder plate to support the load of feed within the barrel, and feeder holes cut into the sides of the barrel. Do not use barrels in which flammable materials like gasoline or other dangerous chemicals have been stored -- unless you can clean the barrel so thoroughly that the chance of an explosion is eliminated.

1. Cut feeder holes into the sides of the barrel. The lower edge should be 3-1/2" above the bottom of the barrel. The holes should be 13-1/4" wide and 7-1/4" inches high. Three such holes should be cut in a 55 gal. barrel (10-1/4" apart) or two in a 30 gal. drum.
2. Extend the vertical cuts made for the feeder holes upward two (2) extra inches to the center of the expanded rim on the barrel. Then fold in this tab above each feeder hole. The tabs will hold the feeder plate in place.
3. Make the feeder plate. The procedure will have to vary with the type of barrels you have.

- A. If you have a barrel with a separate cover, save the cover and make the feeder plate out of plywood (5/8" min.) cut to the proper diameter. Make a feed spout from an 8" length of stove pipe (either 4" or 6") or a one-pound coffee can. Cut down 2" from one end of the pipe in place in the feeder plate. Next, cut a hole to match the pipe diameter in the center of the feeder plate. A couple of small bolts should be used to secure tabs to the feeder plate.
 - B. If you have a sealed barrel, cut out the top of the barrel and make the feeder plate as described above out of this metal top. A top cover to keep out snow or rain can be made out of whatever is handy. It will need some projections to fit either inside or outside the barrel to prevent its being knocked off.
4. Make a few small drain holes in the bottom of the barrel.
 5. Force the feeder plate (spout down) into the barrel to the bent-in tabs above the feeder holes.
 6. Place the barrel on concrete blocks, boards, or logs to facilitate drainage.

RH:lr



The bur oak and aspen surrounding the meadow are draped in hoar frost, remains of the February night. In the cold, grey dawn the deer come like shadows, silently, dark against the snow. They stop at the edge of the meadow, looking this way and that through wisps of vapor from their nostrils. A few cautious steps brings them to a wooden structure resembling a small cattle-feeder. Between frequent glances over their shoulders, they nibble at the pelleted deer ration in the manger of the feeder. Thus, one of the oldest forms of game management is applied to the white-tailed deer in Manitoba.

Harsh winters are a fact of life in Manitoba. Each creature living in this climate has its own way of coping. Humans bundle up in layers of clothing when outside and turn up their furnaces when indoors. Many birds migrate to warmer lands each winter. Some humans have taken the cue from their feathered friends and follow them south. Most animals that live in Manitoba, however, must adapt to the rigors of winter in order to survive. Included in this long list of hardy creatures is the white-tailed deer. Considering that white-tails only immigrated into this province about 90 years ago, they have adapted well to the harsh climate.

White-tailed deer are the most studied big game animal in North America, but it is only recently that deer managers in northern parts of the range have begun to understand how deer cope with the stress of winter. Here in Manitoba, white-tails are on the northern fringe of their range but much of what we have read and learned about deer came from the central and southern United States. During the last decade researchers in the snowbelt states and their Canadian colleagues have uncovered much about the winter ecology of the white-tail that raises doubts about conventional techniques for managing deer in winter.

Hibernating animals store fat during the fall and live on this energy reserve during their winter sleep. To varying degrees, non-hibernating animals, such as deer, undergo the same cycle. The metabolism (body processes) of deer is highest in summer and autumn when nutritious food is abundant. Wild herbaceous plants and farm crops such as alfalfa, clover, fall rye, cereal grain, and oil seeds provide food for deer in fall. From these foods, fat, proteins and minerals are stored in preparation for winter.

Deer deaths in winter are most often related to poor weather and inadequate food supplies in fall and early spring. During winters when snow is deep, deer normally must rely on buds and twigs of trees and shrubs; this food source is called "browse". Due to the low nutrient value of much available natural browse, deer may expend more energy in searching for this food than they obtain when the material is digested. Therefore, they often must rely on fat reserves accumulated during the previous fall. If the quantity and quality of food was good in the fall, chances for winter survival are enhanced. Spring is also a critical time. Deer need good food to recover from the rigors of winter; in addition, pregnant does must prepare for the birth and harsh storms in March and April can have a devastating effect on deer that are already weakened.

A major factor in winterkill of deer in Manitoba is habitat loss. Protection from the elements and browse supplied by trees and shrubs is often critical. Unfortunately, trees and shrubs are being replaced by cultivated farmland at the rate of 64,000 hectares annually. Remaining bushland is usually used for livestock pasture. Many wild plants important to deer are also eaten by cattle, leaving little food in reserve for deer to prepare for winter or to refuel in spring. As a result, deer in agricultural Manitoba have had to adopt a new lifestyle. They rely on remnants of bush for shelter and use cereal grains and tame forage for much of their food. Even during mild winters deer feed on unprotected hay bales and grain piles, resulting in a sharp increase in the number of deer damage complaints from farmers.

Severe winter conditions, combined with the loss and deterioration of habitat and heavy hunting were the chief causes of a major reduction of the provincial deer herd during the late 1960's and early 1970's. The decline in populations became so serious that after the harsh winter of 1973/74, deer hunting was prohibited for three years. That crystallized the need for innovative means to help deer cope with winter.

About that time, long-term deer feeding research in Michigan and northern Minnesota uncovered new information about white-tails in winter. Those studies revealed that by feeding deer a commercially produced, high-energy ration to supplement their natural diet, it was possible to help these animals cope with harsh winter weather and to increase fawn production. Conversely, some of the traditional methods of dealing with starving deer, such as cutting and feeding browse or providing hay and grain of questionable quality, were found to be ineffective. Apparently, the energy provided by these foods is insufficient to meet the demands of deer under stress of severe weather. A sudden switch from a natural to a feed-grain diet occasionally caused stomach disorders in deer when their digestive systems could not adjust to the new food.

In the late 1970's, wildlife managers working closely with conservation officers followed up on this research by conducting deer feeding studies under field situations in southern Manitoba. These projects were used to develop the techniques of feeding deer using supplemental rations as a practical management tool.

The Manitoba deer management program applies deer feeding in two situations: to reduce damage to farm forage (usually hay bale) and to supplement natural food supplies of deer in small Wildlife Management Areas or other key habitats in Agro-Manitoba. Livestock feed companies have developed a pelleted deer ration according to a strict nutritional formula prepared by animal nutritionists. These rations are transported to the field in 40 kilogram bags by pick-up truck and trailers and placed in small scale livestock-type self-feeders having a capacity of about one tonne.

