Department of the Interior
U.S. Fish and Wildlife Service

Federal Fish and Wildlife Permit Application Form

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Expires Nov. 30, 2010
OMB No. 1018-0094

Return to: U.S. Fish and Wildlife Service (USFWS)

TE219624

Type of Activity: Native Endangered and Threatened Species –

Scientific Purposes, Enhancement of Propagation or Survival Permits (i.e., Recovery Permits) & Interstate Commerce Permits

Complete Sections A or B, and C, D, and E of this application. U.S. address may be required in Section C, see instructions for details.
See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.

A. Complete if applying as an individual				
1.a. Last name		1.b. First name	1.c. Middle name or initial	1.d. Suffix
2. Date of birth (mm/dd/yyyy)	3. Social Security No.	4. Occupation	5. Affiliation/ Doing business as (see instructions)	
6.a. Telephone number	6.b. Alternate telephone number	6.c. Fax number	6.d. E-mail address	

B. Complete if applying on behalf of a business, corporation, public agency or institution			
1.a. Name of business, agency, or institution		1.b. Doing business as (dba)	
Michigan Department of Natural Resources			
2. Tax identification no.	3. Description of business, agency, or institution		
38-6000134	State Agency		
4.a. Principal officer Last name	4.b. Principal officer First name	4.c. Principal officer Middle name/ initial	4.d. Suffix
Koch	Armida		
5. Principal officer title	6. Primary contact		
Deputy Director	Christopher Hoving		
7.a. Business telephone number	7.b. Alternate telephone number	7.c. Business fax number	7.d. Business e-mail address
517-373-1263		517-373-6705	HovingC@michigan.gov

C. All applicants complete address information				
1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)				
530 West Allegan				
1.b. City	1.c. State	1.d. Zip code/Postal code:	1.e. County/Province	1.f. Country
Lansing	MI	48933	Ingham	USA
2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)				
2.b. City	2.c. State	2.d. Zip code/Postal code:	2.e. County/Province	2.f. Country

D. All applicants MUST complete

1. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount indicated on page 2**. Federal, tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – ***attach documentation of fee exempt status as outlined in instructions.*** (50 CFR 13.11(d))

2. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
   Yes ☒ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: _____
   No ☐

3. Certification: I hereby certify that I have read and am familiar with the regulations contained in ***Title 50, Part 13 of the Code of Federal Regulations*** and the other ***applicable parts in subchapter B of Chapter I of Title 50***, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

X _____ 03 26 09

Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) — Date of signature (mm/dd/yyyy)

Please continue to next page

**** See page 13 for additional instructions on completing the above form. See page 14 for information on the Paperwork Reduction Act, Privacy Act, and Freedom of Information Act aspects of this application form.**

Section E. **ALL APPLICANTS COMPLETE SECTION E.** Provide the information outlined in Section E. on the following pages. Be as complete and descriptive as possible. Please do not send pages that are over 8.5"X 11", videotapes, or DVDs.

SCIENTIFIC PURPOSES, ENHANCEMENT OF PROPAGATION OR SURVIVAL PERMITS (i.e., RECOVERY PERMITS) & INTERSTATE COMMERCE PERMITS

What type of permit are you requesting?

- ⊟ Recovery (see instructions and requirements on pp. 2-8 and 13-14 of this application form)

OR

- □ Interstate Commerce (see instructions and requirements on pp. 2-3, 9-10 and 13-14 of this application form)

Have you obtained all required State, Federal or foreign government approval to conduct the activity you propose? Please be aware that there may be other requirements necessary to conduct this activity such as an import permit, collection permit, permission to work on Federal lands, Federal bird banding permit, Corps of Engineers permits, Environmental Protection Agency NPDES permits, State, county or local permits, etc.

- □ Yes. Provide a copy of the approval(s). List the State, Federal or foreign countries involved and type of document required. Include a copy of these documents with the application.

- □ I have applied. List the State, Federal or foreign countries involved and type of documents required. Provide the reasons why the permits have not been issued. _____

- ⊟ Not required. The proposed activity is not regulated.

Application Processing Fees

The application processing fee for a new Recovery or Interstate Commerce permit, or to renew/re-issue an existing valid permit, is $100. If permit amendment is required at a time other than renewal/re-issuance, the processing fee is $50.

Check the appropriate box below and enclose check or money order payable to the *U.S. Fish and Wildlife Service* in the amount of

□ $100 for a **new** permit

OR

□ $100 to **renew/re-issue** my existing valid permit (with only *minor changes* such as updating my name and address) using my current application package on file.

OR

□ $50 to make a **substantive amendment** (with *major changes*) to my existing valid permit [50 CFR 13.11(d)(2)].

If the information in your current application package on file has changed in a manner that triggers a major amendment or a change not otherwise specified in the permit, then you must apply for an amendment to your valid permit. For example, such major changes may include changes in study plan, location, activity, amount or type of take, or species to be covered by the permit. Please contact the Regional Endangered Species Program located within the U.S. Fish and Wildlife Service Region of your proposed activity for technical assistance. Their contact information can be found on the U.S. Fish & Wildlife Service's Endangered Species web page at http://www.fws.gov/endangered/permits/permitscontacts.html

Please check the **type of amendment** you are requesting --

□ add species (specify) _____

□ add a geographic area □ change in personnel

□ other (specify) _____

Referral of a Recovery permitte's contact information (optional)

The U.S. Fish and Wildlife Service often receives requests for lists of Recovery permittees who could conduct contract work for endangered and threatened species (e.g., presence/absence surveys). In accordance with our Privacy Act System of Records Notice (Permits System, Interior – FWS-21), we may release the name and work address or work telephone number of those who wish to be contacted by third parties to do commercial survey activities. Such information is not normally released under the Freedom of Information Act - unless a compelling need on the part of the general public can be cited.

Please be aware that this list does not represent an endorsement by us of any particular permittee. This referral is provided at the discretion of each U.S. Fish and Wildlife Service Regional Office as time and workload allow.

Please indicate below your preference for the release of your information to third parties.

□ Yes, I authorize the U.S. Fish and Wildlife Service to release my name, work address and/or work telephone number to third parties as a referral for contract work for endangered and threatened species.

⊟ No, I do not authorize the U.S. Fish and Wildlife Service to release my name and work address and/or work telephone number to third parties.

Application Processing Time

To expedite a final decision on your application, you are urged to coordinate with us as soon as possible for guidance in assembling a complete application package, and to send us your complete permit application package <u>at least three months</u> prior to the start of your proposed activities. If you are renewing or amending a valid permit, your complete application package must be received at least 30 days prior to the expiration of the valid permit. These time periods begin when we receive a complete permit application package and does not include any time required for requesting clarification or additional information about your application.

The information provided in your permit application will be used to evaluate your application for compliance with the Endangered Species Act, its implementing regulations (which may require a 30 day public comment period), and with U.S. Fish and Wildlife Service policy. Receipt and possession of a permit under the Endangered Species Act should be regarded as a privilege, as we must balance permit issuance with our duties to protect and recover listed species.

Up-to-date annual reports and any other required reports under your valid permit(s) must be on file before a permit will be considered for renewal, re-issuance or amendment.

If your activities may affect species under the authority of the National Marine Fisheries Service (NMFS/NOAA Fisheries), then you may need to obtain a separate permit from that agency. In addition we share jurisdiction with NMFS/NOAA Fisheries for sea turtles (e.g., we evaluate applications for permits to conduct activities impacting sea turtles on land, and NMFS/NOAA Fisheries evaluates applications for permits to conduct activities impacting sea turtles in the marine environment). To apply for a permit to conduct activities with sea turtles in the marine environment or other species under NMFS/NOAA Fisheries jurisdiction, please contact them via their permit web page at http://www.nmfs.noaa.gov/pr/permits/

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If you are not applying as an individual but as a business, corporation, institution, or non-Federal public agency (block B. on page 1 of the application), the person to whom the permit will be issued (e.g., the landowner, president, director, executive director, or executive officer) is legally responsible for implementing the permit. Although other people under the direct control of the permittee (e.g., employees, contractors, consultants) receive third party take authorization in their capacity as designees of the permittee, the individual named as the permittee ultimately is legally responsible for the permit and any activities carried out under the permit except as otherwise limited in the case of permits issued to State or local government entities under 50 CFR 13.25(e).

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RECOVERY PERMIT APPLICATION INSTRUCTIONS

(see pp. 9-10 for Interstate Commerce permit application instructions)

You have 3 options for providing the required information for a Recovery permit application. Choose only one option.

Recovery Permit Application: Option I. Renewal of a Valid Recovery Permit.

Up-to-date annual reports and any other required reports under your valid permit(s) must be on file before a permit will be considered for renewal.

Sign the following statement if you are applying to renew an existing valid Recovery permit. If you are proposing major changes to your Recovery permit, you must use Option II.

The individual signing box D. on page 1 of the application must also sign (in blue ink) the following statement. This certification language is required under 50 CFR 13.22(a).

> I certify that the statements and information submitted in support of my original application for a U.S. Fish and Wildlife Service Recovery permit # _____ are still current and correct and hereby request renewal of that permit.
>
> _____ _____
> signature (in blue ink) date
>
> _____
> please print name legibly
>
> * Please note: If you have signed the above statement, then your renewal request is complete. Please submit completed pages 1 through 4 of this application to our Regional Office (see attached list) covering the location of your proposed activity. Requests for renewals must be received no later than 30 days prior to permit expiration to ensure that your current permit remains in effect while we process your renewal request.

Recovery Permit Application: Option II. Amended Recovery Permit (with *major changes*)

Up-to-date annual reports and any other required reports under your valid permit(s) must be on file before a permit will be considered for amendment.

Sign the following statement if you are proposing to amend a valid Recovery permit by making major changes. Such major changes may include changes in study plan, location, activity, amount or type of take, or species to be covered by the permit.

The individual signing box D. on page 1 of the application must also sign (in blue ink) the following statement. This certification language is required under 50 CFR 13.22(a).

> I certify that the statements and information submitted in support of my original application for a U.S. Fish and Wildlife Service Recovery permit # _____ are still current and correct, except for the changes listed below, and hereby request amendment of that permit.

_____ _____

signature (in blue ink) date

_____

please print name legibly

Provide a brief description of the changes to your valid permit (answer the appropriate questions for these changes under Recovery Permit Application Option III. below). Please submit completed pages 1 through 5 of this application form (along with the changed information relative to Option III below) to our Regional Office (see attached list) covering the location of your proposed activity.

Recovery Permit Application: Option III. New Recovery Permit & Supplementary Information for Amendment of a Valid Permit (with *major changes*)

General permit regulations for the U.S. Fish and Wildlife Service can be found at 50 CFR 13. Regulations for Recovery and Interstate Commerce permits under the Endangered Species Act can be found at 50 CFR 17.22(a)(1) for endangered wildlife species, 50 CFR 17.32(a)(1) for threatened wildlife species, 50 CFR 17.62 for endangered plant species, and 50 CFR 17.72 for threatened plant species.

Applications for a Recovery permit must provide the following specific information (relevant to the activity) in addition to the general information on pages 1-5 of this application. Please attach separate pages. In order to assist us in processing your request, please provide the item number (A.1.a., etc.) of the required information before each of your responses. Thank you.

A. Identify species and activity:

1. For a new Recovery permit:
   a. Provide the common and scientific names of the species being requested for coverage in the permit and their status (endangered (E) or threatened (T)).

   b. Provide the number, age, and sex of such species to the extent known.

   c. Identify the activity sought to be authorized (i.e., presence/absence survey, nest monitoring, bird banding, etc.) for each species.

2. For an amended Recovery permit:
   a. Identify the species to be added to your valid permit (provide both the scientific, to the most specific taxonomic level, and common names) as well as the species' status (see 1.a. above).

   b. Provide the number, age, and sex of such species to the extent known.

   c. If any activities requested in this application differ from those authorized in your valid permit, then for each species state the currently authorized activity, the requested new activity, and how the new activity will impact each species.

   d. Identify the activity sought to be authorized (i.e., presence/absence survey, nest monitoring, banding, etc.) for each species.

   e. Quantify any anticipated effects to the habitat of each added species.

   f. Identify species to be deleted from your valid permit and the reason(s) for the deletion.

B. Identify location of the proposed activity:

1. Provide the name of the State, county, and specific location of the proposed activity site(s). Include a formal legal description, section/township/range information, county tax parcel number, local address, or any other identifying property designation that will precisely place the location of the proposed activity site(s).

2. If the specific study area is known at the time of application, attach a U.S. Geological Survey map of the study area in 7.5 minute quadrangle (1:24,000) scale, or other appropriately scaled map. If you plan to conduct surveys on a contract basis in the future, these maps can be provided once the specific area is known (the counties in which you will work must be provided at this time).

3. If your request is for aquatic species, identify the aquatic system (river/lake/stream name, river mile information, and drainage basin).

C. Describe the proposed activity:

1. Provide a statement justifying the permit request, including the following: *[A copy of a research or study proposal that provides this information can be attached in lieu of the information requested below.]* Use additional sheets as necessary.

   a. Describe in detail the purpose(s) and objective(s) of the project.

i. Include study design, sampling methodologies and equipment to be used.

ii. Identify any null hypothesis or other anticipated results from the project that will support the reasoning why the project is justified for enhancement of propagation or survival of the affected species.

iii. Include planned disposition of specimens upon completion of project

b. Describe how the proposal will help recover each species.

i. If there is an approved recovery plan, identify the recovery tasks by number and name, if applicable.

ii. Identify, or provide copies of any previous or similar research conducted on this species.

iii. If this information exists, explain how the project will answer questions not answered by earlier research.

iv. Explain how you will coordinate your efforts with past and ongoing research studies.

c. Can this project result in the injury, death, or removal from the wild of any individuals of the species?

i. If yes, describe all that apply (i.e., injury, death, removal from the wild).

ii. For each species, please state the maximum number of individuals that would be injured, killed, or removed from the wild: [*If applicable, please identify, based on a reasonable expectation, the number of individuals likely to be injured or killed per activity.]*

iii. Please state what will be done to minimize the possibility of injury to or death of individuals.

iv. If the proposed activity would cause the death of individuals from the wild or remove individuals from the wild, describe your attempts to obtain the wildlife or plant specimens currently held in captivity/nurseries/museums, or produced in captivity. You must demonstrate conclusively that existing specimens are unavailable or your study objectives require new/additional specimens. *[Provide the identity and phone number of each contact made in this regard.]*

d. Identify contracts and agreements held for the proposed activities (attach copy or give title, funding organization name and address, date of signature, duration of contract).

i. State whether full funding will be available for the completion of the proposed activity. *[If you do not hold a contract at this time, but foresee receiving one, you may apply for a permit contingent upon receiving the contract(s).]*

e. If live wildlife or plants to be covered by the permit are to be held in captivity:
[Note: Under our regulations at 50 CFR 17.22(a)(3) and 17.32(a)(3), escape of wildlife held in captivity must be reported immediately to our appropriate Regional Office (see attached list)].

i. Give a complete description, attaching photographs and/or diagrams, of the area and facilities where wildlife or plant(s) will be held and/or maintained in captivity and describe arrangements for care during transportation and maintenance. Include the name and address of the area and facilities. *[A separate discussion specific for each species must be provided, if applicable.]*

ii. Provide the full names of person(s) who will care for live specimens, including a resume of their experience in raising, caring for, and propagating similar wildlife or plants.

iii. Provide any contract or agreement you have secured for care of any live specimens collected under this permit request if the identified facility is not affiliated with you. Attach a copy or give title, funding organization name and address, date of signature, and duration of contract. *[A joint application may be appropriate in situations where one entity will collect the specimens and*

another entity will conduct the propagation/maintenance activities.]

iv. List mortalities resulting from your activities with these or similar species in the last 2 years.

v. Provide an explanation of each mortality event and the procedures employed or modified to eliminate any future mortality events.

vi. Indicate your willingness to participate in a cooperative breeding or propagation program or to contribute data to a database or studbook. Holding wildlife and plants in captivity must comply with our Policy Regarding Controlled Propagation of Species Listed Under the Endangered Species Act. This policy can be found on the U.S. Fish and Wildlife Service's Endangered Species web page at http://www.fws.gov/endangered/policy/propagation.html. Briefly describe how the proposed activity will comply with this policy.

vii. State the planned disposition of the collected and/or propagated species after termination of the project/activity.

D. Identify the persons who will conduct the proposed activity:

1. Provide the full name of all individuals, *including first name, middle initial, and last name,* who you propose will work under this permit.
   a. If more than one activity is included in the permit application, indicate which activity(ies) will be completed by each individual.

   b. For each listed individual, please also provide a copy of each person's resume and/or curriculum vitae, plus specific information on previous professional experience working with the species affected by the permit request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate number of each species the applicant has worked with at each site (e.g., how many pair of birds at a specific site); names, dates, and location of areas surveyed; and experience with similar species. Please provide the names and phone numbers of at least two references who can verify experience with the species (reference letters are always appreciated).

E. Identify the location of the affected species:

1. For each species indicate whether, at the time of the application, the organism was:
   a. still in the wild;

   b. had been removed from the wild (provide State, county, and specific location of removal); and

   c. was born in captivity or artificially propagated (provide State, county, specific location, and name of the institution where born or propagated).

2. If you are applying for a permit for the collection of plants from the wild, list the lands from which you plan to collect the plants.
   a. If these lands are under Federal jurisdiction, identify the Federal land management agency(ies) that have jurisdiction for the lands. Include the name, title, address, and telephone number of the person in charge of the Federal lands.

   b. Describe what plant part(s), and the number(s) or other type(s) of indication of material you plan to collect (i.e., whole plant, leaves, pollen, seeds, etc.).

   c. If the proposed activity involves the collection of seeds taken from the wild, provide information that evaluates the effects of the seed collection on the reproductive potential of the species at the collection location.

INTERSTATE COMMERCE PERMIT APPLICATION INSTRUCTIONS

General permit regulations for the U.S. Fish and Wildlife Service can be found at 50 CFR 13. Regulations for Recovery and Interstate Commerce permits under the Endangered Species Act can be found at 50 CFR 17.22(a)(1) for endangered wildlife species, 50 CFR 17.32(a)(1) for threatened wildlife species, 50 CFR 17.62 for endangered plant species, and 50 CFR 17.72 for threatened plant species.

Interstate Commerce permits authorize the sale of native endangered and threatened species across State lines, but only for activities that will contribute to the species' recovery by enhancing their propagation or survival.