Where deer are causing damage to farm forage, they are lured to a self-feeder placed in their bedding area. This is done by sprinkling bloodmeal, a packing house by-product, on the bale stack to scare deer away. At the same time, the feeder and surrounding area are "baited" with good quality alfalfa hay to introduce deer to the pelletized ration. The result

- deer remain in their bedding area and feed on the deer ration and cease causing damage to forage stacks. The principle is not unlike that of using lure crops to prevent waterfowl damage to cereal grain crops.

Deer that are fed on small Wildlife Management Areas or other pieces of habitat on Crown or private land have a lower rate of winterkill and better reproduction (increased numbers of fawns and fewer deaths of newborn fawns). These rations replace food covered by deep snow and compensate for food scarcity caused by livestock grazing or mature habitat where trees and shrubs have grown out of reach. Deer that have a good source of food nearby are less likely to cause problems at nearby farmsteads.

Pelleted deer rations cost about \$200 per ton, at that price it costs \$20.00 to overwinter one deer (based on a consumption rate of one kilogram of ration per deer per day for 100 days). Only when we analyze the question of supply and demand for deer can we judge whether this expense is warranted to simply produce more deer. However, it is economically feasible to feed deer to prevent damage to stored forage, when compared to paying farmers compensation for damage. It is a positive program that is well received by Manitoba farmers.

The concept of an annual feeding program is out-of-step with conventional wildlife management in North America. European gamekeepers have fed wild deer and other wildlife species for decades but on this continent many wildlife managers still feel uneasy about the practice. There are a host of reasons given for condemning artificial feeding programs and many experts predict dire consequences. However, farmers and grain elevator agents in Manitoba have successfully helped large numbers of deer survive severe winters by feeding the animals grain, good quality forage and screening wastes obtained from cleaning grain. The deer were saved because feeding started early in winter and continued until snow-melt.

Some wildlife managers may have reservations about feeding white-tails, but farmers, sportsmen and the public are enthusiastic about the program. Farmers have been critical of situations when potential farmlands owned by the government have been designated as Wildlife Management Areas to maintain deer habitat and the deer kept in these areas have ended up in farmyards looking for food in winter. On the other hand, the public has also criticized government officials when no effort was made to save deer in bad winters.

It is unrealistic to expect that all deer in the 180,000 square kilometers of deer range in Manitoba can be helped in winter. But it may be feasible to nourish small herds in key areas of southern Manitoba so that prime breeding stock can produce a healthy crop of fawns despite winter conditions. In the words of respected Michigan deer biologists Louis Verme and John Ozoga: "Traditional principle aside, perhaps biologists should stop viewing artificial feeding as professional heresy and realize that when properly done it can serve as a valuable tool in the current state of the art".

In spite of the best efforts of government and wildlife groups, deer habitat will continue to disappear in southern Manitoba for some time to come. Our only hope of maintaining substantial numbers of deer in this

intensively farmed area is to save remnant pieces of habitat wherever possible and provide deer with the best source of food energy we can afford. A carefully designed deer feeding program may be the only feasible method of providing that food energy.

Herb Goulden
Provincial Deer Manager

MANITOBA
Department of Natural Resources
Conservation Comment #114 - March 1983

Attachment 15

February 2, 1962

TO: Game Managers, Game Wardens & Game Biologists

FROM: Sections of Game & Research

RE: Storm Mortality and Malnutrition in Minnesota Pheasant Populations:
Symptoms and Their Diagnosis.

Weather since mid-December has been relatively severe with a heavy snow cover and low temperatures. This has resulted in deterioration of cover, shifting pheasant flocks in response to food availability and scattered reports of winter storm losses. In different areas of the pheasant range, observations of numerous flocks indicate that the birds, as of February 1 are doing remarkably well. Winter mortality associated with freezing and suffocating has been negligible. No birds suffering from malnutrition have been found.

Examination of 3 cocks and 21 hens in January 1962, has shown average weights of 3 lbs. 2 oz. and 2 lbs. 1 oz., respectively. As indicated later in this report, these weights attest to the good health of our birds. In a year such as this, however, losses due to accidents/car kills, birds flying into wires, etc. increase sharply and we are presently picking up such kills at a rate (we would estimate to be) two to three times that of an open winter. Road killed birds, which have been autopsied by some of the division fieldmen, were found to be in normal condition.

Irregardless of the present situation, it is important to recognize that pheasant losses due to adverse weather are a potential threat at this season. With this thought in mind we have compiled the following list of factors associated with such losses. We hope that you will find this material of value for future reference.

The greatest danger to exposure and freezing that pheasants must face occurs when a period of rain is followed by rapidly dropping temperatures and prolonged below zero temperatures. Wetting of the feathers reduces their insulating quality and accelerates heat loss.

Heavy winds accompanied by blowing snow and low temperatures can also be damaging even though wetting of the feathers may not occur. Birds in poor cover (fence lines, small thickets and grazed woodlots) suffer most. The effect is more pronounced if a storm descends quickly and lasts several days.

Birds normally sit facing into the wind. Chances of actual mortality increase as encrusted snow and ice accumulate around the head. Encrusted snow plus severe cold drains body heat and birds become reluctant to fly. Early signs of danger are birds with snow encrusted on the rump. Birds badly encrusted and weakened by the cold fly erratically. Encrusted birds dead from exposure are typically found squatting on the ground as if at rest. The beak is often open and filled with ice, as are the nostrils. Internal examination will usually reveal enlarged hearts and hemorrhages into the pericardium (sack around heart).

Death of wild pheasants due to starvation is exceedingly rare in Minnesota. Experimental starvation of pheasants at Madelia under normal winter conditions has provided information on the symptoms of starvation and the appearance and activities of starving birds. For example, birds weakened by starvation appear listless and unable to fly or fly only short distances. Sometimes they run short distances and then

collapse. Poor control of the wing muscles is apparent. In advance stages of starvation birds appear "droopy" and frequently stand in a "hunched up" position with feathers fluffed and head and neck drawn in. Droppings of starved birds are watery and light in color; those of healthy birds are semi-solid and dark gray or brown in color. Droppings of starved birds just prior to death have the consistency and appearance of milk.

Weights for wild pheasants are of help in diagnosing starvation. Average weight of healthy and starved birds are give below.

Av. Wt. of Healthy Birds		Starved Birds		% Wt. Loss (Both Sexes)
<u>Cocks</u>	<u>Hens</u>	<u>Cocks</u>	<u>Hens</u>	
2 lbs. 14 oz.	2 lbs. 2 oz.	1 lb. 6 oz.	1 lb. 0 oz.	50-55%

It must be borne in mind that these are average weights and that individual weights may occasionally vary 8 ounces or more from the average, depending upon body size. In addition to weight loss, starving birds typically have a prominent keel and breast contours in cross section are V-shaped as compared to the well rounded breast of a healthy bird.

Internal examination of starving birds reveals little or no body fat and the muscles appear wasted, flabby to the touch and have a slimy consistency. The crop and gizzard are usually empty or contain fragments of corn stalks, straw and other cellulose material of low nutritional value. The gizzard lining is typically dark green or black compared to light green in a healthy bird.

Pheasants deprived of all food usually die under experimental conditions after an average period of 12-14 days of normal winter conditions. Death may occur, however, anywhere between 7 and 30 days depending upon weather and the condition of the birds at the beginning of the starvation period. Survival is influenced by body size with the result that the largest birds of either sex survive the longest. However, data indicates that hens, despite their smaller size, can endure the starvation as long or possibly even longer than cocks.

Fortunately, winter feeding is rarely necessary. If it were we would have a tremendous job in view of our 45,000 square miles of pheasant range, almost every section of which winters at least a few birds. Ill-advised winter feeding not only can be a waste of funds and effort but can actually be detrimental to the birds. Harm to the birds can result under conditions where they are enticed by food to unsafe areas such as roadsides. Also, birds flushed from cover during bad weather while the food is being distributed can come to grief if they are forced to fly long distances and seek shelter in poor protective cover.

1984 WINTER CONDITION SURVEY

	Specimen No.	Date	Location	County	Sex	Est. Age	Live Dressed WT.	Brought in BY	Family Group Relationship	Ruman	Cause of Death	Back Fat	Kidney Fat	Marrow Fat
ADULTS	80402002	1-24-84	FORT RIDGELY State Park	Nicollet	F	5-1/2	-- 120	Bremer	W/one fawn	--	gunshot	thick	enveloped	96
SACRIFICED	80402003	1-24-84	FORT RIDGELY State Park	Nicollet	F	3-1/2	-- 95	Bremer	W/two fawn	--	gunshot	thick	enveloped	95
	80408013	1-24-84	Bright Lake	Martin	F	3-1/2	122 97	Olson	--	corn	dogs	thick	enveloped	74
	80412005	1-19-84	Co. 62 W. of Window at Heron Lk. outlet	Cottonwood	F	3-1/2	147 112	Wells	--	corn	roadkill	thick	enveloped	92
ADULTS	70407003	1-22-84	Sibley S. P. Highway 9	Kandiyohi	F	9-1/2	155 126	Miller	--	Cedar no corn	roadkill	thick	enveloped	91
FOUND	70407004	1-22-84	Sibley S. P. Highway 9	Kandiyohi	M	3-1/2	161 120	Miller	--	Corn	roadkill	thick	enveloped	91
DEAD	80408021	1-20-84	Rice Lake S.P. 4 mi. south	Steele	F	1-1/2	124 88	Idstrom	--	Corn	found dead run by dog	thick	enveloped	82
	80412009	1-23-84	Kilen Woods S.P.	Jackson	F	3-1/2	124 102	Wells	--	Corn	dogs	thick	enveloped	90
	80408015	1-25-84	Flandrau S.P.	Brown	M	5-1/2	211 165	Miller	--	Corn	dogs	thick	enveloped	86
	80408025	1-29-84	SW 1/4, S20 T113 R36, Delhi Twp.	Redwood	M	2-1/2	120 82	Bonnema	--	Corn lgal fluid	starvation	absent	absent	*

2-1-84

1984 WINTER CONDITION SURVEY

Specimen No.	Date	Location	County	Sex	Est. Age	Live Dressed WT.	Brought In BY	Family Group Relationship	Ruman	Cause of Death	Back Fat	Kidney Fat	Marrow Fat
80408010	1-4-84	NE ¼ Sec. 33-111-42	Lyon	F	Fawn	53 40	Meyer	--	no corn	starvation	absent	absent	14
80408011	1-4-84	NE ¼ Sec. 7 - 109 -45	Lincoln	M	7 mo.	86 60	Meyer	--	no corn	found dead starvation	some (thin)	spotty	78
CRIPPLE 80412003	1-12-84	Sec. 25 & 26 Amo Twp.	Cottonwood	M	7.5 mo.	75 54	Wells	--	--	Road kill prev. leg inj	absent	absent	22
80408007	1-18-84	I-90 Fairmont	Martin	F	Fawn	--	Olson	--	--	road kill	--	--	72
80408008	1-19-84	Hwy 14 by spring E of 14 & 15 Jct.	Nicollet	M	Fawn	75 50	Haseman	--	no corn	road kill	very thin	spotty	80
80408009	1-20-84	Watonwan B. 1/2 m S. St. James on Co. 104	Watonwah	F	Fawn	70 50	Schulz	--	corn	dog kill in trap	present	enveloped	86
FAWNS CRIPPLE 80408017	1-20-84	Rice Lake S. P.	Steele	M	7 - 8 mo.	56 42	Idstrom	--	no corn	cripple found dead	none	absent	*
FOUND 80408019	1-20-84	Rice Lake S.P.	Steele	F	7 mos.	54 40	Idstrom	--	no corn	dogs partly eaten	none	absent	*
DEAD 80408020	1-20-84	Rice Lake S. P.	Steele	F	8 mos.	80 62	Idstrom	--	no corn	dogs	very thin	spotty	76
80408012	1-23-84	NW¼ S22 Long Lake Twp	Watonwan	F	7-8 mos.	81 55	Schulz	--	corn	found dead ?	very thin	spotty	74
80408016	1-24-84	3 m. E Alden	Freeborn	M	7-8 mos	60 45	Idstrom	--	no corn	dogs starvation ?	absent	absent	13
80408018	1-24-84	3 m. E Alden	Freeborn	F	7-8 mos	59 42	Idstrom	--	no corn	dogs	absent	absent	56
80408014	1-25-84	Upper Sioux Agency S.P.	Yellow Medicine	M	7-8 mos	78 57	Miller	--	no corn	road kill	very thin	spotty	86
80408022	1-23-84	S-11-105-43	Pipestone	F	7 mo.	75 57	Talcot	--	corn	road kill	thick	spotty	86
CRIPPLE 80408023	1-9-84	Hwy 23 by Camden S. P.	Lincoln	M	6.5 mo.	70 54	Talcot	--	corn	cripple found dead	absent	absent	*