PLEASE NOTE:

- Interstate commerce activities for *wildlife* require the *buyer* to obtain a permit prior to the sale.
- In addition, our regulations at 50 CFR 17.62(a) for endangered plant species and 17.72(a) for threatened plant species require that –
  - Interstate commerce activities for *plants taken from the wild* require the *buyer* to obtain a permit prior to the sale.
  - Interstate commerce activities for *plants taken from cultivated stock* require the *seller* to obtain a permit prior to the sale.

Unlike other permits for native endangered and threatened species (which are issued by the U.S. Fish & Wildlife Service Regions according to where the proposed activity will take place), Interstate Commerce permits are issued by the Region having the lead responsibility for the affected species. To determine the lead Region for a species, follow the instructions at the end of our Endangered Species web page for permit contacts at http://www.fws.gov/endangered/permits/permitscontacts.html

Applications for an Interstate Commerce permit must provide the following specific information (relevant to the activity) in addition to the general information on pages 1-2 of this application. Please attach separate pages. In order to assist us in processing your request, please provide the item number (A.1., etc.) of the required information before each of your responses. Thank you.

A. For Wildlife:

1. Provide the common and scientific names of the species being requested for coverage in the permit and their status (endangered (E) or threatened (T)).
2. Identify the activity sought to be authorized for each species.
3. Provide the sex, birth date, birth place, age, number of specimens, and identifying features (e.g., band number, collar number, scars, tattoo number, etc.).
4. Provide the name, address and telephone number of the seller.
5. State whether the wildlife has been captively bred or removed from the wild.
6. Provide the expected time needed to complete transaction(s).
7. Provide a complete description with photographs and/or diagrams of the area and facilities where wildlife will be held in captivity, and description of arrangements for care during transportation and maintenance. [Note: Under our regulations at 50 CFR 17.22(a)(3) and 17.32(a)(3), escape of wildlife held in captivity must be reported immediately to our Regional Office (see attached list)].
8. Describe experience with breeding this or similar species in the past.
9. Provide the full names of person(s) who will care for live specimens, including any experience in raising, caring for, and propagating similar wildlife.
10. List mortalities resulting from your activities with these or similar species in the last 2 years. Provide an explanation of each mortality event and the procedures employed or modified to eliminate any future mortality events.
11. Indicate your willingness to participate in a cooperative breeding or propagation program or to contribute data to a database or studbook. Holding wildlife in captivity must comply with our Policy Regarding Controlled Propagation

of Species Listed Under the Endangered Species Act. This policy can be found on the U.S. Fish and Wildlife Service's Endangered Specie web page at http://www.fws.gov/endangered/policy/propagation.html. Briefly describe how the proposed activity will comply with this policy.

12. Provide a statement from the wildlife breeder that the wildlife was bred at their home/facility. This statement must include the name and address of the breeder, date of birth or hatch, band number or any other identifying marks or characteristics.

13. Please provide detailed information on how you propose to manage your breeding stock to uniquely identify all progeny, and to ensure that the genetic diversity and integrity of your breeding stock are maintained to the maximum extent possible.

B. For Plants:

1. Provide the common and scientific names of the species being requested for coverage in the permit and their status (endangered (E) or threatened (T)).

2. Identify the activity sought to be authorized for each species.

3. Provide the location where plants will be cultivated for sale.

4. Provide the full names of person(s) who will care for live specimens, including any experience in raising, caring for, and propagating similar plants.

5. State whether the breeding stock is of cultivated or wild origin.

6. If you are applying a permit to buy plants taken from the wild, provide the name, address and telephone number of the seller. If you are applying for a permit to sell plants taken from cultivated stock, provide the name, address, and telephone number of the buyer.

7. Indicate your willingness to participate in a cooperative breeding or propagation program or to contribute data to a database. Holding plants in captivity must comply with our Policy Regarding Controlled Propagation of Species Listed Under the Endangered Species Act. This policy can be found on the U.S. Fish and Wildlife Service's Endangered Specie web page at http://www.fws.gov/endangered/policy/propagation.html. Briefly describe how the proposed activity will comply with this policy.

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The public reporting burden for completing this application for a Recovery and Interstate Commerce permit is estimated to be 4 hours, including time for reviewing instructions, gathering and maintaining application data, and completing and reviewing the forms. Comments regarding the burden estimate or any other aspect of the reporting requirement(s) should be directed to the U.S. Fish & Wildlife Service Information Collection Clearance Officer, MS 222 ARLSQ, U.S. Fish and Wildlife Service, Washington, DC 20240.

An agency may not conduct and a person is not required to respond to a collection of information unless a currently valid OMB control number is displayed.

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USFWS Regional Contacts for Native Endangered & Threatened Species Permits

Pacific Region (Region 1): HI, ID, OR, WA, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories

U.S. Fish and Wildlife Service
Endangered Species Permit Office
911 NE 11th Avenue
Portland, Oregon 97232-4181

Web: http://www.fws.gov/pacific/ecoservices/endangered/index.html
Phone: (503) 231-2071
email: permitsR1ES@fws.gov
Fax: (503) 231-6243

California & Nevada Region (Region 8): CA and NV

U.S. Fish and Wildlife Service
Endangered Species Permit Office
2800 Cottage Way, Suite W-2606
Sacramento, California 95825 - 1846

Web: http://www.fws.gov/cno/es/recovery.html
Phone: (916) 414-6464
email: permitsCNES@fws.gov
Fax: (916) 414-6486

Southwest Region (Region 2): AZ, NM, OK, and TX

U.S. Fish and Wildlife Service
Endangered Species Permit Office
500 Gold Avenue S.W. (street address)
P.O. Box 1306 (mailing address)
Albuquerque, New Mexico 87103-1306

Web: http://www.fws.gov/southwest/es/EndangeredSpecies/
Phone: (505) 248-6649
email: permitsR2ES@fws.gov
Fax: (505) 248-6788

Midwest Region (Region 3): IA, IL, IN, MI, MN, MO, OH, and WI

U.S. Fish and Wildlife Service
Endangered Species Permit Office
B.H. Whipple Federal Building
One Federal Drive
Fort Snelling, Minnesota 55111-4056

Web: http://www.fws.gov/southwest/es/EndangeredSpecies/
Phone: (612) 713-5343
email: permitsR3ES@fws.gov
Fax: (612) 713-5292

Southeast Region (Region 4): AL, AR, FL, GA, KY, LA, MS, NC, PR, SC, TN, and U.S. Virgin Islands

U.S. Fish and Wildlife Service
Endangered Species Permit Office
1875 Century Blvd., Suite 200
Atlanta, Georgia 30345

Web: http://www.fws.gov/southeast/es/#
Phone: (404) 679-7217
email: permitsR4ES@fws.gov
Fax: (404) 679-7081

Northeast Region (Region 5): CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, and WV

U.S. Fish and Wildlife Service
Endangered Species Permit Office
300 Westgate Center Drive
Hadley, MA 01035-9589

Web: http://www.fws.gov/northeast/endangered/
Phone: (413) 253-8628
email: permitsR5ES@fws.gov
Fax: (413) 253-8482

Mountain-Prairie Region (Region 6): CO, KS, MT, NE, ND, SD, UT, and WY

U.S. Fish and Wildlife Service
Endangered Species Permit Office
Denver Federal Center
P.O. Box 25486
Denver, Colorado 80225-0489

Web: http://www.fws.gov/mountain%2Dprairie/endspp/
Phone: (303) 236-7400
email: permitsR6ES@fws.gov
Fax: (303) 236-0027

Alaska Region (Region 7): AK

U.S. Fish and Wildlife Service
Endangered Species Permit Office
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

Web: http://alaska.fws.gov/fisheries/endangered/index.htm
Phone: (907) 786-3323
email: permitsR7ES@fws.gov
Fax: (907) 786-3350

PERMIT APPLICATION FORM INSTRUCTIONS

The following instructions pertain to the standard permit form 3-200 that must be completed as an application for a U.S. Fish and Wildlife Service or CITES permit. The General Permit Procedures in 50 CFR 13 address the permitting process. For simplicity, all licenses, permits, registrations, and certificates will be referred to as a permit.

GENERAL INSTRUCTIONS:

- Complete all blocks/lines/questions in Sections A or B, and C and D. Complete all of Section E.
- **An incomplete application may cause delays in processing or may be returned to the applicant. Be sure you are filling in the appropriate application form for the proposed activity.**
- Print clearly or type in the information. Illegible applications may cause delays.
- Sign the application in blue ink. Faxes or copies of the original signature will not be accepted.
- Mail the original application to the address at the top of page one of the application or if applicable on the attached address list.
- **Keep a copy of your completed application.**
- **Please plan ahead. Allow at least 60 days for your application to be processed. Some applications may take longer than 90 days to process. (50 CFR 13.11)**
- Applications are processed in the order they are received.
- Additional forms and instructions are available from http://permits.fws.gov/ .

COMPLETE EITHER SECTION A OR SECTION B:

Section A. **Complete if applying as an individual:**

- Enter the complete name of the responsible individual who will be the permittee if a permit is issued. Enter personal information that identifies the applicant. ***Fax and e-mail are not required if not available.***
- If you are applying on behalf of a client, the personal information must pertain to the client, and a document evidencing power of attorney must be included with the application.
- **Affiliation/ Doing business as (dba)**: business, agency, organizational, or institutional affiliation *directly* related to the activity requested in the application (e.g., a taxidermist is an individual whose business can *directly* relate to the requested activity). The Division of Management Authority (DMA) will **not** accept *doing business as* affiliations for individuals.

Section B. **Complete if applying as a business, corporation, public agency, or institution:**

- Enter the complete name of the business, agency or institution that will be the permittee if a permit is issued. Give a brief description of the type of business the applicant is engaged in. Provide contact phone number(s) of the business.
- **Principal Officer** is the person in charge of the listed business, corporation, public agency, or institution. The principal officer is the person responsible for the application and any permitted activities. Often the principal officer is a Director or President. **Primary Contact** is the person at the business, corporation, public agency, or institution who will be available to answer questions about the application or permitted activities. Often this is the preparer of the application.

ALL APPLICANTS COMPLETE SECTION C:

- For all applications submitted to the Division of Management Authority (DMA) a physical U.S. address is **required**. Province and Country blocks are provided for those USFWS programs which use foreign addresses and are not required by DMA..
- **Mailing address** is address where communications from USFWS should be mailed if different than applicant's physical address.

ALL APPLICANTS COMPLETE SECTION D:

Section D.1 **Application processing fee:**

- An application processing fee is required at the time of application; unless exempted under 50 CFR13.11(d)(3). The application processing fee is assessed to partially cover the cost of processing a request. **The fee does not guarantee the issuance of a permit. Fees will not be refunded for applications that are approved, abandoned, or denied.** We may return fees for withdrawn applications prior to any significant processing occurring.
- **Documentation of fee exempt status is not required for Federal, tribal, State, or local government agencies; but must be supplied by those applicants acting on behalf of such agencies**. Those applicants acting on behalf of such agencies must submit a letter on agency letterhead and signed by the head of the unit of government for which the applicant is acting on behalf, confirming that the applicant will be carrying out the permitted activity for the agency.

Section D.2 **Federal Fish and Wildlife permits:**

- List the number(s) of your most current FWS or CITES permit or the number of the most recent permit if none are currently valid. If applying for re-issuance of a CITES permit, the original permit must be returned with this application.

Section D.3 **CERTIFICATION:**

- **The individual identified in Section A, the principal officer named in Section B, or person with a valid power of attorney (documentation must be included in the application) must sign and date the application in blue ink.** This signature binds the applicant to the statement of certification. This means that you certify that you have read and understand the regulations that apply to the permit. You also certify that everything included in the application is true to the best of your knowledge. Be sure to read the statement and re-read the application and your answers before signing.

Please continue to next page

APPLICATION FOR A FEDERAL FISH AND WILDLIFE PERMIT
Paperwork Reduction Act, Privacy Act, and Freedom of Information Act – Notices

In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3501, *et seq.*) and the Privacy Act of 1974 (5 U.S.C. 552a), please be advised:

1. The gathering of information on fish and wildlife is authorized by:
(Authorizing statutes can be found at: http://www.gpoaccess.gov/cfr/index.html and http://www.fws.gov/permits/ltr/ltr.shtml.)

   a. Bald and Golden Eagle Protection Act (16 U.S.C. 668), 50 CFR 22;
   b. Endangered Species Act of 1973 (16 U.S.C. 1531-1544), 50CFR 17;
   c. Migratory Bird Treaty Act (16 U.S.C. 703-712), 50 CFR 21;
   d. Marine Mammal Protection Act of 1972 (16 U.S.C. 1361, *et. seq.*), 50 CFR 18;
   e. Wild Bird Conservation Act (16 U.S.C. 4901-4916), 50 CFR 15;
   f. Lacey Act: Injurious Wildlife (18 U.S.C. 42), 50 CFR 16;
   g. Convention on International Trade in Endangered Species of Wild Fauna and Flora (TIAS 8249), http://www.cites.org/ , 50 CFR 23;
   h. General Provisions, 50 CFR 10;
   i. General Permit Procedures, 50 CFR 13; and
   j. Wildlife Provisions (Import/export/transport), 50 CFR 14.

2. Information requested in this form is purely voluntary. However, submission of requested information is required in order to process applications for permits authorized under the above laws. Failure to provide all requested information may be sufficient cause for the U.S. Fish and Wildlife Service to deny the request. Response is not required unless a currently valid Office of Management and Budget (OMB) control number is displayed on form.

3. Certain applications for permits authorized under the Endangered Species Act of 1973 (16 U.S.C. 1539) and the Marine Mammal Protection Act of 1972 (16 U.S.C. 1374) will be published in the **Federal Register** as required by the two laws.

4. Disclosures outside the Department of the Interior may be made without the consent of an individual under the routine uses listed below, if the disclosure is compatible with the purposes for which the record was collected. (Ref. 68 FR 52611, September 4, 2003)

   a. Routine disclosure to subject matter experts, and Federal, tribal, State, local, and foreign agencies, for the purpose of obtaining advice relevant to making a decision on an application for a permit or when necessary to accomplish a FWS function related to this system of records.
   b. Routine disclosure to the public as a result of publishing **Federal Register** notices announcing the receipt of permit applications for public comment or notice of the decision on a permit application.
   c. Routine disclosure to Federal, tribal, State, local, or foreign wildlife and plant agencies for the exchange of information on permits granted or denied to assure compliance with all applicable permitting requirements.
   d. Routine disclosure to Captive-bred Wildlife registrants under the Endangered Species Act for the exchange of authorized species, and to share information on the captive breeding of these species.
   e. Routine disclosure to Federal, tribal, State, and local authorities who need to know who is permitted to receive and rehabilitate sick, orphaned, and injured birds under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act; federally permitted rehabilitators; individuals seeking a permitted rehabilitator with whom to place a bird in need of care; and licensed veterinarians who receive, treat, or diagnose sick, orphaned, and injured birds.
   f. Routine disclosure to the Department of Justice, or a court, adjudicative, or other administrative body or to a party in litigation before a court or adjudicative or administrative body, under certain circumstances.
   g. Routine disclosure to the appropriate Federal, tribal, State, local, or foreign governmental agency responsible for investigating, prosecuting, enforcing, or implementing statutes, rules, or licenses, when we become aware of a violation or potential violation of such statutes, rules, or licenses, or when we need to monitor activities associated with a permit or regulated use.
   h. Routine disclosure to a congressional office in response to an inquiry to the office by the individual to whom the record pertains.
   i. Routine disclosure to the General Accounting Office or Congress when the information is required for the evaluation of the permit programs.
   j. Routine disclosure to provide addresses obtained from the Internal Revenue Service to debt collection agencies for purposes of locating a debtor to collect or compromise a Federal claim against the debtor or to consumer reporting agencies to prepare a commercial credit report for use by the FWS.

5. For individuals, personal information such as home address and telephone number, financial data, and personal identifiers (social security number, birth date, etc.) will be removed prior to any release of the application.

6. The public reporting burden on the applicant for information collection varies depending on the activity for which a permit is requested. The relevant burden for a **Recovery and Interstate Commerce** permit application is **4 hours** . This burden estimate includes time for reviewing instructions, gathering and maintaining data and completing and reviewing the form. You may direct comments regarding the burden estimate or any other aspect of the form to the Service Information Clearance Officer, U.S. Fish and Wildlife Service, Mail Stop 222, Arlington Square, U.S. Department of the Interior, 1849 C Street, NW, Washington D.C. 20240.

Freedom of Information Act – Notice

For organizations, businesses, or individuals operating as a business (i.e., permittees not covered by the Privacy Act), we request that you identify any information that should be considered privileged and confidential business information to allow the Service to meet its responsibilities under FOIA. Confidential business information must be clearly marked "Business Confidential" at the top of the letter or page and each succeeding page and must be accompanied by a non-confidential summary of the confidential information. The non-confidential summary and remaining documents may be made available to the public under FOIA [43 CFR 2.13(c)(4), 43 CFR 2.15(d)(1)(i)].

APPLICATION FOR A NEW FEDERAL RECOVERY PERMIT

Text in bold corresponds to items identified on Form-3-200-55

A. **IDENTIFY SPECIES AND ACTIVITY**

A.1.a. **Provide the common and scientific names of the species being requested for coverage in the permit and their status (endangered or threatened).**

Gray wolf (*Canis lupus*): endangered

A.1.b. **Provide the number, age, and sex of such species to the extent known.**

Up to 10 percent of the winter population estimate of wolves in Michigan annually, including both male and female wolves but excluding young-of-year wolves prior to August 1 each year.

A.1.c. **Identify the activity sought to be authorized for each species.**

Activities:

We request authority to:

1. Conduct lethal control of wolves involved in confirmed depredation of livestock or other domestic animals, according to the following conditions:
    a. Wolf depredation on lawfully present domestic animals must be verified by appropriately trained personnel.
    b. Depredation is likely to be repeated.
    c. The taking must occur within 1 mile of the depredation site.
    d. Taking, wolf handling, and euthanizing must be carried out in a humane manner, and may include the use of foothold traps, snares, shooting, and/or lethal injection.
    e. Traps and snares must be checked at least every 24 hours.
    f. Young-of-year wolves trapped before August 1 must be released.
    g. Lactating females trapped before July 1 must be released near the point of capture unless they have been involved with chronic depredation problems (i.e., three or more depredation events); in this case, lactating females may be captured and euthanized.
    h. Lethal control efforts may not be implemented at livestock operations or on other private lands that fail to follow technical assistance guidelines in a timely manner.

i. Lethal control may not be used when wolves kill dogs that are free-roaming on, hunting on, or training on public lands.
j. Disposal of wolf carcasses and parts will follow 50 CFR 17.21 and the: *Michigan Department of Natural Resources (MDNR) Wildlife Division procedure: disposal of wildlife carcasses and parts* (enclosed).
k. If a depredation has not occurred in the current calendar year, lethal control may proceed only if: 1) verified depredation occurred at the site, or in the immediate vicinity, during the previous year; 2) there is strong evidence one or more members of the depredating pack has remained in the area since the verified depredation; 3) based on wolf behavior and other factors, the depredation is likely to be repeated; and 4) trapping is conducted in a location and in a manner to minimize the likelihood a wolf or wolves from a non-depredating pack is captured.