1984 WINTER CONDITION SURVEY

Specimen No.	Date	Location	County	Sex	Est. Age	Live Dressed WT.	Brought in BY	Family Group Relationship	Ruman	Cause of Death	Back Fat	Kidney Fat	Marrow Fat
80408026	1-27-84	Bright Lake	Martin	F	7-8 mo.	90 66	Olson	--	beans	Dog kill	none	Spotty	*
80408024	1-29-84	SW 1/4 - S 20 T113 R36 Delhi Twp	Redwood	F	7-8 mo.	100 67	Bonnema	--	corn + 1 gal fluid	could not hold head up shot	none	spotty	*
													* data in process

FAWNS
FOUND
DEAD

1984 WINTER CONDITION SURVEY

Specimen No.	Date	Location	County	Sex	Est. Age	Live Dressed WT.	Brought in BY	Family Group Relationship	Ruman	Cause of Death	Back Fat	Kidney Fat	% Marrow Fat
80401001	1-4-84	Plum Creek, Walnut Grove	Redwood	F	7½ mos.	93 61	Bonnema	?	conifer corn	needles headshot	present	thick spotty	82
80401002	1-4-84	Plum Creek, Walnut Grove	Redwood	M	7 mos.	75 50	Bonnema	?	con. nd's corn	headshot	present	thick spotty	93
80402001	1-4-84	Anderson Island Ref. Swan Lake	Nicollet	M	6 mos.	49 35	Bremer	Orphan ?	leaves no corn	heart gunshot	absent	absent	10
80412001	1-6-84	2 mi N. 2 mi. E Ceylon	Martin	M	7 mos.	-- 54	Wells	single fawn w/ 6 deer	oats no corn	neckshot	very thin	thin spotty	82
80408003	1-1-84	Loon Lake	Blue Earth	M	6 mos.	71 ---	Ekstrom	---	---	starvation	absent	absent	38
80408002	1-3-84	Swan Lake	Nicollet	M	6 mos.	71 ---	Abraham	--	corn	starvation	absent	absent	36
80408004	1-9-84	3 mi E ½ mi S LaSalle	Watowan	M	7 mos.	67 42	Ingbrigton	---	grass no corn	starvation & Dogs	absent	absent	11
80412002	1-9-84	2 mi N of Jackson on DesMoines Riv.	Jackson	F	7 mos.	80 63	Wells	--	no corn	starvation dogs	absent	absent	60*
80408005	1-9-84	Bright Lake	Martin	F	7 mos	-- eaten	Olson	--	--	starvation	absent	absent	58*
80408001	1-1-84	3 mi. e LaSalle	Watowan	F	2½ yrs	--	Ludwig	--	--	roadkill	thick	enveloped	87
80408006	1-9-84	Bright Lake	Martin	F	3½ yrs	93 73	Olson	--	no corn	dogs starvation	thin	thin spotty	82*
													*new data

Attachment 17

DISEASES OF WILDLIFE IN WYOMING

Second Edition

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WYOMING GAME AND FISH DEPARTMENT

1962

STARVATION IN WILD RUMINANTS

RED. ETI

The nutrient intake of wild ruminants is highly variable during the course of the year. Periods of malnutrition are normal and do not usually affect population numbers. Undernourishment and malnutrition result from inadequate dietary intake of any of the required nutrients. An insufficient intake of minerals, vitamins, protein, etc. is commonly referred to as a deficiency, whereas insufficient energy intake, especially long-term deprivation, is often referred to as starvation. Although other nutrients function to spare energy and improve its utilization,

starvation usually results from an energy insufficiency. This section deals with advanced malnutrition, or starvation, as it is appropriately called.

Starvation occurs frequently in wild ruminant populations; routinely eliminates young, old, weak, and sick animals; and often controls population levels. Many reports cite the occurrence of starvation in wild ruminant populations of the Northern Hemisphere: To list a few, it has been reported among moose on Isle Royale;¹⁰⁰ white-tailed deer fawn survival has been reduced on poor ranges in Texas;¹⁰¹ in Utah, 9 to 42 percent of the mule deer in some herds reportedly have died of starvation;¹⁰² severe winter conditions in Montana resulted in death of 62 percent of the pronghorn antelope in some herds;¹⁰³ and many pronghorns in the Red Desert area of Wyoming died of starvation and exposure during the winter of 1971-72.

Starvation, to some degree, probably occurs most winters in most wild ruminant herds of Wyoming. Wyoming Game and Fish Research Laboratory records show starvation was diagnosed as the major cause, or a contributing cause, of death in pronghorn antelope, mule deer, white-tailed deer, elk, moose, and Rocky Mountain bighorn sheep submitted from 17 counties since 1949. Exceptionally severe winters occasionally cause extensive losses. In Wyoming, there have been both minor and major losses of wild ruminants due to starvation. Twenty to 25 mule deer died on the Horse Creek drainage, Laramie County in 1954,¹⁰⁴ and a starvation induced die-off involving "many" deer occurred in 1959 near Douglas in Converse County.¹⁰⁴ A small die-off in 1979 involved 10 pronghorn antelope near Rock Springs.¹⁰⁴ Most small die-offs may go unreported or undetected, but extensive losses have also occurred. During the winter of 1948-1949, numerous wild animals, particularly deer and pronghorn antelope, starved or died of

exposure over much of southern Wyoming.¹⁰⁴ During winter of 1971-1972 in the Farson area, Sweetwater County, pronghorn populations experienced extensive starvation losses (J. Straley, pers. commun.). Approximately 25 to 30 percent of the deer in the upper Platte River drainage, Carbon County, died of starvation in the winter of 1972-1973; in isolated areas as many as 70 percent of the animals died (J. L. Newman, pers. commun.). Up to 80 percent of the deer and pronghorn antelope in the Pinedale and Big Piney areas, Fremont County may have died of starvation during the winter of 1978-1979 (J. Straley, pers. commun.).

Physiology of Starvation Inadequate food intake causes many physiologic changes in ruminants. The number of rumen microorganisms declines rapidly after the onset of starvation. Protozoa disappear from the rumen within 3 to 4 days,¹⁰⁵ and numbers of bacteria in the rumen of mule deer are greatly reduced by starvation.¹⁰⁶ Volatile fatty acids produced by bacteria and protozoa in the rumen likewise decline.^{105,107} This is important because ruminant animals obtain about 70 percent of their energy from volatile fatty acids produced in the rumen. As a result of reduced volatile fatty acid concentrations, rumen pH can increase from 6.1 in well fed mule deer to 7.2 in starved deer.¹⁰⁸ The strength and magnitude of rumen contractions is greatly decreased during starvation; only 20 hours of starvation can impair rumen motility.¹⁰⁹ Rumen contractions became weak and were reduced to about one half the normal rate in domestic sheep after 6 days of starvation.¹⁰⁹ These factors greatly reduce digestion, especially of fibrous material. When white-tailed deer were fasted 16 to 30 days, alfalfa and cellulose digestibility dropped to below prestarvation rates.¹¹⁰

The time needed for the ruminant digestive tract to readjust to food following starvation depends upon the length and severity of starvation. Two to 4 days are apparently required for complete recovery following 2 to 4 days of fasting.¹¹¹ Approximately 2 weeks are necessary for domestic sheep to recover from 27 days of starvation.¹¹² Starved ruminants do not eat large quantities when suddenly allowed access to unlimited amounts of food. At least 4 days are required before food intake of goats returns to normal following short-term starvation,¹¹³ and 4 weeks may be needed following long-term starvation.¹¹⁴

This explains why it is not uncommon for ruminants to die after they receive supplemental feed following prolonged starvation and why ruminants sometimes die after the spring green-up. They enter these situations in weakened condition with digestive

tracts that are not fully functional. Also, their digestive systems are adapted to high fiber diets; several days are required for rumen flora to adjust to a diet rich in the readily available carbohydrates that are abundant in new spring growth and in some formulated emergency rations. In the case of spring green-up, another factor must be overcome. New growth of forage in early spring is very high in water content, and it is difficult for ruminants to consume adequate amounts of dry matter until after the forage reaches about 5 cm in height. Therefore, ruminants subjected to abrupt dietary changes, e.g., new spring growth or during emergency feeding, following severe starvation must have enough body reserves to live in a negative energy balance for up to 2 additional weeks, the time required for the animal to adjust to the new diet and enter into a positive energy balance. Failing to do so, some ruminants die of starvation even though food is available to them.

Adult ruminants are able to store tremendous amounts of nutrients within their body tissues. Captive mule deer have been able to survive complete starvation for 64 days and still recover when fed.⁴⁰ Ruminants under 1 year of age do not have the ability to store as much body reserve and are more susceptible to starvation. In general, death is likely to occur when an adult animal loses approximately 25 to 30 percent of the weight it had attained in the fall.

Physiologic energy requirements are satisfied by any or all of four energy sources. Consumption of food is the first and most obvious source of energy. If food intake is inadequate, energy stored in body tissues provides the other sources of energy. Glycogen (a polysaccharide which is the chief carbohydrate storage material in animals) is of little significance during long-term starvation as it is the first stored energy source to be utilized. Glycogen supplies are small and become exhausted in a few hours.⁴¹ Body fat and protein (the other two energy sources) are probably utilized together during starvation.⁴² Muscle protein may be catabolized to a much greater degree than would be supposed from the observed loss in body weight.⁴³ For example, dairy cows have very large reserves of labile protein; up to 27 percent of their weight is readily available as protein, and up to 50 percent of their body protein can be catabolized during periods of energy shortage.⁴⁴

By the time an animal dies of starvation, most body fat and a substantial part of body protein will have been catabolized. The rate of protein catabolism seems to vary. During extreme cold and undernourishment, a sharp increase in utilization of protein reserves oc-

urs.⁴⁵ The ratio of fat to protein catabolized during undernutrition is generally thought to depend on the amount of stored fat.^{46,47} Fat animals (usually adults) utilize more fat than protein, especially in early stages of starvation; young animals, which have smaller fat reserves, utilize more protein than fat. Immature sheep partially starved for 42 days utilized both fat and protein as energy; the rate of utilization was in proportion to the relative amounts of those tissues in the body.⁴⁴ After all fat is utilized, there is a rise in nitrogen excretion, indicating additional protein catabolism just prior to death.

Wild ruminants have adapted physiologically to cope with some dietary deficiencies that result from consumption of poor quality forage. They obtain energy from poor quality roughages if the reticulorumen provides a suitable environment for the rumen microflora. Food sources on most winter ranges do not provide adequate minerals and nitrogen needed for an optimum rumen environment. In order to assure a suitable rumen environment, ruminants appear to be able to store in their tissues minerals and nitrogen which are secreted into the rumen during winter months. No less than six minerals are removed from blood and secreted into the rumen.⁴⁸ Ruminants recycle some of these nutrients, thereby retaining them for reuse by rumen microorganisms. Up to 92 percent of the rumen nitrogen of white-tailed deer is recycled.⁴⁹ Although ruminants can apparently obtain additional energy from roughages via recycling of nutrients, as forage quality decreases and fiber and lignin content of forages increases, the amount of energy obtained eventually becomes inadequate.

Susceptibility to Starvation In Wyoming, most wild ruminants are faced with marginal or inadequate food for 4 to 5 months during winter and early spring. Several factors influence their ability to survive this period. Juveniles, yearlings, and very old animals are most susceptible to starvation; they enter winter with fewer body reserves. Old animals often cannot consume adequate amounts of winter forage because of tooth wear; they, therefore, have low nutrient intake. Young animals also have greater nutritional requirements per unit of body weight than adults. Up to 60 to 70 percent of winter starvation deaths may consist of animals less than 1 year of age.

In addition to age, there are other important factors that determine the extent of animal losses due to starvation. Duration of winter is very critical because it determines the length of time ruminants must depend on

body reserves and low quality forage for nutrients. Once winter begins, most ruminants will be very near, or in, a negative energy balance. Early winters, such as those that begin in November, with deep and persistent snow cover are especially apt to result in starvation. Severity of weather from mid-November to mid-December seems to be an important indicator of the degree of starvation losses that may occur later in winter. Also, when deep snow and severe cold extend exceptionally late into spring, losses due to starvation can be expected.