2. Conduct non-lethal, injurious harassment of wolves that pose a threat to livestock and other domestic animals, under the following circumstances:
    a. a wolf attacks or closely approaches livestock or other domestic animals.
    b. the harassment cannot be reasonably expected to cause permanent physical damage or death to a wolf.

3. Designate other agencies and tribal governments as State agents authorized to conduct activities outlined under Items 1 and 2, and designate organizations and private individuals as State agents authorized to conduct activities outlined under Item 2, according to the following conditions:
    a. Designated State agents must understand and adhere to all conditions outlined under Items 1 and 2.
    b. Prior to designation of organizations and private individuals as State agents, wolf depredation or other wolf-related threats to livestock or other domestic animals in areas relevant to the organizations or private individuals in question must be verified by appropriately trained personnel.
    c. Organizations and private individuals designated at State agents must be trained in the safe and appropriate use of harassment techniques and equipment.
    d. Organizations and private individuals designated at State agents must sign a User Agreement indicating they have been informed, trained and understand the safe and appropriate use of harassment equipment and techniques.

e. Organizations and private individuals designated as State agents must report any use of harassment equipment or techniques within 24 hours of the action.
f. Permittee must inform the U.S. Fish and Wildlife Service of any wolves taken by designated agents in accordance with the reporting requirements outlined below.

Reporting:

The Michigan Department of Natural Resources will provide an annual permit report to the U.S. Fish and Wildlife Service East Lansing Field Office by January 31 each year. This report will include:

1. the date, location, age, sex, and general description of the physical condition of each wolf captured or injuriously harassed;
2. description of any medications administered to captured wolves;
3. the disposition of any wolves injured, killed, salvaged, held and transported;
4. the results of any blood analysis;
5. the results of efforts to address and resolve depredation issues; and
6. a summary that includes the following for each wolf injury or mortality that occurred:
    a. the date and time of the taking;
    b. the name of any persons involved in the takings;
    c. the circumstances surrounding any taking, including the stimulus for the taking, and/or human activities involved;
    d. the behavioral responses of any gray wolves taken; and
    e. any actions taken to avoid or minimize taking.

Definitions:

Depredation is defined as the injury or killing of livestock or other domestic animals.

Domestic animals include animals that have been selectively bred over many generations to enhance specific traits for their use by humans, including use as pets.

Injurious harassment includes, but is not limited to, the use of nonlethal ammunition such as rubber bullets or projectile bean bags.

Livestock include, but are not limited to, cattle, sheep, new world camelids, goats, bison, privately owned cervids, ratites, swine, equine, poultry, aquaculture, rabbits and herding or guard animals (e.g., llamas,

donkeys, and certain special-use breeds of dogs commonly used for guarding or herding livestock).

B. **IDENTIFY LOCATION OF THE PROPOSED ACTIVITY**

B.1. **Provide the name of the State, county, and specific location of the proposed activity site(s). Include a formal legal description, section/township/range information, county tax parcel number, local address, or any other identifying property designation that will precisely place the location of the proposed activity site(s).**

State of Michigan.

B.2. **If the specific study area is known at the time of application, attach a U.S. Geological Survey map of the study area in 7.5 minute quadrangle (1:24,000) scale, or other appropriately scaled map. If you plan to conduct surveys on a contract basis in the future, these maps can be provided once the specific area is known (the counties in which you will work must be provided at this time).**

Not useful.

B.3. **If your request is for aquatic species, identify the aquatic system (river/lake/stream name, river mile information, and drainage basin).**

Not applicable.

C. **DESCRIBE THE PROPOSED ACTIVITY**

C.1. **Provide a statement justifying the permit request, including the following: [*A copy of a research or study proposal that provides this information can be attached in lieu of the information requested below.*] Use additional sheets as necessary.**

See below.

C.1.a. **Describe in detail the purpose(s) and objective(s) of the project.**

The purpose of the proposed activities is to enhance the survival and recovery of the gray wolf in Michigan by preventing or minimizing the development of negative public attitudes which can result in widespread adverse impacts to the population. The objectives of the proposed activities are to minimize depredation by wolves on domestic animals. By responding effectively to depredation concerns, we will be able to

minimize the development of intolerance and resentment for the wolf population. The proposed actions are therefore necessary to maintain public support and thereby ensure the long-term recovery of the species.

C.1.a.i. Include study design, sampling methodologies and equipment to be used.

See activities and conditions outlined under A.1.c. For a more thorough discussion of methodologies and equipment to be used, see:

Michigan Department of Natural Resources Wildlife Division procedure: Requirements and guidelines for management of wolf depredation (enclosed).

C.1.a.ii. Identify any null hypothesis or other anticipated results from the project that will support the reasoning why the project is justified for enhancement of propagation or survival of the affected species.

During the past decade, the wolf population in Michigan has increased by approximately 500%. The combined population in Wisconsin and Michigan is nine to ten times larger than required by Federal delisting criteria. As the Michigan population has grown, the incidence of problems posed by wolves has increased. Of all the wolf-related depredation events confirmed since 1996, approximately 75 percent have occurred since 2003. Approximately 79 percent of wolf attacks on pet dogs confirmed since 1996 have occurred since 2002. The number of wolves habituated near human residences also has been growing. As wolves expand further into agricultural and residential areas, we expect the incidence of these conflicts to increase exponentially with population size.

As a result of increasing wolf problems, public support is eroding. Negative media reports are becoming more common and the frequency of complaints to our agency is increasing. Perhaps most significant, the number of illegal wolf killings has been on the rise. At least 4 of the 9 (44%) known wolf mortalities which occurred since relisting on 9/29/08 were due to illegal taking. In this way, mounting anti-wolf sentiments are having a direct effect on the wolf population, despite legal protection. Without the authority which would allow us to effectively deal with problem wolves, public support will continue to decline and the frequency of these illegal actions are certain to increase.

Without a permit, the options currently available to us are impractical or insufficient for effective management of the wolf population. Improvement of husbandry techniques is often unsuccessful at deterring livestock depredation. Relocation is no longer feasible in the Upper

Peninsula (UP) for several reasons: (1) relocated wolves often do not remain near release sites, and some return to their original territories; (2) given the widespread wolf distribution across the UP at this time, any relocated wolves would probably be killed by resident packs; (3) relocated wolves may continue to exhibit problem behavior; and (4) relocation gives the false impression that we are introducing additional wolves to the UP, which contributes to the decline in public support. We continue to provide monetary reimbursement for property loss due to wolf depredation, but most livestock producers do not see compensation as an acceptable solution. To foster tolerance within this group, we need the ability to prevent or minimize serial depredation.

For these reasons, the authority to use harassment and lethal control is absolutely necessary to manage and conserve wolves in Michigan. The ability to respond effectively to problems would minimize the development of negative public attitudes and better ensure the persistence of the population as a whole.

For a more thorough discussion of how the proposed activities will enhance the survival and recovery of the species, see:

Federal Register. February 8, 2007. Final rule designating the Western Great Lakes populations of Gray Wolves as a distinct population segment; Removing the Western Great Lakes distinct population segment of the Gray Wolf from the list of endangered and threatened wildlife. 50 CFR Part 17 Volume 72, No. 26, pages 6052–6103.

C.1.a.iii. Include planned disposition of specimens upon completion of project.

The disposition of specimens will be determined according to 50 CFR 17.21 and the: *Michigan Department of Natural Resources (MDNR) Wildlife Division procedure: disposal of wildlife carcasses and parts* (enclosed).

C.1.b. Describe how the proposal will help recover each species.

See C.1.a and C.1.a.ii.

C.1.b.i. If there is an approved recovery plan, identify the recovery tasks by number and name, if applicable.

Not applicable.

C.1.b.ii. Identify, or provide copies of any previous or similar research conducted on this species.

For a description of depredation management conducted in Michigan under the former 10(a)(1)(A) permit, see:

Michigan Department of Natural Resources Wildlife Division Report No. 3484: Michigan wolf management plan (enclosed)

Michigan Department of Natural Resources Wildlife Division procedure: Requirements and guidelines for management of wolf depredation (enclosed).

For a description of depredation management conducted under Section 10(a)(1)(A) of the Federal Endangered Species Act, see:

Federal Fish and Wildlife permit TE111357-0

C.1.b.iii. If this information exists, explain how the project will answer questions not answered by earlier research.

Not applicable.

C.1.b.iv. Explain how you will coordinate your efforts with past and ongoing research studies.

Lethal control and harassment will be conducted using methods similar to those authorized and used under the former 10(a)(1)(A) permit TE11357-0.

C.1.c. Can this project result in the injury, death, or removal from the wild of any individuals of the species?

Yes.

C.1.c.i. If yes, describe all that apply (i.e., injury, death, removal from the wild).

Injury and death could occur due to the proposed actions. Live animals would not be removed from the wild.

C.1.c.ii. For each species, please state the maximum number of individuals that would be injured, killed, or removed from the wild: [If applicable, please identify, based on a reasonable expectation, the number of individuals likely to be injured or killed per activity.]

We request authority to take as much as 10 percent of the winter population estimate of wolves annually in response to confirmed depredation events. Based on the 2007–2008 winter survey data, the

Michigan wolf population is estimated to consist of a minimum of 520 wolves. At the requested level of take and the current population size, as many as 52 wolves could be removed from the population annually. However, the actual number of wolves taken annually would probably not exceed 25 during the next few years. As the population grows and depredation events occur more frequently, this number will probably increase.

C.1.c.iii. Please state what will be done to minimize the possibility of injury to or death of individuals.

1. Wolf depredation on lawfully present domestic animals must be verified by appropriately trained personnel. All personnel making field evaluations to determine whether an incident constitutes a verified wolf depredation event will have undergone the depredation training provided by MDNR Wildlife Division.
2. The evaluation of whether depredation is likely to occur again will be based on a field review, past history of depredations in the area, known pack locations and movement patterns, and consultation with MDNR Management Unit Supervisors or their designees.
3. Traps and snares must be checked at least every 24 hours.
4. Snares will be set for nonlethal capture (to avoid entanglement of the captured animal).
5. Young-of-year wolves trapped before August 1 must be released.
6. Lactating females trapped before July 1 must be released near the point of capture unless they have been involved with chronic depredation problems (i.e., three or more depredation events); in this case, lactating females may be captured and euthanized.
7. Lethal control efforts may not be implemented at livestock operations or on other private lands that fail to follow technical assistance guidelines in a timely manner.
8. Lethal control may not be used when wolves kill dogs that are free-roaming on, hunting on, or training on public lands.
9. On farms that suffer their first loss, lethal control efforts will usually be stopped after two wolves have been captured.
10. Technical assistance will be provided to the extent practical to help address animal husbandry practices that may be contributing to wolf depredation. We will work with partners to develop and distribute materials detailing appropriate management practices to be used on farms where wolves occur in the vicinity. All technical assistance advised or given to producers prior to or after a depredation incident will be recorded.
11. Permittees will follow the most current accepted wolf-capture and handling protocols to ensure the risk of incidental injury or death is minimized to the fullest extent.

12. All wolf trappers will be properly trained in chemical immobilization, trapping, medical treatment, and other wolf handling procedures.
13. Organizations and private individuals designated as State agents will be trained in the safe and appropriate use of harassment equipment and techniques.
14. Organizations and private individuals designated at State agents must sign a User Agreement indicating they have been informed, trained and understand the safe and appropriate use of harassment equipment and techniques.

C.1.c.iv. **If the proposed activity would cause the death of individuals from the wild or remove individuals from the wild, describe your attempts to obtain the wildlife or plant specimens currently held in captivity/nurseries/museums, or produced in captivity. You must demonstrate conclusively that existing specimens are unavailable or your study objectives require new/additional specimens. [Provide the identity and phone number of each contact made in this regard.]**

The purpose of the proposed action is to further wolf recovery and ensure population persistence through the removal of individual, wild wolves showing problem behavior. This purpose cannot be achieved through acquisition of captive specimens.

C.1.d.i. **State whether full funding will be available for the completion of the proposed activity. [If you do not hold a contract at this time, but foresee receiving one, you may apply for a permit contingent upon receiving the contract(s).]**

Full funding, from State and Federal sources, will be available for conducting the proposed activities.

C.1.e. **If live wildlife or plants to be covered by the permit are to be held in captivity: [C.1.e.i–C.1.e.vii]**

Not applicable.

D. **<u>IDENTIFY THE PERSONS WHO WILL CONDUCT THE PROPOSED ACTIVITY:</u>**

D.1. **Provide the full name of all individuals, including first name, middle initial, and last name, who you propose will work under this permit.**

Rebecca A. Humphries, Director
Michigan Department of Natural Resources

Russ Mason, Chief
Wildlife Division, Michigan Department of Natural Resources

Gary Hagler, Chief
Law Enforcement Division, Michigan Department of Natural Resources

Wildlife Division and Law Enforcement Division personnel working under the supervision of the persons named above.

Agents of the State designated according to the conditions outlined under A.1.c.

D.1.a. **If more than one activity is included in the permit application, indicate which activity(ies) will be completed by each individual.**

Organizations and private individuals designated as agents of the State may conduct only those activities described under A.1.c Item 2.

All other individuals working under the permit will potentially conduct all activities outlined under A.1.c.

D.1.b. **For each listed individual, please also provide a copy of each person's resume and/or curriculum vitae, plus specific information on previous professional experience working with the species affected by the permit request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate number of each species the applicant has worked with at each site (e.g., how many pair of birds at a specific site); names, dates, and location of areas surveyed; and experience with similar species. Please provide the names and phone numbers of at least two references who can verify experience with the species (reference letters are always appreciated).**

Curricula vitae and other specific information on the persons named under D.1 will be made available upon specific request from the U.S. Fish and Wildlife Service.

References:

Mr. Craig Czarnecki, Field Supervisor
U.S. Fish and Wildlife Service
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
517-351-8470

Mr. Jack Dingledine
U.S. Fish and Wildlife Service
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
517-351-6320

E. **IDENTIFY THE LOCATION OF THE AFFECTED SPECIES:**

E.1.a–c. **For each species indicate whether, at the time of the application, the organism was: still in the wild; had been removed from the wild (provide State, county, and specific location of removal); and was born in captivity or artificially propagated (provide State, county, specific location, and name of the institution where born or propagated).**

All wolves relevant to this permit application are in the wild.

E.2. **If you are applying for a permit for the collection of plants from the wild, list the lands from which you plan to collect the plants. [E.2.a–c]**

Not applicable.

F. **IDENTIFY OTHER PERMITS REQUIRED**

F.1. **List any additional valid permits currently held or other permits needed for the proposed activities (i.e., permission to work on Federal lands, Federal bird banding permit, Corps of Engineers permits, Environmental Protection Agency NPDES permits, State, county or local permits, etc).**

No additional permits are needed.

F.2. **Attach a copy of permit or provide agency name, permit number (if any), effective date, and duration.**

Not applicable.

F.3. **Provide information on any pending applications for the above permits and the reasons why the permits have not been issued.**

Not applicable.

DNR – Wildlife Procedure

Disposal of Wildlife Carcasses and Parts

Background

In the normal course of managing Michigan's wildlife, Department of Natural Resources (DNR) staff (most frequently Wildlife and Law Enforcement Divisions) encounter dead wildlife of many species. This procedure addresses the proper disposal of the wildlife carcasses that come into the possession of the DNR. This procedure is established under the authority of Part 401, Wildlife Conservation, P.A. 451 of 1994.

Local Disposal of Wildlife

The proper disposal of wildlife specimens depends on the species of animal, the condition of the carcass, and the circumstances of collection. Unless otherwise specified in this procedure, the disposal of wildlife carcasses should occur locally, in a manner that is appropriate to protect human health, public safety, and is environmentally responsible. Property not required for department use or not disposed through the Wildlife Disease Laboratory (WDL) shall be destroyed. Wildlife specimens and their parts shall not be retained for personal use.

Disposal through the Wildlife Disease Laboratory

Wildlife that must be sent to the WDL include the following:

- Wildlife where cause of death is not clear or where there is concern about disease or environmental contaminants,
- Wildlife that are part of approved wildlife harvest surveys or wildlife health studies,
- Wildlife that are regulated by the U.S. Fish and Wildlife Service (except for waterfowl and other common migratory bird species where procedures allow for local documentation of possession and local disposal),
- Wildlife that are on the state or federal list of threatened or endangered species,
- Wildlife that would provide useable parts that have been requested for scientific or educational use.

Wildlife Parts List

The WDL will maintain a list of wildlife species and parts that have been requested by recognized organizations. The WDL will periodically update this list and distribute the list to all appropriate DNR personnel.

Requesting Wildlife Parts

Recognized organizations can submit a request to the WDL for donation of wildlife parts. Each request must be for a specific wildlife species and must include information on the specific parts needed, the quantity of these parts, and the intended use of these parts.

Priorities for Filling Requests

Recognizing the relative abundance of wildlife parts, the individual condition of specimens collected, and other circumstances associated with each request, filling requests will be based on the following priorities (in descending order of importance):

1. Scientific investigations that benefit the conservation and management of the species,

2. Departmental (DNR) educational uses either as part of an interpretive display or for use in educational activities,

3. Educational activities associated with a public museum, other public facilities, nature centers, or non-profit organization facilities where substantial public contact occurs,

4. Educational use by school systems or non-profit organizations,

5. Display within a DNR or other state, county or local government facility

Using the above criteria, and using the list of organizations requesting specific wildlife parts, the WDL will decide the disposition of all wildlife parts submitted to the WDL. In the case of federally listed species, the Endangered Species Specialist must be notified. The Specialist will be responsible for coordinating any permitting and disposal issues with the U.S. Fish and Wildlife Service. Before any wildlife parts are transferred to a requesting organization, the WDL will determine that the organization has all necessary state and federal permits to possess those wildlife parts.