Availability of cover and its relationship to the severity of cold winter temperatures and wind affects survival. In addition to breaking up wind currents, cover also provides some radiant heat which animals utilize.¹⁴⁴ Cold temperatures increase energy requirements, resulting in quicker utilization of body reserves. White-tailed deer weighing 50 k on maintenance nutrition at 30 C utilized about 95 Kcal more per hour when exposed to 19.2 km per hour wind.¹⁴⁵

Susceptibility of ruminants to winter starvation is greatly influenced by adequacy of summer and fall ranges.¹⁴¹ Animals that have access to high quality forage and experience small energy demands during summer and fall accumulate more reserves before winter than those animals that have high energy demands (e.g., from lactation, growth, excessive harassment, etc.) and come from poor summer and fall ranges. This may be evident on winter ranges where some animals of a given age and sex die of starvation while others survive. A likely explanation is that many individuals that die may spend summer or fall on ranges of poorer quality or expend more energy prior to winter than those that survive. Good year-round habitat and nutrition are very important. Winter range requirements depend, in part, on what was available on other seasonal ranges.¹⁴¹

The Consequences of Starvation Nutrition affects the extent of winter mortalities due to starvation, reproductive success, and resistance to some diseases and parasites. Well nourished animals, however, may be no more able to resist viral and some other infections than malnourished animals.¹⁴ Winter-death of wild ruminants are the most readily observed effects of inadequate nutrition. The effect of starvation-induced mortalities may be great and persist for many years. Evidence of the severe winter of 1973 in the upper Platte River drainage could be seen in the age structure of these mule deer 6 years later. Such losses can be anticipated to occur periodically in Wyoming, especially among deer and antelope. Death rates of 5 to

6 percent by animals that produce single offspring and 10 to 12 percent by those that commonly produce twins are not unusual and probably are acceptable.

Effects of disease and parasitism, due to lowered resistance, in undernourished animals are difficult to quantify and often go unnoticed. These effects may occur throughout the year, although they are most common in winter and spring; are usually isolated in occurrence; and usually involve only a few animals at any one time.

Starvation lowers reproductive success, a loss that is not readily noticed even when young:adult ratios are determined. Pregnant females protect developing fetuses by catabolizing much of their own fat and protein reserves. Pregnant females that experience prolonged or severe starvation may abort or resorb the fetus; soft tissues are taken back into the mother's system and bones may be held in the uterus (Fig. 131) or expelled.

Starvation that extends into late gestation may cause birth of small young that have reduced chances of survival. Elk cows that lost over 3 percent of their body weight during the last half of gestation (January to just prior to parturition) gave birth to small calves with much lower chances of survival than calves born to cows that maintained weight. The 3 percent body weight loss immediately prior to calving actually represented about a 15 percent loss because the calf and products of conception at birth were about 10 to 12 percent of the cow's weight. Under captive conditions, elk calves weighing at least 16 k at birth had a 90 percent chance of survival; fewer than 50 percent of the calves weighing under 11.4 k survived.¹⁴⁷ Preliminary results of current research with elk in Wyoming and work done with domestic livestock indicate mature females may be able to lose large amounts of body weight during the first two-thirds of gestation and still produce healthy offspring, if well nourished during the last 30 to 60 days of gestation.¹⁴⁸

Starvation during gestation also affects reproductive rates in deer.^{113,114,115} In 1962, Verme¹¹³ reported that when winter and spring nutritional levels were low over 33 percent of the white-tailed deer fawns born to malnourished does died within 48 hours after birth. These deaths resulted from fawns being born in very poor physical condition, fawns too small to reach the doe's teats, fawns not permitted by the doe to suckle, and delayed lactation or no milk available to the fawns. Langenau and Lerg¹¹⁴ studied winter nutritional stress on maternal

and neonatal behavior of white-tailed deer. Most postnatal fawn mortality resulted from rejection of the fawn; fawns which did not nurse died within 77 hours after birth. In nearly all cases, when a doe rejected one of a set of twins, she rejected the other. Does that received good nutrition during winter nursed their fawns more often; this has also been demonstrated in Rocky Mountain bighorn sheep.^{104,122} Studies in Montana showed reproductive rates of surviving pronghorn antelope ranged from 39 to 55 fawns per 100 does following a severe winter.¹²³

Prevention and Control Maintaining wildlife populations within the carrying capacity of their habitat is the best means of preventing starvation. Critical habitat of wildlife should be protected and carefully managed to maintain it in good condition; land use planning is vital for the protection of habitat. Wildlife habitat is steadily decreasing because of urban expansion, road construction, mining, and other developments. When possible, these activities should be restricted to areas and times not critical to wildlife. Land reclamation following mining offers land managers the opportunity to provide habitat.

Supplemental feeding of starving wild ruminants is an alternative to allowing starvation to occur during unusually severe conditions. Feeding of game animals should not be considered until all other options have been examined. Many elk and some moose have been routinely fed each winter in northwestern Wyoming. The major reason for most of this feeding is damage prevention, although many elk are fed to prevent starvation because of loss of historic winter ranges.

Supplemental feeding of free-ranging ruminants can be ineffective if not begun until starvation is advanced in some animals.

Large species such as elk and moose have been successfully fed baled alfalfa hay during periods of nutritional stress. High quality second or third cutting alfalfa is ideal; alfalfa-grass hay mixtures are fair, but grass hay alone is marginal or inadequate in emergency situations. Elk consume 4 to 5 kg of good quality baled hay daily over an extended period; this is a maintenance ration. Feeding levels as low as 2.3 kg per elk per day help, but the elk remain in a negative energy balance and starvation, although slowed, continues.

Feed quality is especially important with deer and pronghorn antelope. Their digestive systems cannot obtain adequate energy from roughages high in fiber. As a result, if supplemental feed is expected to save lives, it must be of high quality. It is important that rations formulated for emergency periods be

palatable and contain readily available carbohydrates (grain), roughage, minerals, and vitamins. In general, a pelleted ration with about 30 percent grain, e.g., barley, 5 percent molasses, 65 percent alfalfa, plus vitamin and mineral supplements is probably suitable for starving deer and antelope. Soybean meal (5 to 10 percent) can be added in place of part of the alfalfa to increase protein concentration. Commonly, baled hay is fed to deer and antelope during emergency situations. In these cases, success depends on feeding high quality alfalfa at a level at which the animals are able to satisfy their appetite and yet not be forced to consume the large stems.

It should be understood that ruminants may continue to die after feeding has begun because emergency feeding programs usually are not initiated until starvation has advanced too far for some animals to be saved. Also, hay often is not of sufficiently high quality to provide maintenance nutrition for deer and antelope. The number of animals saved by emergency feeding depends on their condition at the time feeding is initiated, quality and palatability of the feed, and the amount of feed provided.