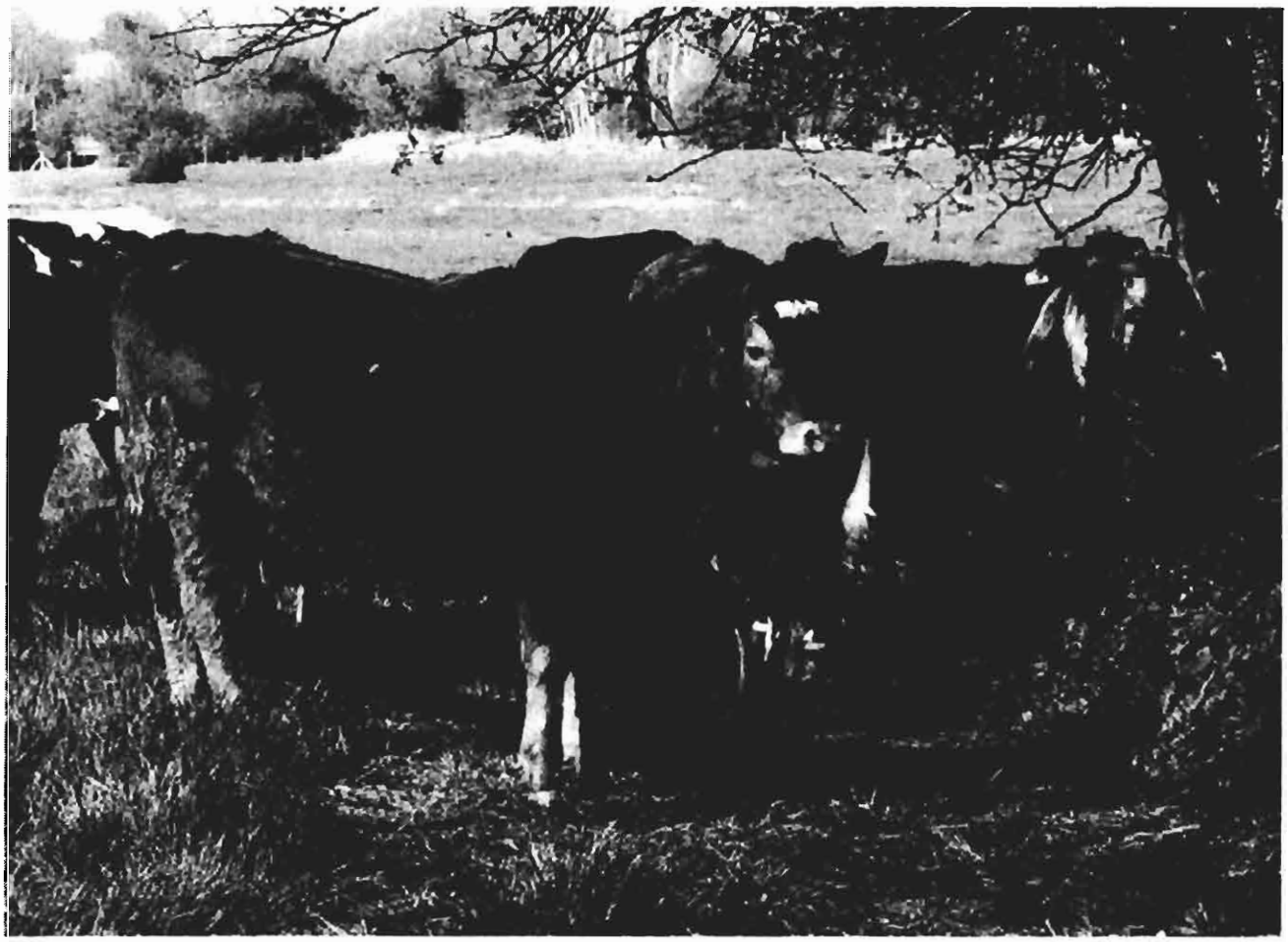
Species Requested for Scientific or Educational Use

A list of requests for carcasses or wildlife parts will be maintained and updated by WDL for the following species.

Common Name	Scientific Name
Moose	*Alces alces*
Gray Wolf	*Canis lupus*
Common Loon	*Gavia immer*
Peregrine Falcon	*Falco peregrinus*

Michigan Department of Natural Resources
Wildlife Division Procedure

Requirements and Guidelines for Management of Wolf Depredation



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Background

In Michigan, the eastern timber wolf or gray wolf was protected under federal and state endangered species protection statutes in 1974 and 1976, respectively. Recovery of the population began in the late 1980s, when three wolves were documented in Dickinson County. In March 2006, the U.S. Fish and Wildlife Service (USFWS) determined that wolves in this region had met the predetermined recovery criteria and were no longer at risk and began the process for delisting wolves from the Western Great Lake Distinct Population Segment. On March 12, 2007, wolves were removed from the federal list of threatened and endangered species.

Although federal protections have ceased, wolves in Michigan are still listed as a state threatened species. Wolf recovery in Michigan has been guided by the state's Wolf Recovery and Management Plan which was officially adopted in 1997. The Plan called for reclassification of wolves from endangered to threatened status after the population had exceed 100 animals for five consecutive years. The wolf population met this criterion in 2000 and two years later wolves were reclassified to threatened status. Removal of wolves from the state list of threatened and endangered species requires a population of 200 or more animals for five consecutive years. This recovery goal was met in 2004 and the state has begun the process to remove wolves from the state list.

Since 1997, the context of wolf management in Michigan has changed considerably. Wolf population size and distribution have expanded, presenting a different set of biological and social issues that need to be addressed. In response to these changes, the Michigan Department of Natural Resources (DNR) initiated revision of the 1997 wolf management plan. The DNR developed this revision through a process which included involvement of affected stakeholder groups and the general public along with a review of the available scientific information. To help develop a plan revision acceptable to a wide range of stakeholder interests, the Michigan DNR convened an advisory committee called the Michigan Wolf Management Roundtable. The charge of this Roundtable was to develop principles to guide management of Michigan wolves and wolf-related issues following Federal delisting. The Roundtable's guiding principles, including those pertaining to management of wolf-related conflicts, were used to revise the wolf management plan. The revised wolf management plan was approved in July, 2008. The strategic actions necessary to develop a program that address depredation on domestic animals are identified in *section 6.10* of the *Michigan Wolf Management Plan.*

These procedures detail how the State, in cooperation with United States Department of Agriculture Wildlife Services (USDA-WS), will manage wolves following confirmed depredation events. **However, in all cases, DNR or USDA-WS employees in consultation with the Management Unit supervisors or others if so directed has the discretion to make management decisions on a case by case basis in the exercise of his or her judgment (See *Appendix A*, for contact information).**

Wolf Depredation on Livestock

Depredation is a predatory attack resulting in the injury or death of a domestic animal. A depredation event occurs when a predator kills or injures one or more animals at a given time. Wolves normally kill or injure wild prey and competitors, but they may sometimes attack domestic animals. Although the frequency of depredations is lower in Michigan than in Minnesota or Wisconsin, wolf depredation in Michigan has become an important management issue.

Livestock are defined by the Michigan Department of Agriculture *(Animal Industry Act, Public Act 466 of 1988)* and include, but are not limited to, cattle, sheep, new world camelids, goats, bison, privately owned cervids, ratites, swine, equine, poultry, aquaculture, and rabbits. Livestock does not include dogs and cats.

Because wolves are still listed as a state threatened species, private citizens are not allowed to kill a wolf during or after an attack on livestock or pets. The only time citizens are allowed to kill a wolf is in defense of human life *(Public Act 451, Part 365, Section 324.36505 (5))*. However, once wolves are removed from the state list of threatened and endangered species the Department will implement a program to allow livestock producers to control depredating wolves on their property as described in *section 6.10.4* of the *Michigan Wolf Management Plan*. Details of this program will be found in the *Requirements and Guidelines for Lethal Control of Wolves by Livestock Producers*.

Wolves exhibiting fearless behavior or those becoming habituated to humans and posing a non-immediate but demonstrable threat to human safety can be harassed or humanely dispatched by DNR or USDA-WS personal (see *Michigan Nuisance Wolf Management Guidelines*).

Verifying Wolf Depredation

The causes of depredation are not always apparent and other causes of death or injury can often be mistaken for wolf depredation. For example, at least 27% of the wolf-depredation complaints submitted by Michigan residents in 2004 were prompted by depredations that were actually caused by dogs or coyotes. Another 23% of the alleged wolf-depredation events reported in 2004 could not be attributed to a specific cause because the available physical evidence was insufficient.

Proper investigation of depredation events is complicated, available evidence is often incomplete, and there will be varying levels of difficulty in confirming wolf attacks or kills. Whenever possible, individuals with the most experience investigating depredation incidents should conduct the initial site visit. However, because it is critical to initiate an investigation as soon as possible, there will be times when experienced investigators are not immediately available. In those instances, Division personnel that have received training should initiate contact with the complainant and begin the investigation. However, if the evidence is not clear a more experienced investigator should be contacted. In all cases, the final determination is the responsibility of the Management Unit Supervisor. *Appendix B* outlines wolf depredation investigative criteria used successfully in Minnesota (W.J. Paul, USDA-WS, pers. comm.).

Verified wolf depredation means that the event was recorded as **confirmed** on the *Report of Livestock Depredation* form filled out by investigating personnel. Confirmed depredation is defined as clear evidence that a wolf or wolves were responsible for the depredation, such as a carcass present with bite marks and associated hemorrhaging and wolf tracks and/or scat in the immediate vicinity. Depredation where the majority of a carcass was consumed eliminating evidence of an attack, but there is good evidence that depredation occurred, such as a kill site or blood trails with wolf tracks and/or scat in the immediate vicinity can be considered confirmed by the investigating personnel. Cases where livestock are missing and additional evidence (e.g., kill site) is absent will usually not be considered confirmed depredation. The only scenario where an on-site depredation investigator might consider a "missing animal" as a confirmed wolf depredation would be if the investigator finds fresh wolf sign in the pasture coinciding with the time of loss such as fresh wolf droppings containing livestock hair (with no livestock carcass dump present) and an agitated cow in nursing condition looking for her calf. Harassment of livestock by wolves will not constitute verified depredation.

Approach to Addressing Wolf-Livestock Conflicts

Many techniques can effectively prevent or deter depredation. However, the effectiveness of some techniques may be temporary, and some techniques may fail to work altogether in certain situations. Where depredation occurs despite reasonable efforts to prevent it, the Michigan DNR, USDA Wildlife Services and other management partners will take appropriate steps to eliminate or minimize ongoing problems.

The strategic actions necessary for eliminating or minimizing ongoing wolf depredation of domestic animals are identified in *6.10.3 of the Michigan Wolf Management Plan.*

On farms that have suffered a verified wolf depredation, non-lethal as well as lethal control techniques may be employed by DNR or USDA-WS personnel. The DNR and USDA-WS will take an incremental approach to addressing wolf–livestock conflicts that is guided by severity and frequency of conflicts. When severity and frequency of conflicts are low, more conservative methods will be applied whereas increasingly aggressive control methods may be applied as the severity and frequency of conflicts increase. As part of the incremental approach to addressing livestock losses, a suite of approaches must be used, including technical support, non-lethal and lethal methods.

Use of Non-Lethal Means to Resolve Wolf-Livestock Conflicts

Available non-lethal methods to resolve wolf-livestock conflicts include improving animal husbandry practices by using best management practices (BMPs), exclusion, frightening devices and harssment (*e.g.*, fladry, flashing lights, strobe light/siren devices, shell crackers, rubber ammunition) protection of livestock (*e.g.*, livestock guarding animals), and translocation. Non-lethal methods will be offered to livestock producers when wolves are known to be in an area where livestock are being housed or pastured, and there is a legitimate complaint that wolves are harassing, injuring or killing livestock. The legitimacy of these complaints will be evaluated in the field by DNR or USDA-WS personnel. A credible observation of wolves in an area frequented by livestock does not constitute enough of a threat to initiate the use of harassment techniques.

Best management practices (BMPs)
By implementing BMPs for livestock, farmers can prevent or reduce wolf damage. Where and when practiable field personel may suggest any of the following: maintaining healthy, well-fed animals; pregnancy testing livestock; properly disposing of dead livestock carcasses through rendering, burying, composting or burning; conducting calving or lambing operations in close proximity to the farmyard, penning vulnerable livestock at night; and monitoring livestock on a regular basis to detect any disease, natural mortality, or predation.

The use of open pits ("death pits") for disposal of livestock carcass or parts is illegal in Michigan *(Regulations for Act 239, P.A. as amended Bodies of Dead Animals)*. Compensation for depredation will not be available for farms that intentionally maintain or practice this type of carcass disposal.

Exclusion
The use of low level electric or tightly spaced woven wire fencing may be used to prevent or limit access by predators to livestock pastures, calving or lambing areas, or livestock confinement areas. Because of the high cost of anti-predator fencing it is often not a practical management option for most farmers. However, we may suggest in some cases that sheep, calves or other vulnerable livestock be penned near farm buildings at night in a small area with anti-predator fencing.

Frightening devices and harssment
Devices currently available for Michigan farmers for aversive conditioning may include: light/siren devices, propane cannon, flashing highway lights, fladry (strips of flagging placed on fencelines), shell crackers, and rubber ammunition. Devices such as beeper collars and bells for the livestock have also been reported to have been successful in detering depredation. However, frightening devices often only produce the desired result for a short time because wildlife will become accustom to the disturbances making it necessary use a multiple non-lethal options.

Livestock guarding animals
Livestock guarding animals such dogs, llamas, and donkeys may be used to protect livestock from wolves. Guard dogs can be used effectively to protect sheep and cattle from predation and have been effective in protecting small or large flocks or herds in fenced pastures, on open range and in feedlots. Llamas and donkeys seem to be best suited to fenced pastures of less than 300 acres.

The effectiveness of the different breeds of dogs, llamas or donkeys are inconclusive because all three species were not rated in the same surveys or under the same conditions. Generally, dogs seem to be more effective in controlling depredation; however they are also more expensive to obtain, maintain and train. Whereas llamas and donkeys are less expensive because they are long-lived, eat the same food as livestock, and don't require much training. Regardless of the species of guarding species it can be cost effective when compared to the loss of livestock due to depredation by wolves, coyotes or bears.

Translocation
Trapping and translocating depredating wolves is a non-lethal management option. However, trapping and relocating wolves has become increasingly problematic because there are very few if any, suitable places to release wolves where a resident pack doesn't already exist. In addition, many citizens have expressed concern about releasing 'problem' wolves near their community. For these reasons translocation will rarely be used and only at the discretion of the Management Unit Supervisor. All wolves trapped and relocated will be radio-collared.

Use of Lethal Control to Resolve Wolf Depredation on Livestock

Four requirements must be met before lethal control can be considered as a management action.

Requirements before the application of lethal control:

1. Wolf depredation must be verified.
   a. If verified depredation has occurred within 1 mile or within a known pack territory in the previous year, lethal control prior to another confirmed depredation may be considered if wolves are harassing livestock.

   b. Farms that have suffered two or more depredation events in the previous five years will be considered chronic wolf depredation farms. Lethal control may be used if wolves harass livestock on a chronic depredation farm.

2. Livestock must be lawfully present. Lawfully present livestock are animals that are on the property owned or leased by the farmer and in a fenced area.

3. Depredation at the site is likely to continue in the immediate future if the depredating wolf or wolves are not removed. The evaluation of whether depredation is likely to occur again will be based on a field review by DNR or USDA-WS personnel, past history of depredations in the area, known pack locations and movement patterns.

4. Permission from the landowner must be obtained. This permission will be documented on a *Private Property Access Agreement.* Depredation control activities on tribal lands must be coordinated with tribal natural resources personnel and lethal control will only be carried out if requested by the tribe.

The decision to apply lethal control is the responsibility of the Management Unit Supervisor. If the Management Unit Supervisor cannot be reached in a reasonable timeframe contact the Wolf Coordinator or other individuals listed in Appendix A for approval to use lethal control.

Requirements for the application of lethal control:

1. Wolf handling, and euthanizing must be carried out in a humane manner.

2. Traps and snares are checked at least every 24 hours.

3. Depredation control activities must occur within one mile of the depredation site.

4. If lethal control is being used at a captive cervid facility, all trapping, snaring, or shooting will take place inside of the fence.

5. If trapping or shooting is going to be attempted on adjacent state, federal or commercial forest lands, the owner or managing authority must be contacted for permission, unless prior arrangements have been made. If needed contact the Wolf Coordinator to secure these permissions.

6. Snares must have a "deer stop" to prevent the loop from closing smaller than 4.0 inches.

7. Carcasses of wolves euthanized will be shipped to the Wildlife Disease Laboratory at Michigan State University for necropsy.

Disposal of carcasses and parts will follow the requirements in the DNR-Department Procedure: *4107.7 Disposition of fish, birds and mammals collected for scientific and management purposes.*

The next section outlines additional procedures to help guide you during depredation control activities.

Guidelines on the use of lethal control include:

1. Lactating females trapped before July 1 must be released near the capture site, unless the wolf has been involved in three or more depredation events, in which case it may be euthanized. The animal may also be euthanized prior to July 1, by the request of the Management Unit Supervisor.

2. Since wolf pups are highly unlikely to be directly involved in livestock depredation, pups captured before August 1 will be released near the capture site. However, a pup may be euthanized in special circumstances by the request of the Management Unit Supervisor.

3. Snares should be set for a non-lethal capture (*e.g.*, avoid entanglement of the captured animal).

4. DNR or USDA-WS personnel are responsible for checking traps and snares. In most instances, this will be the person that set the traps or snares.

5. Radio-collared or tagged wolves will be treated as any other depredating wolf.

6. Control efforts (trapping and snaring) normally will be carried out for 10 to 15 days, however the duration of control efforts will vary and be determined by the DNR in consultation with USDA-WS.

7. If trapping is going to be attempted on adjacent state, federal or commercial forest lands, the area should be signed to alert the public that trapping is occurring. Signs should be placed on all roads that provide access to the area being trapped. If needed, signs can also be placed every ½ mile along the roads that are being trapped.

8. On farms that suffer their first loss, control efforts will usually be stopped after two wolves have been captured.

9. Lethal control will be used when trapping would have to be conducted during periods of extreme cold or heat as these conditions would increase the likelihood of serious injury to a captured wolf.

10. Trapping is conducted in a location and manner to minimize the likelihood of capturing a wolf or wolves from non-depredating packs or non-target animals.