Diagnosis Starvation, especially in advanced stages, may be easily diagnosed. Several methods have been used to determine the degree of starvation; each has often animals must be captured or killed before physical condition can be evaluated. Therefore, visual assessment of the condition of free-ranging ruminants has much value. Animals in very good condition and those very near death are easily recognized. However, the body condition of animals not falling into these extremes is difficult to assess. For example, deer are very near death if they have lost 25 percent of the maximum weight they had attained upon entering the winter. It can be extremely difficult to distinguish animals that have lost 10 percent of their weight from those that have lost 20 percent, especially when they are in winter pelage. Animals in very good condition have a pelage that is healthy in appearance; however, this can be misleading in late spring because well nourished ruminants shed earlier than undernourished animals and their hair coat looks rough and uneven though they are in good nutritional condition.²²¹ Well nourished ruminants have a full and rounded appearance; they have little if any demarcation between the neck and shoulders and their ribs are not visible. On the other hand, animals experiencing advanced starvation (Fig. J32) have a dull coat, and the backbone and ribs may be visible (although winter hair coats sometimes make

the latter difficult to observe). The muscles, especially in the hindquarters and shoulders are not full; the pelvis may be distinct; a definite demarcation between the neck and shoulders is present; the upper foreleg is distinct from the chest; and the legs appear noticeably thin. Finally, the skin may appear loose, and weakness may be apparent as the animal stands with the humerus in a horizontal position and the back humped or sagged; the outline of the scapula and the spine of the scapula may be apparent. The face of starved ruminants may seem swollen, which is probably due to erect hairs, especially just prior to death. Behavior of starving animals differs from that of healthy animals. Well nourished ruminants from hunted populations are commonly wary; weak, hungry animals are much more tolerant of humans, especially as starvation advances. When death from starvation approaches, affected animals become lethargic and unsteady when steadiness due to muscle weakness have been observed in severely undernourished domestic bulls.¹⁰⁷

More information about their physical condition may be obtained from trapped animals. They can be palpated, and the amount of fat over the back and ribs and the degree of muscle atrophy can be determined. Pronounced backbone, ribs, and shoulder indicate much of the animal's reserves have been exhausted (Plate 4.7). Weight of these animals also indicates their overall condition when compared to healthy animals. Although blood samples can be taken from live animals, from a practical viewpoint it is unlikely that blood parameters reveal much more about the condition of the animal than can be gained from observing and feeling it, but they are not as subjective as personal observation.

Other techniques for evaluating physical condition require that the carcass be examined. Most determine the amounts of adipose tissue at various locations in the body. Bone marrow of the femur is commonly used to determine the body condition.¹⁰⁸ Femoral marrow of adult animals is used primarily for fat storage, while in young animals, it serves to produce red blood cells rather than function for fat storage. For this nutritional status must be limited to animals in which red blood cell formation is not occurring in the femoral marrow.

Femoral marrow of adult ruminants in good physical condition is white in color and has the consistency of hard fat or tallow (Plate V). As fat reserves are utilized, the amount of fat in the marrow decreases. Marrow of an animal that died of starvation is red or yellow in color, relatively clear, and

very gelatinous (Plate V). However, caution must be maintained when using marrow as an indicator of starvation. Occasionally, femoral marrow of emaciated ruminants is gelatinous, but white rather than red or yellow; the marrow, nevertheless, is low in fat content. A gelatinous consistency, regardless of color, indicates poor body condition. On the other hand, a solid and/or white marrow does not always mean the animal was in good condition.⁹

Various techniques have been designed to measure the amount of femoral marrow fat. A compression method has been used with elk.^{109,110} This method involves removing a specific length of marrow from the femur, and standing it on end to determine percentage of its original length that it compresses while standing. The degree of compression is inversely related to the amount of fat present. If laboratory facilities are available, the amount of marrow fat (ether-extract) can be precisely measured. The dried weight of femoral marrow also provides an accurate measure of fat content.^{111,112} In order to use these methods, it is necessary to determine or have access to data that correlate the amount of femoral marrow fat present to body condition. It is suggested that, in most cases, unless detailed data are necessary, visual estimate of the fat content of the femoral marrow and general body condition will suffice.

Harris¹¹ has shown a general pattern of fat utilization occurs in malnourished mule deer. The first fat to disappear is off the rump and back. Subcutaneous fat is utilized next, followed by omental and perirenal (around the kidneys) fat. Fat can be found on the heart after the omental and perirenal fat are gone, and the last stored fat to disappear is in bone marrow.

Fat is normally deposited around some of the internal organs of the body; some investigators have used the amount of perirenal fat to calculate a kidney-fat index (weight of fat surrounding the kidneys compared to kidney weight and expressed as a fraction) to indicate the body condition of animals. This method has been used with many species of wild ruminants. However, caution must be followed when using the kidney-fat index, especially when comparisons are being made at different times of the year, because the weight of the kidneys may change during the year.¹²

Starving ruminants continue to eat until they die, and necropsied ruminants which die of starvation seldom have an empty rumen, even though the rumen contents are usually low quality forage.

WILDLIFE HABITAT IMPROVEMENT PROGRAM
MN/DNR Section of Wildlife

1. Approved Practice - Food Plots

A. Annual plantings of

1. Corn
2. Corn/Sorghum
3. Sunflowers
4. Oats
5. Soybeans
6. Waterfowl pasture

Second standing winter of previously purchased

1. Corn

II. Purpose

- a. To provide over wintering wildlife primarily white-tailed deer, pheasants, prairie chickens, Hungarian partridge and songbirds a reliable and adequate source of food and to moderate private lands occupancy of big game herds and migratory waterfowl flocks.

III. Specifications

- A. Because the food plot program offers many opportunities to blend landowner, hunter and wildlife considerations, the Area Manager will be responsible for integrating the payment rate with local concerns, recognizing, however, that the primary goal is the maintenance of desired wildlife populations on private lands.
- B. Wildlife food plot consumption should be planned for 100% utilization. This requires periodic inspection, knowledge of historical population trends as well as application of short-term and long-term management goals. This may prove quite important in the vicinity of migratory waterfowl and big game refuges. Food plots which are under utilized reduce opportunities for cost share establishment in other needed sites. Also, compensation rates are compromised as landowner receives a dis-proportionate return on grain after harvesting.
- C. Food plot shall remain standing until April 1 of the following established crop year unless otherwise stated in agreement.
- D. Food plots should be established pursuant to U of M - Ag. Extension and USDA recommended chemical and mechanical treatments for tillage technique utilized by cooperating farmer. Minimum and no till techniques should be favored.

- E. Site selection may be in response to wildlife crop depredation, however, crops purchased must be essentially undisturbed and compensation cannot be applied to crops already consumed. See State-wide Standards for Emergency Corn Food Plot Purchases.

IV. Site Eligibility Requirements

A. Location

1. Statewide
2. Soils and climate must be suitable for crop selected

B. Funding Sources

1. WHIP (G&F fund) account; private lands only.
2. DHIP account; private and public lands.
3. Pheasant Habitat Stamp account; private and public lands with preference to private.
4. Gifts account; as stipulated by gift agreement.
5. Deer Depredation Reserve account; private lands only.

- C. Other site guidelines are at descretion of Area and Regional Managers, however, strong preference should be shown for sites permitting the harvest of wildlife unless sustained refuge situation is part of management goal. Regional Supervisor, Private Lands - Coordinator, Research Group or species advisory committee should be consulted prior to food plot establishment in a refuge system.

V. Cost Sharing

A. Without USDA Land Retirement Program

1. Emergency Rates - see State Standards for Emergency Corn Food Plot Purchases - Section of Wildlife memo dated 11/5/82.
2. Regular Food Plot Rates - i.e., WHIP, DHIP or Pheasant Habitat Stamp funded.
 - a. Minimum grain cost reimbursement rates are the U of M Agricultural Extension Grain Budgets for appropriate soil area which include these cash cost items. A similar cost analysis technique for a cooperating farmer may be also applied.
 - (1) Machine planting rates for conventional, minimum till, no till techniques
 - (2) Seed
 - (3) Fertilizer nitrogen, ammonia, phosphorous, potassium
 - (4) Fertilizer application rate
 - (5) Spraying & Herbicide Costs
 - (6) Cultivation costs
 - (7) Taxes

Budgets for 12 soil areas of Minnesota and stipulated crops are available from the Private Lands Coordinator.

- b. Maximum grain cost reimbursement rate is 125% of above.
 - c. If maximum rate is selected, payment should be adjusted downward to reflect the amounts of grain harvested and retained by landowner after expiration of a previous food plot agreement period.
 - d. A negotiated cash land rental cost may be added to the final grain payment rate. (A.2.a. and b.) With the addition of a land rental payment equaling the mean cash rental of that county and absolute maximum payment is reached. For mean cash rental rates see WHIP Nesting Cover Guidelines - Appendix I.
3. Two year food plot - Total cost sharing (I.B.) payment shall be a negotiated percentage of the previous years payment not to exceed mean cash rental rate for county.
- B. With USDA Land Retirement Program if food plots are USDA approved for Conservation Use Acres.
1. No WHIP land rental payment offered.
 2. V.A.2.a., b. and c. apply.

VI. Agreement Processing

- A. Sign up period - January thru June.
- B. Payment processing - no later than Dec. 1st of crop year.
- C. Forms - Complete four (4) copies of Private Lands Agreement - Wildlife Habitat Improvement Program - Food Plot - NA-01719-02. Distribute as follows: 2 Area, (1 copy used as inspection and payment form), 1 Region, and 1 landowner.
- D. Note fund source (IV.B.) on upper right corner of Food plot form.

DEPARTMENT Natural Resources - Wildlife Research

Office Memorandum

TO: Blair Joselyn

DATE: 2-1-84

FROM: David Ingebrigtsen & John Ludwig

PHONE: 507-642-8478
" " 3186

SUBJECT: Deer Condition Update

We have examined 10 adults from Regions IV and V since January 11. The healthy adults (see data sheets) include 2 that were shot, 3 roadkills, and 4 dog kills. All had ample back, visceral and marrow fat. Even the dog kills (which we would think to be the weaker deer) have ample fat reserves. An adult male in poor condition was found in a Redwood county wood lot where Ken Bonnema reported that feeding had just begun. The deer's rumen was full with corn and about a gallon of fluid, suggesting feeding probably was too late for this particular deer, and/or a problem caused by a load of corn after a period of no food. A fawn in similar condition was also picked up near this adult. (A road-killed adult doe also has been reported to us from Jackson county in poor condition - 52% marrow fat).

We have examined 17 additional fawns from a wide area of the southwest. Cripples account for 3 of these (shaded on data sheet). Except for the cripples and 2 fawns that died from starvation, the fawn marrow fat levels are sufficient for life. Levels in the 80's appear to be normal for fawns. When they drop into the 70's they are dipping into their reserves. Most fawns examined have very little back fat or visceral fat.

Apparently most groups of deer in southwest and south central MN are being fed. It appears that most of the adults are in good shape and can survive more subzero periods with continued feeding. The fawns are walking a thin line, however. A prolonged cold period may deplete their marrow fat reserves resulting in more losses even with supplemental feeding. Managers should be made aware that some deer in poor condition may be lost due to problems caused by overloading with unlimited corn after a period of no food (see attached article).

DI:JL:jl

Enc: 1-Updated 1984 Winter Condition Data Sheet (1-11-84)
3 New 1984 Winter Condition Data Sheets (2-1-84)
Reprint

cc: L. Nelson
H. Shepperd
R. Holmes
A. Berner

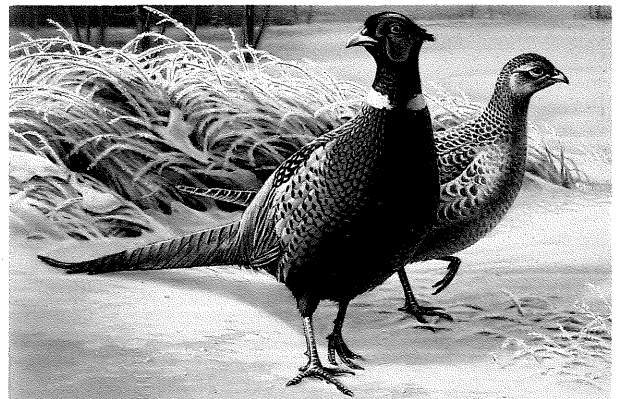
1985 Pheasant Stamp



1984 Pheasant Stamp



1983 Pheasant Stamp



Pheasant stamps generate about \$500,000 annually, of which about 90 percent goes toward upgrading habitat on private lands and in roadsides. In 1983, Minnesota became the third state to institute a Pheasant Stamp Program. It requires hunters to purchase a special \$5 stamp along with their general hunting license. The DNR conducts an annual contest to select the winning design for each stamp.