11. Technical assistance will be provided to the extent practical to help address animal husbandry practices that may be contributing to wolf depredation. The Michigan DNR and USDA-WS will cooperate with Michigan State University Extension (MSUE), Michigan Farm Bureau (MFB), Michigan Cattleman's Association (MCA), and other interested organizations to develop and distribute materials detailing appropriate management practices to be used on farms where wolves occur in the vicinity. It is hoped that the livestock producers will agree to a minimum set of animal husbandry standards. All technical assistance provided to producers before or after a depredation incident will be recorded.

12. Dogs captured at depredation sites will be turned over to the owner or local animal control officer (*See Appendix C*).

13. Wolf-dog hybrids captured at depredation sites will be turned over to local animal control officer (*See Appendix C*).

Methods of Lethal Control

Available lethal control methods to resolve wolf depredation on livestock include foothold traps and euthanasia, snares and euthanasia, and shooting. Wolves will be euthanized by shooting or lethal injection.

Indemnification

Compensation programs have been designed to assist livestock producers by reimbursing them for losses attributable to wolves in many states. Current Michigan law requires the State to compensate livestock owners for livestock killed by wolves, regardless of the extent to which efforts have been made to reduce depredation risks. The *Michigan Wolf Management Plan (section 6.10.5)* provides direction to facilitate financial compensation for livestock losses.

Wolf indemnification payments are only available for verified depredations and lawfully present livestock (see definition of livestock on page 2.). After a verified wolf depredation event the farmer is eligible to receive a State indemnification payment for the value of the animal at the time of loss. This value is determined by the Michigan Department of Agriculture. State indemnification payments are established by the Michigan legislature each fiscal year the availability and rules regarding these payments are subject to change each fiscal year.

For livestock less than a year old that are killed by wolves between January 1 and September 1, a second supplemental payment is available to eligible farmers. This supplemental payment allows the farmer to receive the full fall market value of the depredated animal. The fall market value is also determined by the Michigan Department of Agriculture. Donations made primarily by Defenders of Wildlife support this second payment. However, because of conditions that came with the donated funds, supplemental payments are not available for captive cervids.

Wolf Depredation on Dogs

Certain human behaviors and practices can attract wolves and thus increase the risk of depredation of domestic animals. Directly feeding wolves is the most obvious way to invite depredation problems. Baiting and feeding other wildlife can attract and concentrate natural prey and thus attract wolves and other predators. Feeding pets outside and leaving pets outside unattended also may attract wolves. Avoiding these behaviors and practices can help reduce the risk of depredation.

Wolf depredation on dogs will be investigated using the same techniques that are used for livestock depredations. The use of lethal control for wolf depredation on dogs is subject to the same restrictions used for livestock. Guard animals will be treated as any other domestic animals for verification and control purposes. If wolf depredation is verified and it is likely that depredation will be repeated, lethal control can be used when wolves have killed dogs that were leashed, confined, or under the owners control. Similarly, lethal control will be a management option in specific areas where wolf attacks on free-ranging hunting dogs have been documented, and non-lethal methods are determined to be ineffective. However, lethal control will not be used as a preventative measure where attacks have not yet occurred. Wolf control permits will not be issued on wolves that kill dogs that are free-roaming, roaming at large, hunting, or training on public lands, and all other lands open to public hunting.

Documentation and Information Transfer

1. Personnel receiving a depredation complaint will fill out the *Wolf Activity Report* and forward copies to the Wolf Coordinator who will provide copies to the Management Unit Supervisor.

2. Personnel investigating a depredation complaint will fill out *Report of Livestock Depredation* form (Form R- 2566E). This form will be forwarded to the Wolf Coordinator who will provide copies to the Management Unit Supervisor.

3. The Michigan Wolf Coordinator will forward a signed and fully completed form to the Michigan Department of Agriculture for indemnification payment.

4. If the Management Unit Supervisor authorizes lethal control, field personnel will complete a *Private Property Access Agreement* form. This form will be forwarded to the Wolf Coordinator.

5. If the DNR, USDA-WS, MSUE, MFB, MCA or other organizations provide technical assistance, document that assistance on the *Private Property Access Agreement* form. Documentation of the success or failure of these measures should be appended to the *Private Property Access Agreement* form.

6. Non-lethal and lethal control activities will be documented in detail by DNR and USDA-WS personnel on the *Wolf Depredation Effort and Results* form. For example, time spent, miles driven, types of technical assistance, and numbers of traps set are all important factors to document. This form will be forwarded to the Wolf Coordinator.

7. If wolves are euthanized during control efforts, field personnel will affix a wolf necropsy tag and inform the Wolf Coordinator as soon as possible. The Wolf Coordinator will provide background information on the incident along with the necropsy tag number to the Wildlife Disease Laboratory, Management Unit Supervisors, Research Biologist, Endangered Species Coordinator, Field Operations Supervisor, Law Enforcement Supervisors, and by request the USFWS.

8. If a lactating female is captured prior to July 1, or pup is captured prior to August 1, field personnel will inform the Wolf Coordinator as soon as possible. The Wolf Coordinator will notify the Management Unit Supervisor.

9. A trap injury form must be completed and forwarded to wildlife research for any wolves trapped when lethal control is used to resolve depredation on livestock.

10. Submit all requests for wolf pelts or skulls to the Wolf Coordinator.

Required Training of Personnel

All Michigan DNR and USDA-WS personnel making field evaluations to determine if an incident constitutes a verified wolf depredation event will have undergone the depredation training provided by Michigan DNR Wildlife Division. In addition, all trappers shall be trained in, and receive annual refresher courses in the trapping, chemical immobilization, and medical handling of animals, with emphasis on wolves, to minimize accidental injury and death to wolves.

Appendix A

Contact Information
Lethal Control Approval and Assistance

Eastern Upper Peninsula Management Supervisor (See Map)

Terry Minzey

Office	906-293-5131
Cell	
Home	906-439-5412
Radio	4-30

Western Upper Peninsula Management Supervisor (See Map)

Bob Doepker

Office	906-228-6561 or Norway 906-563-9077
Cell	906-458-7375
Home	906-774-1884
Radio	15-30

If the appropriate Management Supervisor can not be reached the person on scene should attempt to contact the following individuals in order of appearance.

Wolf Coordinator

Brian Roell

Office	906-228-6561
Cell	906-235-0361
Home	906-345-0069
Radio	15-32

USDA Wildlife Services

Don Lonsway

Cell	906-630-1869
Home	906-932-3898

Upper Peninsula Research Biologist

Dean Beyer

Office	906-227-1627
Cell	906-250-9714
Home	906-249-4502
Radio	15-31

Appendix A
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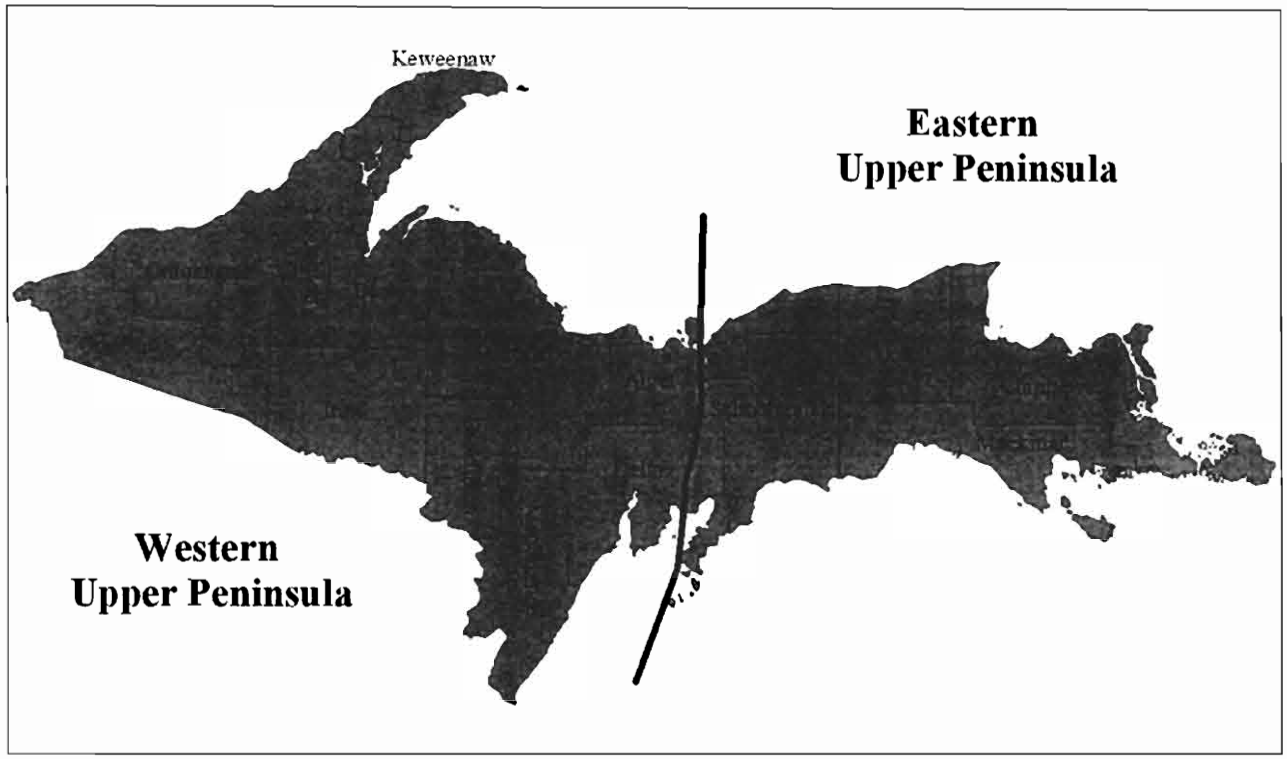


Appendix B

Investigative Criteria to Differentiate Wolf Depredation from Depredation by Other Predators or Natural Mortality/Scavenging of Livestock.

The following investigative criteria were provided by William J. Paul, Assistant State Director, USDA Wildlife Services, Grand Rapids, Minnesota.

- The livestock carcass must be reasonably fresh (not more than a few days old). A determination can not be made on carcasses that are already rotted down to bare bones.
- Tracks left by wolves at kill sites are easily distinguishable from those of most other predators except large dogs.
- Wolf attacks on large livestock are characterized by bites and large ragged wounds on the hindquarters, flanks, and sometimes the upper shoulders. Attacks on young calves or sheep are characterized by bites on the throat, head, neck, back, or hind legs. Wolves and coyotes may cause extensive trauma to underlying tissues, but don't always penetrate the skin with their canines.
- Wolves usually begin feeding on the viscera and hindquarters. Much of the carcass may be eaten with large bones chewed and broken. The carcass is usually torn apart and scattered with subsequent feedings.
- Coyotes also eat the viscera and hindquarters first, but the feeding pattern is not as heavy as for a wolf. Coyotes tend to eat the meat from a carcass rather neatly leaving most of the skeleton intact in the early stages. They tend to chew just the tips of the ribs off (eat the cartilage). Coyotes (unlike wolves) may also chew the ears or nose off a calf carcass. Coyotes are an important predator on newborn and small calves up to a month old.
- Wolves and coyotes may show similar killing and feeding patterns on small livestock. Where wounds are present, the area should be skinned out so that the size and spacing of the tooth holes can be examined. Wolf canine tooth holes are about ¼ inch (0.6 cm) in diameter while those of a coyote are about 1/8 inch (0.3 cm) in diameter. Spacing of wolf canines ranges from 37.3 to 48.2 mm (n = 22) and spacing of coyote canines ranges from 22.3 to 35.8 mm (n = 30).
- Wolves are attracted to and will scavenge carcasses of livestock that have died of natural causes. It is important to distinguish between predation and scavenging. Evidence of predation includes signs of a struggle, and hemorrhaging beneath the skin in the throat, neck, back, or hindquarter area.
- Animals that have died of natural mortality do not exhibit any obvious wounds and may not be fed upon or may be fed upon very lightly. Skin out appropriate areas of the intact carcass to look for any signs of attack (not all predator bites produce canine punctures). Wolves do not kill livestock animals without feeding upon them—they also do not run animals to death where they just tip over.
- A depredation investigation should include examining all possible clues such as the presence of tracks, feeding pattern, nature of wounds, size of canine tooth holes, and possible mortality factors. Look for all of these factors before giving the livestock-producer a determination. Show the livestock producer any evidence that eliminates wolves but implicates another predator.

Appendix B
Continued

- Remember that at most farms in the wolf range, wolves, coyotes, and black bears are all present and could be involved in a depredation. Even at farms with chronic wolf problems, other predators such as coyotes may kill livestock or natural mortality may occur. Look at every depredation on a case-by-case basis even though the farm may have a history of wolf damage.

Appendix C.

Contact information by County for Animal Control

Note: If the county has an animal control officer on staff they are dispatched by the sheriff's office. If the county does not employ an animal control officer then the sheriff's department would be responsible.

Alger County
Sheriff David M. Cromell
101 E. Varnum
Munising, MI 49862
(906) 387-4444

Baraga County
Sheriff Robert Teddy
P.O. Box 307, US 41
L'Anse, MI 49946
(906) 524-6177

Chippewa County
Sheriff Jeff Moran
331 Court St.
Sault Ste. Marie, MI 49783
(906) 635-6355

Delta County
Sheriff Gary Ballweg
111 North Third Street
Escanaba, MI 49829
(906) 786-3633

Dickinson County
Sheriff Donald J. Charlevoix
300 East D. Street
Iron Mountain, MI 49801
(906) 774-6262

Gogebic County
Sheriff Larry Sanders
100 Iron St.
Bessemer, MI 49911
(906) 667-0203

Houghton County
Sheriff Brian J. McLean
403 E. Houghton Avenue
Houghton, MI 49931
906-482-0055

Iron County
Sheriff Robert W. Remondini
2 S. 6th St., Suite 18
Crystal Falls, MI 49920
(906) 875-6669

Keweenaw County
Sheriff Ronald Lahti
4th Street
Eagle River, MI 49924
(906) 337-0528

Luce County
Sheriff Kevin Erickson
411 W. Harrie Street
Newberry, MI 49868
(906) 293-8431

Mackinac County
Sheriff Scott Strait
100 N. Marley Street
St. Ignace, MI 49781
(800) 643-1911

Marquette County
Sheriff Mike Lovelace
236 West Baraga Ave.
Marquette, MI 49855
(906) 225-8435

Menominee County
Sheriff Brett Botbyl
831 Tenth Ave.
Menominee, MI 49858
(906) 863-4441

Ontonagon County
Sheriff John Gravier
620 Conglomerate St.
Ontonagon, MI 49953
(906) 884-4901

Schoolcraft County
Sheriff Gary Maddox
300 Main St.
Manistique, MI 49854
(906) 341-2122

MICHIGAN

WOLF MANAGEMENT PLAN

Michigan Department of Natural Resources
Wildlife Division Report No. 3484
July 10, 2008

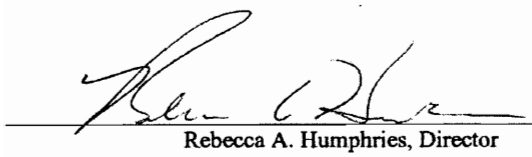
Printed by Authority of: PA 451 of 1994
Total Number of Copies Printed.....100
Cost Per Copy: $5.45
Total Cost: $545.00

Michigan Department of Natural Resources

IC2579 (July 10, 2008)

MICHIGAN
WOLF MANAGEMENT PLAN

Approved:



Rebecca A. Humphries, Director

Michigan Department of Natural Resources

Lansing, Michigan

Date: July 10, 2008

ACKNOWLEDGMENTS

The Michigan Department of Natural Resources (DNR) appreciates the valuable contributions offered by many individuals, agencies and organizations during the development of this plan.

We thank the thousands of Michigan residents who helped shape the content of this plan through their participation in public wolf meetings held throughout the State, through the input and opinions they shared during public-comment periods, through their involvement in focus-group discussions, and through their participation in public-attitude surveys.

We express our appreciation to the members of the Michigan Wolf Management Roundtable for their dedication and hard work as they developed a set of principles to help guide wolf management in Michigan. Those principles are directly reflected in the management strategies outlined throughout this document.

We extend a special thank-you to Dr. R. Ben Peyton, faculty member in the collaborative Partners in Ecological Research and Management program between the Michigan State University Department of Fisheries and Wildlife and the Michigan DNR. As the facilitator of the Michigan Wolf Management Roundtable, Dr. Peyton rose to the challenge of building consensus among group members and played an integral role in the success of the group. In addition, he and his colleague, Peter Bull, conducted an extensive study of attitudes held by Michigan residents regarding wolves, and their data were an indispensable component of the planning process.

We thank our Federal, State and tribal agency partners for their cooperation in wolf management and for the information and feedback they offered during the development of this plan. We especially acknowledge the contributions of the USDA Wildlife Services, whose expertise and assistance has been and continues to be a critical component of the wolf management program in Michigan.

Finally, we thank members of the Michigan DNR Wolf Management Work Group, whose sustained efforts to coordinate all phases of the planning process have resulted in the production of this document.

A contribution of Federal Aid in Wildlife Restoration, Michigan Project W-147-R

COVER ART BY KEITH GROVE

Keith Grove has had a lifelong interest in wildlife and has promoted this interest as a specialty throughout his 25-year career as an award-winning, commercial illustrator. After completing a commission for three white-tailed deer oil paintings for a series of prints that sold out in a national catalog, Keith decided it was time to concentrate on his own wildlife subjects. Using alkyd oils and a realistic style, Keith tries to "tell a story" by capturing unique, cameo moments of wilderness life. A graduate of the college of Associated Arts, St. Paul, Keith has also studied classical realism and continues to expand his knowledge of computer graphics and large-format printing techniques for the production of his own giclée prints. For more information, contact Keith at grovewildife@aol.com.

LIST OF ABBREVIATIONS

DNR	Department of Natural Resources
LP	Lower Peninsula
MSU	Michigan State University
UP	Upper Peninsula
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

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1. INTRODUCTION

1.1 Purpose of Plan

This plan provides strategic guidance for the management of wolves in Michigan. It was developed to help: 1) maintain a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered; 2) facilitate wolf-related benefits; 3) minimize wolf-related conflicts; and 4) conduct science-based wolf management with socially acceptable methods.

The Michigan DNR has the primary responsibility and statutory authority for the management of resident wildlife in Michigan. Accordingly, this plan was developed primarily to guide the Michigan DNR's management of wolves. This plan may also provide guidance to other Federal, State and tribal agencies and private organizations. Consequently, it may encourage cooperation and consistent approaches among management partners in their efforts to manage wolves in Michigan.

This plan does not outline operational details of wolf management in Michigan. Operational details will be specified within an adaptive-management framework, in which specific management methods are routinely adjusted and updated as local conditions, technology, regulations, and other aspects of management context change.

1.2 Context of Plan

In 1997, the Michigan DNR finalized the *Michigan Gray Wolf Recovery and Management Plan* (Michigan DNR 1997). That plan was developed when the gray wolf (*Canis lupus*) in Michigan was classified as a federally endangered species and the number of wolves in the State was relatively small. The plan focused on the biological needs of a small population and was a valuable tool for the recovery of wolves in Michigan. It also contributed to the regional recovery of wolves in the western Great Lakes region: in 2007, the U.S. Fish and Wildlife Service (USFWS) removed the gray wolf in the Western Great Lakes Distinct Population Segment, which includes all of Michigan, from the Federal list of threatened and endangered species (USFWS 2007).

Since 1997, the context of wolf management in Michigan has changed considerably. Wolf population size and distribution have expanded, presenting a different set of biological and social issues that need to be addressed. Understanding of wolf biology has improved significantly, enabling managers to better predict the consequences of their management decisions. Regulations regarding wolves have changed, offering more flexibility for addressing new challenges.

Active involvement of the USDA Animal and Plant Inspection Service Wildlife Services in the Michigan wolf management program represents another significant change. Since 2000, USDA Wildlife Services personnel have played a key role in population monitoring, research, training of field staff, and program planning. The Michigan DNR and USDA Wildlife Services are

currently working to formalize their cooperative relationship in a memorandum of understanding.

Another notable development has been the preparation and implementation of *Michigan's Wildlife Action Plan* (Eagle et al. 2005). That plan, finalized in 2005, guides the conservation of all wildlife throughout the State. The plan identifies wolves as a Species of Greatest Conservation Need and establishes a framework of holistic wildlife conservation on which to base wolf management.

To address these changes and to continue to manage the wolf population based on the best available scientific information, the Michigan DNR has revised its original wolf plan. This new plan addresses the challenges associated with the current biological, social and regulatory context of wolf management in Michigan.

As of the finalization of this plan, Michigan wolves are not classified as threatened or endangered under the Federal Endangered Species Act. However, the 2007 Federal rule that de-listed wolves in the western Great Lakes Distinct Population Segment currently faces a legal challenge. As a result, the Federal status of Michigan wolves may be subject to change. The feasibility of implementing some parts of this plan will depend on the outcome of ongoing litigation.

2. PLANNING PROCESS

The Michigan DNR developed this plan through a process that included review of the best available scientific information and substantial involvement of affected stakeholder groups and the general public. The process included the following eight phases:

- Intra- and inter-agency scoping
- Public meetings and comment period
- Focus-group meetings
- Public-attitude surveys
- Review of science relevant to wolf management in Michigan
- Michigan Wolf Management Roundtable
- Plan writing
- Public review and comment

The information compiled and evaluated during all of these phases was used to produce a plan that is based on sound science and careful and respectful consideration of the diverse perspectives held by Michigan society. These phases are described under the following headings.

2.1 Intra- and Inter-agency Scoping

In August 2004, the Michigan DNR met with Federal and State agency partners to identify issues regarding wolves and their management in Michigan. Each agency shared its vision and

concerns regarding wolf management. Agencies also identified future wolf management needs and opportunities for continuing partnerships. After this initial meeting, the Michigan DNR Wolf Management Work Group conducted a situational analysis to identify the strengths, weaknesses, opportunities, threats and issues surrounding future wolf management in Michigan. During the ensuing months, the group continued to explore the issues and formulated a plan and timeline for revising the Michigan wolf management plan.

2.2 Public Meetings and Comment Period

In May 2005, the Michigan DNR hosted ten public meetings to discuss wolf management in Michigan. Six meetings took place in the Upper Peninsula (Watersmeet, Houghton, Escanaba, Newberry, Sault Ste. Marie and Marquette) and four meetings took place in the Lower Peninsula (Clare, Grand Rapids, Ann Arbor and Gaylord). The purpose of the meetings was to provide the public with an opportunity to identify important issues and express opinions regarding wolves and wolf management in the State. A professional facilitator not affiliated with the Michigan DNR moderated each meeting. Meeting participants were given the opportunity to provide verbal comments, and they were also asked to complete a survey regarding their views on wolves and wolf management.

Based on information obtained from sign-in sheets, at least 560 people attended the public meetings. Four hundred twenty-two of those individuals attended the Upper Peninsula (UP) meetings, and the remaining 138 individuals attended the Lower Peninsula (LP) meetings. Four hundred thirty-three people who attended the meetings submitted a completed survey. Results of the survey are summarized in Beyer et al. 2006.

The Michigan DNR press release that announced the public meetings also announced the opening of a public-comment period during which people were encouraged to mail or email their wolf-related comments. From April 12 through August 31, 2005, the Michigan DNR received 133 emails and 36 letters that specifically dealt with wolves.

2.3 Focus-group Meetings

During the summer of 2005, the Michigan State University (MSU) Department of Fisheries and Wildlife coordinated nine focus-group meetings to discuss wolves and wolf-related issues. The main purpose of the meetings was to refine understanding of issues identified as important by members of different stakeholder groups and to test and improve questions being considered for a statewide public-attitude survey.

The nine focus-groups included: 1) eastern UP livestock producers; 2) western UP livestock producers; 3) UP hunters who hunt with dogs; 4) northern LP hunters who hunt with dogs; 5) UP deer hunters; 6) northern LP deer hunters; 7) wolf conservationists (i.e., individuals focused on wolves at a population or ecosystem level); 8) wolf protectionists (i.e., individuals focused on the welfare and rights of individual wolves); and 9) trappers. A total of 78 individuals participated in the focus-group meetings.

Topics of discussion differed somewhat among the focus-groups. However, all focus-groups discussed the following six subjects: 1) benefits of having wolves in Michigan; 2) costs of having wolves in Michigan; 3) compensation and losses associated with wolf depredation; 4) preferences regarding quantification of wolf numbers in Michigan; 5) topics that should be addressed by the Michigan Wolf Management Roundtable (see 2.6); and 6) the role of the Michigan Wolf Management Roundtable in the development of the wolf management plan. Overviews of the discussions are provided in Bull and Peyton 2005 (included as Appendix IX in Beyer et al. 2006).

2.4 Public-attitude Surveys

Studies conducted prior to 2005 had assessed the attitudes held by Michigan residents regarding wolves (e.g., Kellert 1990, Mertig 2004). However, those studies may not reflect current public opinions given the substantial changes in wolf abundance and distribution in the UP and limitations of sample size. To ensure current social data were available during development of this plan, the MSU Department of Fisheries and Wildlife undertook a new study that explored the attitudes of Michigan residents.

Data for this new study were obtained from public-attitude surveys designed to address specific management questions relevant to the planning process. The questions focused on respondents' preferences and opinions regarding: 1) reasons for having wolves in Michigan; 2) the number of wolves and frequency of wolf-related interactions in different regions of the State; 3) options to address depredation of livestock, hunting dogs and other pets; 4) options to address public concerns regarding human safety; 5) options to address impacts to deer; and 6) a public harvest of wolves.

After survey questions were refined through focus-group discussions and tested through a pilot survey mailing, the final versions of the surveys were mailed repeatedly from November 2005 through January 2006. A general-public survey was mailed to 8,500 Michigan driver's license holders statewide. Slightly modified versions of the survey were mailed to 1,000 licensed furtakers and 1,000 livestock producers. These modified versions were designed to obtain sufficient input from two groups of stakeholders that comprise a relatively small proportion of the general population but experience disproportionately high levels of conflicts with wolves.

Repeated mailings resulted in an overall response rate of 53% for the general-public survey, 69% for the furtaker survey, and 69% for the livestock-producer survey. Data from the different versions of the survey were compiled and analyzed separately. The methods and results of the study are provided in Beyer et al. 2006. Survey responses regarding specific management issues (e.g., human-safety concerns, depredation of livestock, impacts on deer) are summarized under the relevant headings within section 6 (Wolf Management Strategies) of this plan.

2.5 Review of Science Relevant to Wolf Management in Michigan

Concurrent with the phases described above, the Michigan DNR and MSU Department of Fisheries and Wildlife developed a document entitled: *Review of Social and Biological Science Relevant to Wolf Management in Michigan* (Beyer et al. 2006). The document summarized the

best available biological and social science relevant to wolves, wolf-related issues, and wolf management options in Michigan, and it described the remaining scientific uncertainty on those topics. The information presented was obtained from published scientific literature, agency and university reports, unpublished agency data, and personal communication with wolf experts. Results of public-attitude surveys and focus-group discussions conducted by MSU in 2005 and 2006 are presented throughout the document.

Science allows managers to predict the outcomes of particular management actions. However, science alone does not establish wildlife management goals. Those goals are often determined within a social context where stakeholder values and priorities must be addressed. Accordingly, the *Review of Social and Biological Science Relevant to Wolf Management in Michigan* does not provide answers to questions of how wolves should be managed in Michigan. Rather, it facilitates understanding of the potential consequences of particular management approaches, and it thus helps managers make decisions based on the best available science.

The *Review of Social and Biological Science Relevant to Wolf Management in Michigan* is a companion document to this plan, and much of the information it contains is incorporated by reference. The document is available on the Michigan DNR website at www.michigan.gov/dnr.

2.6 Michigan Wolf Management Roundtable

To help it develop a plan that is acceptable to a wide range of stakeholder interests, the Michigan DNR convened an advisory committee called the Michigan Wolf Management Roundtable (Roundtable). Membership included 20 agencies and organizations (see Appendix) that represented the diversity of Michigan interests in wolves. These interests included environmental and ecological interests, hunting and trapping interests, livestock-producer interests, public-safety interests, tourism and resource-development interests, tribes, and wolf-protection interests. Each organization on the Roundtable was selected to ensure the views of all Michigan residents would be represented in a fair and effective manner. Membership included UP and LP residents in roughly the same numbers to ensure adequate representation of the different regions of the State. The charge of the Roundtable, as given by the Michigan DNR, was to develop principles to guide management of Michigan wolves and wolf-related issues following Federal de-listing.

From June through September 2006, Roundtable members met for a total of 10 days to deliberate on wolf management. They identified and prioritized important wolf-related issues, reviewed relevant social and biological science, and engaged in intense negotiations to reach consensus on a set of guiding principles for wolf management in Michigan.

The Roundtable submitted its final report to the Michigan DNR in November 2006. That report, entitled *Recommended Guiding Principles for Wolf Management in Michigan* (Michigan Wolf Management Roundtable 2006; included as the Appendix to this plan; also available on the Michigan DNR website at www.michigan.gov/dnr), outlines guiding principles pertaining to wolf distribution and abundance, benefits of wolves, management of wolf-related conflicts, information and education, funding, research, hybrid and captive wolves, and future plan revisions.

2.7 Plan Writing

Between November 2006 and August 2007, the Michigan DNR evaluated the information and recommendations obtained during the previous phases to develop a draft of this plan. Michigan DNR staff and the Michigan Wolf Management Roundtable reviewed the draft prior to its public release.

2.8 Public Review and Comment

In August 2007, the Michigan DNR released a draft of this plan for public review and comment. During the 90-day comment period, agencies, organizations and individuals submitted approximately 1,480 emails and 15 hard-copy letters that offered comments on the draft plan. Based on those comments, the Michigan DNR modified the plan, as appropriate, prior to its final approval.

3. WOLF BIOLOGY AND ECOLOGY

3.1 Physical Description

Wolves are the largest members of the Canidae (dog family) in Michigan. Other native Michigan canids are the coyote (*Canis latrans*), red fox (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*). Wolves are larger than coyotes, with body dimensions exceeding those of a fully grown German shepherd or Alaskan malamute. In Michigan, weights of adult wolves range from 58 to 112 pounds (26–51 kg), with males (average: 87 lbs; 39 kg) weighing slightly more than females (average: 76 lbs; 34 kg). Wolves are approximately 6 feet (1.8 m) long from the nose to the end of the tail. Adults stand 30–34 inches (75–85 cm) tall at the shoulder. The feet of wolves are large, with tracks measuring 3.5–4 inches (9–10 cm) wide and 4.5–5 inches (11–13 cm) long.

Wolves are well-adapted to cold and temperate climates. The dense underfur in their winter coats is protected by guard hairs that may be up to 6 inches (15 cm) long over the shoulder. Their skeletal and muscular structures make them well-adapted to travel. They have tremendous stamina and often spend 8–10 hours per day on the move, primarily during early morning and evening.

3.2 Social Structure and Behavior

The life of a typical individual wolf is centered on a distinct family unit or pack (Baker 1983). The basic functional unit of a pack is the dominant breeding pair, often called the 'alpha' pair (Mech and Boitani 2003*a*). A pack is typically comprised of these two dominant animals, their pups from the current year, offspring from previous litters, and occasionally other wolves that may or may not be related to the alpha pair (Young and Goldman 1944, Stenlund 1955, Mech 1966). A dominance hierarchy occurs within the pack, where each member occupies a rank or position (Mech 1970). The alpha male and female are normally the only animals that breed, but there are exceptions (Ballard et al. 1987).

Based on ten studies, the average pack size of wolves that prey primarily on deer (*Odocoileus* spp.) is 5.7 animals (Fuller et al. 2003). This size is similar to a recent estimate of average pack size in Minnesota (mean=5.3; Erb and Benson 2004) but higher than a recent estimate of average pack size in Wisconsin (mean≤4.3; Wydeven et al. 2006). From 2003 through 2007, average winter pack size in Michigan ranged from 4.6 to 4.9 animals (B. Roell, Michigan DNR, unpublished data).

Wolves establish and maintain territories (Ballard et al. 1987, Fuller 1989, Mech and Boitani 2003*a*). Howling between packs and scent-marking along territory edges are the principal means of spacing in wild wolf populations. Territory size can vary greatly and depends upon the density of wolves and on the density and distribution of prey.

Estimated sizes of individual wolf pack territories in the UP have ranged from 22 mi^2 to 128 mi^2 (56–331 km^2); in 2004, average pack territory size in the UP was 65 mi^2 (169 km^2; Huntzinger et al. 2005). Average pack territory size decreased approximately 37% from 2000 to 2004 as the UP wolf population increased (Huntzinger et al. 2005).

3.3 Reproduction

Some wolves that were held in captivity were capable of breeding at 9–10 months of age (Medjo and Mech 1976), but wild wolves typically reach sexually maturity at 22 months of age (Mech 1970, Fuller 1989). Mating takes place in February, dens are dug in March, and pups are born in middle to late April (Peterson 1977, Fuller 1989).

Litter sizes can vary, but usually include 4–6 pups (Mech 1970). Pups are born with their eyes and ears closed and lack the ability to properly regulate their body temperature (Mech 1970). Their eyes open when they are between 11 and 15 days old (Rutter and Pimlott 1968, Mech 1970). Pups emerge from their dens when they are approximately 3 weeks old (Young and Goldman 1944). At approximately 9 weeks of age, they are weaned and moved to a rendezvous site, an above-ground area where pups develop until they are able to travel with the pack. By the time pups are 4–6 months old, they are nearly as large as an adult wolf (Carbyn 1987).

3.4 Causes and Rates of Mortality

No animal habitually preys on wolves, but pups may occasionally be taken by bears (*Ursus* spp.) or other predators. Both moose (*Alces alces*) and deer have injured or killed wolves (Nelson and Mech 1985, Mech and Nelson 1989). Other natural mortality factors include accidents, malnutrition, starvation, parasites, diseases, and fatal encounters during territorial disputes between packs. Human-induced mortality can involve vehicle strikes and intentional killing. Causes of wolf mortality are often compensatory (Mech 2001, Fuller et al. 2003). For example, human-induced mortality can sometimes replace mortality that would otherwise occur due to natural factors, such as starvation, disease or intraspecific aggression (Fuller et al. 2003).

Annual mortality of wolves can fluctuate widely from year to year. Up to 60% of pups may die from disease and malnutrition during their first 6 months of life. Mortality rates approximate 45% from 6 months to 1 year, and 20% between years 1 and 2 (Pimlott et al. 1969, Mech 1970,

Mech and Frenzel 1971, Van Ballenberghe et al. 1975, Fritts and Mech 1981). Annual adult wolf mortality in Wisconsin averaged 39% during a period of population decline, and 19% during a period of population increase (Wydeven et al. 1995). Adults may live past 11 years, but most die much sooner (Mech 1988, B. Roell, Michigan DNR, unpublished data).

Using two methods of data analysis, Huntzinger et al. (2005) estimated annual mortality rates of radio-collared wolves in the UP from 1999 to 2005. Estimates of annual mortality rates varied between 15% and 46% and depended on the method of analysis. Although the confidence limits were large and the estimates varied annually, there was no trend in annual mortality. In other words, annual mortality of wolves did not increase or decrease with time.

In Michigan, illegal killing accounted for 34% of radio-collared wolf mortality from 1999 through 2006 (B. Roell, Michigan DNR, unpublished data). Compared to uncollared wolves, radio-collared wolves could be more or less likely to be killed illegally because radio-collars can be visible when wolves are sighted. When vehicle strikes, depredation-control activities, and other human-caused trauma are included, 60% of the radio-collared wolf mortality was directly attributable to humans (B. Roell, Michigan DNR, unpublished data). Causes of wolf mortality may have been biased toward human actions during 1999–2004 because captured wolves were vaccinated for a variety of diseases and treated for mange prior to 2004; that is, the vaccination procedures may have reduced the amount of natural mortality that would have otherwise occurred in the Michigan sample.

3.5 Immigration and Emigration

Most wolves disperse because animals rarely assume a breeding position within their natal packs (Mech and Boitani 2003*a*). Dispersal rates vary geographically and temporally with no clear differences between sexes (Mech and Boitani 2003*a*). Wolves are capable of traveling long distances and movements greater than 500 miles (800 km) have been reported (Ballard et al. 1983, Fritts 1983, Boyd et al. 1995). Long-distance movements and gene flow help preserve or enhance genetic diversity within populations and help mitigate the effects of detrimental demographic fluctuations due to environmental catastrophes (Simberloff and Cox 1987, Boitani 2000).

Movements of wolves among Michigan, Minnesota, Wisconsin and other States have been confirmed through the recovery or observation of marked animals (ear-tagged and/or radio-collared) (Mech et al. 1995, A. P. Wydeven, Wisconsin DNR, unpublished data, D. E. Beyer, Michigan DNR, unpublished data). There is also evidence of wolf movements between the eastern UP and Ontario across Whitefish Bay and the St. Mary's River (Jensen et al. 1986, Thiel and Hammill 1988).

With regard to the documented movements of 29 wolves that traveled from the UP to other States, the average distance between the points of origin and the points of subsequent location was 134 miles (216 km; B. Roell, Michigan DNR, unpublished data). The farthest documented dispersal by a Michigan wolf was made by a male that was captured, tagged and released in Gogebic County in 1999 and killed near Trenton, Missouri in 2001. The straight-line distance between the two points is 457 miles (756 km).

3.6 Wolf Food Habits

Wolves prey on a variety of wildlife species, and predation on those species often changes seasonally and geographically (Voigt et al. 1976, Fritts and Mech 1981, Potvin et al. 1988, Fuller 1989, Mech and Peterson 2003). In general, prey abundance, distribution, vulnerability and behavior influence a prey species' importance to wolves as a food source. In multiple-prey systems, the more-vulnerable species commonly predominates as the main food source for wolves (Van Ballenberghe et al. 1975, Fritts and Mech 1981).

Mandernack (1983) analyzed scats of Wisconsin wolves to determine the relative abundance of prey species in their diet. White-tailed deer (*Odocoileus virginianus*) comprised 55%, beaver (*Castor canadensis*) comprised 16%, snowshoe hare (*Lepus americanus*) comprised 10%, and other small mammals and miscellaneous items comprised 20% of wolf diet in that area. Beaver provided as much as 30% of a Wisconsin wolf's spring diet. In Minnesota, white-tailed deer, moose and beaver comprised the majority (>75%) of annual wolf diet (Van Ballenberghe et al. 1975). The predominance of deer remains in wolf scat indicates deer were the principal prey throughout the year despite relatively high densities of moose.

In the UP, white-tailed deer and moose constitute the ungulate prey available for wolves. However, moose are rarely preyed upon by wolves, probably due to the lack of overlap in distribution with wolf-pack territories, the low abundance of moose in comparison to deer, and differences in vulnerability (D. E. Beyer, Michigan DNR, personal communication). Research in Michigan indicates deer are the primary prey item for wolves during winter; smaller animals such as beaver, snowshoe hare and ruffed grouse (*Bonasa umbellus*) comprise relatively small percentages of winter wolf diet (Huntzinger et al. 2004). Other food items known to have been eaten by wolves in the UP include shrews, squirrels, mice, crayfish, insects, berries and grass (Stebler 1944, 1951, B. Roell, Michigan DNR, personal communication).

3.7 Ecological Function

Wolves are top predators and can have a major influence on the ecological systems in which they live (Mech and Boitani 2003*b*). Primary effects of wolves can include the removal of weak, sick or otherwise vulnerable individual prey, local influences on prey numbers, and increased availability of food for scavengers (Mech 1970). Wolves may also limit populations of competitors such as coyotes (Crabtree and Sheldon 1999). These primary effects can also cause changes (indirect effects) in other elements of the ecosystem. These indirect effects have been termed 'trophic cascades' (Paine 1966) because changes at one trophic level (e.g., carnivores such as wolves) cause changes at another trophic level (e.g., herbivores such as deer).

Trophic cascades can be either 'bottom-up,' wherein changes at lower trophic levels affect higher levels, or 'top-down,' such as when predators cause changes at lower levels. The relative importance of bottom-up versus top-down processes can vary depending on local circumstances. On Isle Royale, McLaren and Peterson (1994) documented a top-down trophic cascade among wolves, moose and balsam fir (*Abies balsamea*). In this system, wolves controlled moose numbers and moose controlled growth of balsam fir. A similar relationship is occurring in Yellowstone National Park as a result of the reintroduction of wolves. Wolf predation on elk

(*Cervus elaphus*) is allowing several tree species, which were formerly limited by elk browsing, to recover (Ripple and Larsen 2000, Ripple et al. 2001, Ripple and Beschta 2003). The mechanism that starts a trophic cascade may be direct (e.g., wolves limit prey numbers; McLaren and Peterson 1994), or indirect (e.g., the risk of wolf predation causes a change in ungulate behavior and browsing patterns; Ripple and Beschta 2004).

3.8 Wolf Habitat

Wolves are habitat generalists and have the potential to occupy areas with an adequate abundance of hoofed prey (Fuller 1995). Given sufficient prey, the chance of an area being occupied and the number of wolves that could be supported is related to the proximity of source populations and the extent of human-caused mortality (Fuller 1995).

Road density has been used as an index of wolf–human contact and appears to be related to illegal and accidental killing of wolves (Mladenoff et al. 1995). Mladenoff et al. (1995) developed a spatial habitat model based on road density that predicted wolves would be unlikely to occupy areas with greater than 0.72 miles of roads per square mile (0.45 km/km^2). Although the model successfully predicted wolf occupancy in northern Wisconsin (Mladenoff et al. 1999), its predictions for the UP were questionable because areas of low deer density (Doepker et al. 1995) that were unlikely to be occupied by wolves were identified as suitable habitat.

Potvin et al. (2005) developed a spatial habitat model for the UP that incorporated measures of both road density and deer density. This model identified a road-density threshold of 1.1 mi/mi^2 (0.7 km/km^2) and a deer-density threshold of 6–15 deer/mi^2 (2.3–5.8 deer/km^2). The deer-density threshold is near the point where wolves become nutritionally stressed (Messier 1987).

The two models produced similar estimates of habitable area (Mladenoff et al. 1999: 11,331 mi^2 or 29,348 km^2; Potvin et al. 2005: 10,695 mi^2 or 27,700 km^2) but differed in how the suitable habitat was distributed. The Mladenoff et al. model predicted many areas in the northern portion of the UP would be occupied, whereas the Potvin et al. model predicted that most habitat occupied by wolves would occur in the southern portion of the UP, where deer densities tend to be higher.

Using an earlier version of the Potvin et al. (2005) model, Potvin (2003) estimated the northern LP contained approximately 3,089 mi^2 (8,000 km^2) of suitable wolf habitat. Gehring and Potter (2005) applied the Mladenoff et al. (1995) model to the northern LP and estimated 1,634 mi^2 (4,231 km^2) of suitable habitat was available. Both modeling efforts indicated wolf habitat is more fragmented in the northern LP than in the UP.

4. WOLVES IN MICHIGAN

4.1 History

Wolves have been part of the Great Lakes fauna since the melting of the last glacier and as such are native to the land area known as Michigan. Stebler (1951) indicated that pioneer documents

and museum specimens show wolves were once present in the areas of all present-day Michigan counties.

Throughout the history of aboriginal peoples of present-day Michigan, wolves figured prominently in tribal culture and beliefs. For example, the wolf is a sacred clan animal among the Anishinaabe (Odawa, Ojibwe and Potawatomi) people. In the Anishinaabe creation story, Maahiingun (the wolf) is a brother to Nanaboozhoo (half man/half spirit); Gzhemnidoo (the Creator) instructed Maahiingun and Nanaboozhoo to travel together to name and visit all the plants, animals and places on earth; later, Gzhemnidoo instructed them to walk their separate paths, but indicated each of their fates would be always tied to that of the other; they would be feared, respected and misunderstood by the people that would later join them on earth (see 6.8 for a more-detailed account of the story of Maahiingun and Nanaboozhoo).

Settlers brought their wolf prejudices with them (Lopez 1978). European werewolf mythology, fairy tales, and religious beliefs, along with views that wolves were incompatible with human civilization, resulted in the persecution of wolves in Michigan as well as the rest of the United States. This practice led to the near-extermination of wolves in the contiguous United States.

The United States Congress passed a wolf bounty in 1817 in the Northwest Territories, which included what is now Michigan. A wolf bounty was the ninth law passed by the first Michigan Legislature in 1838. A wolf bounty continued until 1922, when it was replaced by a State-paid trapper system. The bounty was reinstated in 1935 and repealed in 1960, only after wolves were nearly eliminated from the State. Michigan wolves were given legal protection in 1965.

By the time bounties were imposed in the 1800s, wolves were nearly extirpated from the southern LP. They were absent from the entire LP by 1935, if not sooner (Stebler 1944). In the more sparsely settled UP, the decline was less precipitous. In 1956, the population was estimated at 100 individuals in seven major areas in the UP (Arnold and Schofield 1956). The Michigan wolf population was estimated at only six animals in the UP in 1973. Sporadic breeding and occasional immigration of wolves from more-secure populations in Ontario and Minnesota were postulated as the factors that maintained the small number of wolves in the UP (Hendrickson et al. 1975). It is likely that a few animals persisted in remote areas of the UP and that wolves were never completely extirpated from the State.

In the early 1970s, the wolf population in Minnesota began to expand southward from its northern range. In 1975, a pack of wolves occupied a territory that spanned the Minnesota–Wisconsin border (Thiel 1993), signifying the beginning of re-colonization of former wolf range in Wisconsin. After 1975, the wolf population in Wisconsin expanded into suitable habitat across the northern Wisconsin counties (Wydeven and Wiedenhoeft 2005). In the 1980s, wolves from Minnesota and Wisconsin began to re-colonize the western and central portions of the UP (Thiel 1988, Mech et al. 1995). In addition, wolves from Ontario may have crossed into the UP over ice at Whitefish Bay, along the St. Mary's River, and near northern Lake Huron islands (Jensen et al. 1986, Thiel and Hammill 1988). The beginning of wolf recovery in Michigan was first documented in 1989 when a pair established a territory in the central UP.

Only one wolf reintroduction was attempted in Michigan. Four wolves from Minnesota were released in Marquette County in March 1974 and all died as a result of direct human activities between July and November 1974. These wolves did not reproduce and did not contribute to the current wolf population (Weise et al. 1975). The wild wolves that currently occur in the UP are the result of natural immigration and reproduction.

4.2 Recent Population Size and Distribution

The wolf population in the UP (excluding Isle Royale) showed steady growth after monitoring began in 1989 (Figure 4.1). With the exception of 1997, documented wolf population size increased each year. From 1994 to 2007, the population grew at an average annual rate of 19%. From 2003 to 2007, the average annual growth rate was 12%. The growth rate is expected to decline as the population moves toward the maximum level the UP can sustain (Huntzinger et al. 2005). An estimated 509 wolves occurred on the UP mainland during the winter of 2007.

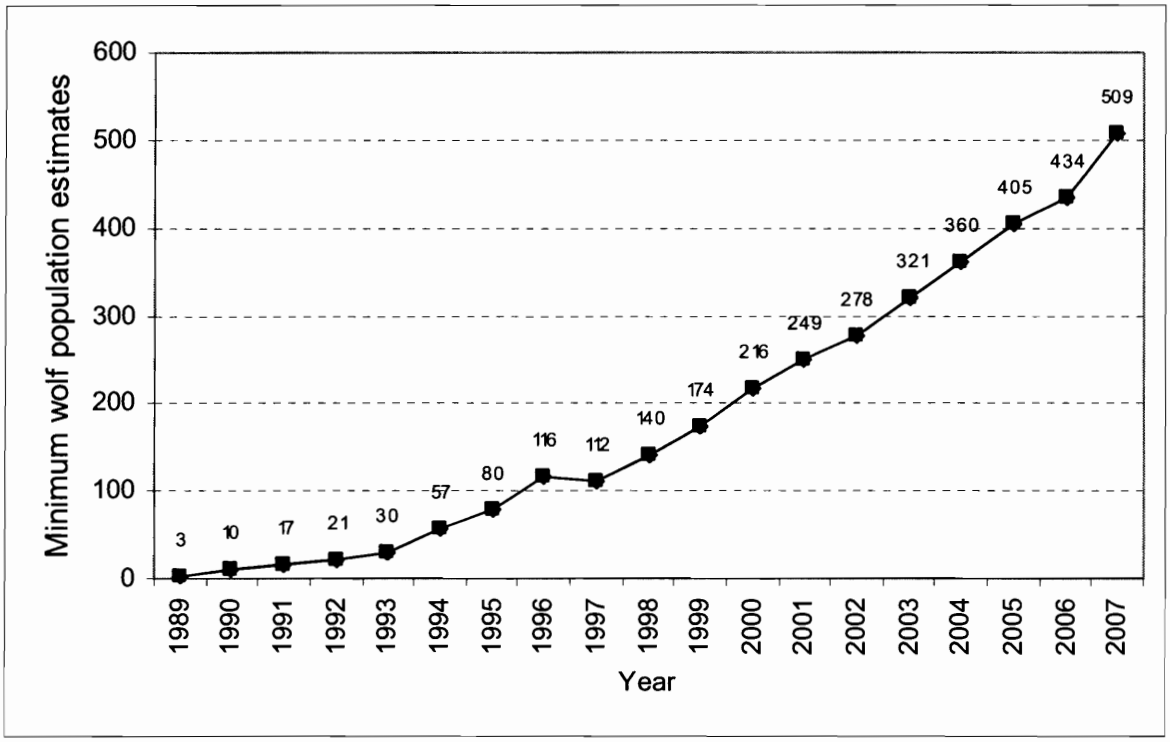

Figure 4.1. Minimum winter estimates of the number of wolves in Michigan's Upper Peninsula (excluding Isle Royale), 1989–2007.

Since 1989, wolves have been found in every county of the UP, but they have been absent from Keweenaw County (excluding Isle Royale) during some years. Wolf density has been higher in the western UP (approximately 12 wolves/1000 km^2 in 2005) than in the eastern UP (approximately 7 wolves/1000 km^2 in 2005) (Huntzinger et al. 2005). Wolves may not be able to

establish year-round territories in the deep-snow areas of the northern UP because of low deer densities during the winter (Potvin et al. 2005).

In October 2004, a wolf that had been captured and radio-collared in the eastern UP was captured and killed by a coyote trapper in Presque Isle County of the LP. This event represented the first verification of a wild wolf in the LP in at least 69 years. Tracks of two other wolves were found in the same vicinity of Presque Isle County in December 2004. However, winter track surveys during 2005, 2006 and 2007 failed to confirm the presence of any wild wolves in the LP.

4.3 Isle Royale

Wolves first appeared on Isle Royale in the late 1940s, when a wolf pair or two lone wolves crossed the ice from either Minnesota or Ontario (Mech 1966, Peterson 1995). There is no physical evidence that wolves occurred on the island prior to this period, but research on that topic has been limited. Wolves arrived on the island to find a substantial moose population, which became their primary food source. Formal monitoring of the moose and wolf populations began in 1958.

The wolf and moose populations on the island followed a pattern of dynamic fluctuations, wherein high moose numbers (particularly older moose) were followed by high wolf numbers. Wolves influenced moose numbers predominantly through the direct killing of calves and have remained the only consistent source of moose mortality on the island. The moose–wolf population patterns held until a dramatic crash occurred in the wolf population in the early 1980s, during which wolf numbers dropped from 50 to 14. Circumstantial evidence suggests the decline in wolf numbers was related to the introduction of canine parvovirus (Peterson 1995*a*, Kreeger 2003). Wolf reproduction progressively declined during 1985–1992 and numbers dropped to their lowest level (12 animals). During the next decade, the wolf population increased slowly. It reached 30 animals in 2005, and included the same number in 2006 (Peterson and Vucetich 2006). Recently, the moose population has declined to its smallest size since monitoring began. In 2007, the wolf population declined to 21 animals, most likely due to lack of food. (Vucetich and Peterson 2007).

Isle Royale was established as a national park in 1940, and protection of the native flora and fauna is the primary management goal for the area. Management of the Isle Royale wolf population is guided by National Park Service (NPS) policy and ongoing research. Scientists representing NPS management, wolf ecologists, disease and genetics experts, and conservation-biology specialists have agreed that the wolf population on the island should be allowed to proceed without intervention (including no introduction of new animals) while more research is conducted to better understand wolf ecology, population dynamics, and the causes of the population decline. The results of ongoing research will play a major role in determining future management options for the Isle Royale wolf population.

5. WOLF MANAGEMENT GOALS

The principal goals of this plan are fourfold: 1) maintain a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered; 2) facilitate wolf-related benefits; 3) minimize wolf-related conflicts; and 4) conduct science-based wolf management with socially acceptable methods.

To achieve those goals, the Michigan DNR must consider the complex interactions of many biological factors and implement measures that assure adequate protection and conservation of the species. At the same time, it must also address the many complex and often controversial social issues that accompany wolf management.

The public is highly polarized on wolf management, as evidenced by the tremendous amount of public input and litigation that has been associated with management decisions in the United States during the past 30 years. Stakeholder groups often have disparate or opposing views and needs regarding wolf management, and this plan reflects efforts to identify an appropriate balance among the biological needs of the species, the benefits wolves provide to some segments of society, the costs they impose on others, and the acceptability and feasibility of particular management methods. These elements reflected in the principal goals of this plan are discussed under the following headings.

5.1 Maintain a Viable Population

5.1.1 Definition of 'Viable Population'

The Michigan DNR is committed to maintaining a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered at either the State or Federal level. Therefore, the Michigan wolf population must exceed criteria used to define a viable population in the *Recovery Plan for the Eastern Timber Wolf* (USFWS 1992) and the *Michigan Gray Wolf Recovery and Management Plan* (Michigan DNR 1997).

The *Recovery Plan for the Eastern Timber Wolf* indicated: "A population of at least 200 wolves . . . is believed to be large enough to be viable, as well as to have sufficient genetic diversity, to exist indefinitely in total isolation from any other wolf population" (USFWS 1992:25). The 1997 *Michigan Wolf Recovery and Management Plan* adopted this definition of a viable isolated population as a criterion for wolf recovery in Michigan (Michigan DNR 1997). When the winter population maintained a minimum level of 200 animals for 5 consecutive years and the species was federally de-listed, wolves could be removed from the State list of threatened and endangered species.

The Michigan wolf population does not exist in isolation. Wolf movements among Minnesota, Wisconsin and Michigan are not uncommon (Mech et al. 1995, A. P. Wydeven, Wisconsin DNR, unpublished data, B. Roell, Michigan DNR, unpublished data), and those movements enhance intra-population genetic diversity and mitigate any adverse effects of demographic and environmental fluctuations. Therefore, a Michigan wolf population connected to other populations through occasional dispersal may require fewer than 200 animals to remain viable

(USFWS 1992). However, the recovery criterion of 200 wolves was adopted in the *Michigan Gray Wolf Recovery and Management Plan* to ensure the viability of the Michigan wolf population regardless of the biological status of wolves in other neighboring States and Provinces.

The minimum criterion of 200 wolves does not reflect the maximum number of wolves the available habitat in Michigan can support. Indeed, the winter population exceeded 200 wolves in 2000, and it grew each year between 2000 and 2007, at an annual average rate of 13% (see Figure 4.1). During the winter of 2007, an estimated 509 wolves lived in the UP. Based on estimates of deer density, one model estimated the UP could sustain between 590 and 1,330 wolves and the northern LP could sustain between 210 and 480 wolves (Potvin 2003).

The winter Michigan wolf population must exceed 200 animals to achieve the first stated goal of this plan. However, this minimum requirement is not necessarily sufficient to provide all of the ecological and social benefits valued by the public (see 5.2). Accordingly, 200 wolves is not a target population size. Management will be conducted to maintain the wolf population above the minimum size requirement and facilitate those wolf-related benefits while minimizing and resolving conflicts where they occur (see 5.3). This plan does not identify a target population size, nor does it establish an upper limit for the number of wolves in the State. As a result, public preferences regarding levels of positive and negative wolf–human interactions will strongly influence the extent to which wolf abundance and distribution exceed the minimum requirements for a viable population.

5.1.2 Need to Maintain a Viable Population

The Michigan DNR is committed to the conservation, protection, management, use and enjoyment of the State's natural resources for current and future generations. Since wolves have become re-established in Michigan, they have once again become an integral part of the natural resources of the State and have improved the natural functioning of Michigan ecosystems. In the context of the Michigan DNR's mission and its implicit public trust responsibilities for the State's wildlife, natural communities and ecosystems, the maintenance of a viable wolf population is an appropriate and necessary goal.

Maintenance of a viable wolf population also helps preclude the need for Federal reclassification of the species as threatened or endangered. Anything that warranted such a reclassification would be detrimental to not only the wolf population; it would also have negative consequences for the people of Michigan. A decline in the wolf population below a viable level would reduce opportunities for positive wolf-related interactions and other benefits derived by many residents. Moreover, regulatory restrictions associated with Federal reclassification would complicate and impede some efforts to address the needs of people who experience wolf-related conflicts. Therefore, maintenance of a viable population serves the best interests of wolves and the human residents of Michigan.

The most-recent public-attitude research shows most Michigan residents support the presence of a wolf population in the State. The format of the general-public survey coordinated by MSU in 2005 and 2006 allowed respondents to identify themselves as either interested or not interested in

wolf-related issues. When 'disinterested' respondents were removed from the analysis, the percentage of respondents who approved of having wolves in the State was 73% (52% in the UP, 71% in the northern LP, and 74% in the southern LP; Beyer et al. 2006). These results indicate that maintenance of a viable wolf population is supported by the vast majority of residents who feel they have an interest and stake in the management of wolves.

5.2 Facilitate Wolf-related Benefits

5.2.1 Benefits Valued by Michigan Residents

Many Michigan residents value the diverse benefits derived from the presence of wolves (Beyer et al. 2006). Many of those benefits fall within five general categories.

Ecology

As top predators, wolves fill an important ecological niche (Mech and Boitani 2003*b*) and are positive indicators of environmental health. Wolves can improve natural ecosystem function by controlling prey numbers, improving the overall health of prey populations, and increasing food available to scavengers (Mech 1970). In addition, they can help control populations of secondary predators and thus have indirect effects on many trophic levels (Paine 1966, Crabtree and Sheldon 1999; see 3.8 for additional information). Seventy-two percent of interested Michigan residents who responded to the most-recent public-attitude survey believed ecological benefits were a 'very' or 'somewhat' important reason to have wolves in Michigan.

Cultural and religious values

Wolves are a species of great significance to many Native Americans. Today, many Native American communities in Michigan value the return of Maahiingun (the wolf) as an intrinsic spiritual component in the reaffirmation and continued viability of their own cultural well-being. Many other people value wolves for reasons that are based on personal or religious convictions. Sixty-seven percent of interested survey respondents indicated at least moderate agreement with the statement: "Regardless of our laws, wolves have a right to exist in Michigan."

Interaction with nature

The presence of wolves in Michigan provides a unique opportunity for people to interact with and experience a particular component of the natural world. The opportunity to personally observe, photograph or study wolves in the wild may be restricted to a relatively small proportion of residents, but the option for those residents to have those experiences is highly valued by society. "People want to view, hear, photograph or study wild wolves in Michigan" was ranked by 60% of interested survey respondents as a 'very' or 'somewhat' important reason to have wolves in the State.

Personal appreciation

Independent of cultural or religious convictions, many people feel wolves have an 'existence value' and they value the knowledge that they exist as a healthy, thriving, wild population in the State. This benefit can be realized whether or not people are able to see or hear those animals. "There are people who appreciate wolves and want to know that wolves exist in Michigan" was ranked by 54% of interested survey respondents as a 'very' or 'somewhat' important reason to have wolves in Michigan.

Tourism and recreation

Forty-two percent of interested survey respondents felt the economic benefits of wolf-based tourism were a 'very' or 'somewhat' important reason to have wolves in Michigan. However, additional survey results suggested the full potential economic benefits were not being realized: the presence of wolves in an area would attract some respondents while deterring others, but more than half of respondents indicated the presence of wolves would not be a consideration when choosing a vacation area. Promotion of tourism and recreational opportunities associated with wolves might attract a greater number of people to local communities within wolf range and thus increase the economic benefits derived from the species.

5.2.2 Providing Benefits through Management

Public support is critical for the long-term viability of a wolf population (USFWS 1992, Wisconsin DNR 1999, Bangs et al. 1995, Minnesota DNR 2001, Boitani 2003, Fritts et al. 2003). The depth and extent of that support is partially influenced by the physical, spiritual, psychological, and economic benefits provided by the population (Slovic 1987). Thus, management that enhances opportunities for positive wolf-related experiences fosters public support for the population and thus serves the best interests of both wolves and the human residents of Michigan.

This plan identifies and supports measures to promote positive wolf-related interactions. Many benefits will be provided through the maintenance of a viable wolf population. Other benefits may be achieved through efforts to develop and promote opportunities for people to experience and appreciate wolves.

5.3 Minimize Wolf-related Conflicts

5.3.1 Need To Minimize Conflicts

Although the wolf population offers benefits as described above, it also poses significant costs and concerns for some Michigan residents (Beyer et al. 2006). These costs include losses of domestic animals, anxieties over the presence of wolves near residential or recreational areas, and concerns over the impact wolves may be having on populations of game species. Given the unequal distribution of wolves in the State and the nature of certain types of conflicts, all segments of society do not bear these costs equally; the presence of wolves represents a greater challenge for some groups of Michigan residents than others.

Left unaddressed, sources of conflict can foster the development of negative public attitudes toward wolves, and those negative attitudes can lead to adverse impacts on wolf distribution and abundance. Indeed, negative public perception of wolves was the primary reason they were historically threatened with extinction in many areas (Mech 1970, Beaufort 1987, Thiel 1993). Negative perceptions, manifesting themselves in the form of widespread killing, nearly eliminated the species from the contiguous United States.

As stated previously, public support is critical for the long-term viability of a wolf population (USFWS 1992, Wisconsin DNR 1999, Bangs et al. 1995, Minnesota DNR 2001, Boitani 2003, Fritts et al. 2003). The risk and frequency of conflicts still influences human views and tolerance of wolves (e.g., Huber et al. 1992, Mishra 1997), and public support for a population of any large predator depends, in part, on confidence that conflicts will be resolved in a timely and effective manner (Frost 1985, Wolstenholme 1996, Beyer et al. 2006). Such resolution would allow people to tolerate greater abundance and distribution of wolves on the landscape (Bangs et al. 1995, Mech 1995, Boitani 2003, Fritts et al. 2003, Mech and Boitani 2003*a*). By contrast, a failure to address conflicts could foster negative attitudes that lead to adverse impacts on wolf distribution and abundance. Thus, effective management of wolf-related conflicts assists affected stakeholders and the wolf population as a whole.

Most Michigan residents recognize the importance of addressing wolf-related conflicts (Beyer et al. 2006). The most-recent public-attitude survey showed at least 76% of interested respondents would support some type of active wolf management to address strong public concerns regarding human-safety risks posed by wolves. At least 75% percent of interested respondents would support active management in areas experiencing high levels of wolf depredation of livestock, hunting dogs and other pets. At least 65% of interested respondents would support active management if evidence showed wolves significantly lowered the number of deer available for hunting in a particular region.

5.3.2 Effective Conflict Management

Setting numeric goals for wolf abundance at large geographic scales (e.g., the entire State, the entire UP) may not be necessary or effective for addressing most wolf-related conflicts. Broadly based abundance goals may not reflect the unequal distribution of wolf habitat, human activity and the potential for positive and negative interactions in local areas. Moreover, wolf numbers alone do not necessarily predict the frequency of certain types of interactions. In an area of abundant natural prey and few human residences, for example, a large number of wolves could cause a relatively low level of negative interactions. Conversely, a small number of wolves could create an unacceptably high level of negative interactions in local areas where natural prey is scarce or where human population density is high. Management driven by broad numeric abundance goals would not necessarily reduce negative interactions, could unacceptably restrict positive interactions desired by the public, and could promote an inaccurate public perception regarding the relationship between wolf numbers and the risk of conflict.

Previous management experience indicates most wolf-related conflicts can be best handled on an individual basis. Conflicts in local areas are often caused by the behavior of a few individual wolves, and management at small scales can often address problems effectively. Therefore, this

plan does not set broad numeric abundance goals for the purpose of managing most conflicts. To the extent it is expected to be effective and logistically feasible, management under this plan will be conducted to prevent and minimize conflicts on a case-by-case basis.

5.4 Conduct Science-based and Socially Acceptable Management

Science allows managers to predict consequences of particular management actions. It is thus a tool of primary importance for identifying those actions that could effectively achieve particular wildlife management goals. The importance of using sound science when making wildlife management decisions is formalized in the Michigan Natural Resources and Environmental Protection Act (Part 401 of Public Act 451 of 1994).

Science can identify probable outcomes of particular management approaches, but as an objective process, it does not prescribe subjective values to those outcomes. Rather, the desirability or acceptability of any outcome depends on the values of affected stakeholders. Moreover, when disagreements originate from differences in values rather than questions of fact, consideration of the available science alone will not be sufficient to resolve conflict. Consequently, a process of social deliberation is often necessary to determine which science-based management approaches are acceptable to individual stakeholder groups and society at large.

This plan outlines approaches for managing many wolf-related issues. These approaches were chosen, in part, based on scientific evaluation of their potential impacts to the wolf population, their feasibility, and their probability of success. In addition, they were chosen because they appear to be acceptable to most Michigan residents. They are not expected to satisfy everybody; indeed, satisfying everybody with any single wolf management approach is not possible. However, the approaches outlined in this plan were supported by a majority (often a strong majority) of interested respondents to the most-recent public-attitude survey (Beyer et al. 2006), and they directly reflect the guidance collectively offered by the diverse interests represented on the Michigan Wolf Management Roundtable.

6. WOLF MANAGEMENT STRATEGIES

The following wolf management strategies will be implemented to achieve the principal goals of this plan. They provide guidance for the management of several wolf-related issues at the strategic level; they do not outline operational details of wolf management in Michigan. Operational details will be specified within an adaptive-management framework, in which specific management methods are routinely adjusted and updated as local conditions, technology, and feasibility of individual management techniques change.

The ensuing headings indicate strategic goals (in bold; e.g., **6.1**), objectives (underlined; e.g., 6.1.1) and actions. They partition broad needs into manageable segments, and thus provide a structure for addressing individual management issues.

6.1 Increase Public Awareness and Understanding of Wolves and Wolf-related Issues.

Researchers, managers and stakeholder groups generally agree an informed public is important for successful wolf conservation and management (Fritts et al. 2003). State and Federal wolf plans (e.g., USFWS 1992, Michigan DNR 1997, Wisconsin DNR 1999) frequently identify education and outreach as a high priority. At the series of wolf-focused public meetings hosted by the Michigan DNR in May 2005, a large proportion of public comments underscored the need for an effective information and education program focused on wolves.

Although the need for an effective wolf-based education program is widely recognized, development of such a program is not a simple task. Strong public opinions, the controversial nature of many issues, and other barriers present agencies and other education partners with several challenges.

Wolves, perhaps more than any other wildlife species, tend to elicit strong emotions among stakeholder groups and the general public (Meadow et al. 2005), and personal views of wolves are often based on core beliefs, which are resistant to change (Fulton et al. 1996). Therefore, the presentation of information alone is not always effective at influencing personal perceptions and opinions (Meadow et al. 2005). Moreover, individuals tend to selectively accept and recall information that is consistent with their existing attitudes (Olson and Zanna 1993, Petty et al. 1997). Similarly, people may interpret new information in ways that support their existing attitudes (Petty et al. 1997).

Another challenge of a wolf-based education program is to present information that is not biased toward a particular point of view. Fritts et al. (2003: 297) cautioned that "there are important and critical differences between objective wolf education and wolf advocacy or activism." Different groups may find difficulty agreeing on the focus of an education program, or even on the facts to be presented, because ethical and subjective values are often involved. However, the presentation of accurate, unbiased information is especially important when education is used as a tool to help resolve wolf-related conflicts among stakeholders.

A third challenge involves popular presentations of wolf-related issues. Controversy tends to receive attention, and the public may receive inaccurate or exaggerated impressions of the extent of wolf-related conflicts (Mech 1995, Bangs and Fritts 1996). In addition, misinformation can spread quickly through a variety of media.

An additional challenge to development of an effective education program has been a lack of agency resources. Although the Michigan DNR has engaged in several wolf education and outreach activities during the past several years (Beyer et al. 2006), it has lacked sufficient staff with the educational expertise necessary to develop and implement a comprehensive wolf-based education program.

The following objectives have been identified to help overcome many of the challenges identified above. To the extent the objectives are achieved, public awareness and understanding of wolves and wolf-related issues are expected to increase.

6.1.1 Coordinate with management partners to develop and implement a wolf-based information and education program.

Coordinating an education program in cooperation with management partners (e.g., other agencies, tribes and private organizations) is the most-effective way to overcome many challenges and barriers. Coordination can help identify target audiences, information needs, and the educational approaches that may be most effective. Partnership with multiple organizations and stakeholder groups can also lend credibility to educational materials and help ensure those materials present unbiased, accurate information. A coordinated program that involves the media can foster the presentation of accurate information to broad audiences.

Coordination also facilitates the involvement of partners who possess the expertise and resources necessary to develop and implement an effective program. Therefore, it can accelerate the development and distribution of educational materials that address the specific needs and interests of particular target audiences. It can also facilitate the organization of wolf-based events and programs, and thus expand opportunities for people to personally experience and appreciate wolves. In these ways, a coordinated education program can maximize the available tools and opportunities for increasing public awareness and understanding.

Actions:

1. Work with management partners to identify target audiences and information and educational needs.

2. Work with management partners to develop and distribute materials that address the needs and interests of target audiences.

3. Work with management partners to develop and deliver presentations that address the needs and interests of target audiences.

4. Work with management partners to coordinate wolf-based programs and events.

5. Work with media to present accurate information to broad audiences.

6. When prudent, invite public and media participation in wolf-related projects.

7. Support efforts of management partners to provide positive wolf-related experiences.

6.1.2 Provide timely and professional responses to information requests.

Providing prompt and professional responses to information requests is one way to increase individual understanding, dispel misconceptions, and generate support for wolf management efforts. A clear process for responding to information requests will facilitate efforts to achieve this objective.

Actions:

1. Increase public awareness regarding where to find and request information regarding wolves.

2. Refine procedures for responding to a broad range of information requests.

3. Train staff on response procedures.

6.1.3 Support training opportunities for staff and management partners involved in the wolf-based information and education program.

Agencies and other management partners can provide the public with accurate information only to the extent they understand wolf-related issues themselves. Therefore, opportunities for personnel to attend regional wolf management meetings, to participate in training, and to review relevant scientific publications are important for an effective education program.

Actions:

1. Provide staff with the training and information resources necessary for effective participation in the information and education program.

2. Share information with management partners to facilitate understanding of current wolf-related issues.

6.1.4 Evaluate the effectiveness of the wolf-based information and education program.

During recent decades, much attention has been given to wolves through a variety of media. Publication of wolf-related research in scientific literature has become increasingly common (Fritts et al. 2003). Conservation organizations and centers have focused on educating the public about wolves. In addition, numerous websites, books, documentaries, magazines and other media reports have provided the public with information on wolves. The Michigan DNR has engaged in several wolf education and outreach activities (Beyer et al. 2006).

Despite the great availability of information, the general public still holds many misconceptions about wolves. Mertig (2004) found that Michigan survey respondents generally had poor knowledge of wolves, noting that public understanding had not improved significantly during the 12-year period following re-establishment of the wolf population in the UP. The persistence of misconceptions and lack of knowledge in the face of abundant information underscores the need to evaluate the effectiveness of any education program.

Action:

1. Work with partners to develop and implement methods to evaluate the information and education program.

6.2 Maintain Active Research and Monitoring Programs to Support Science-based Wolf Management.

As wide-ranging and often controversial components of a large and complex Great Lakes ecosystem, wolves present many complicated management challenges. As a result, the role of science is especially important in the management of the species. Management decisions can have serious biological and social consequences and are often scrutinized by affected stakeholders. To conduct responsible management and earn credibility among the public, agencies must make decisions that are scientifically defensible.

Wolf management in Michigan has regularly benefited from research and management experience from other parts of the world. However, wildlife managers in Michigan cannot always rely on work conducted elsewhere due to differences among local biological and social environments. For example, the experiences of managing wolves in Alaska, Canada or Italy are not always readily applicable to Michigan on account of differences in human density, infrastructure, habitat, wildlife communities, regulations, and public attitudes. In addition, the management environment changes constantly, and scientific information must be regularly updated to reflect current conditions.

In many instances, the Michigan Wolf Management Roundtable felt the available science was inadequate to guide its recommendations for wolf management. For example, the Roundtable identified needs for more research regarding the interactions between wolves and humans, the dynamics of wolf–ungulate systems, management options to address wolf-related conflicts, and the relationship between wolf population size and wolf-related conflicts. As a result, the Roundtable recommended that the Michigan DNR place a high priority on wolf-related research.

The following objectives and actions address the need to maintain active wolf research and monitoring programs in Michigan. These programs will investigate and integrate the biological and social questions associated with wolf management and thus improve the ability of wolf managers to make decisions that are based on sound science.

6.2.1 Monitor the abundance of wolves in Michigan.

To determine whether the population remains viable in the absence of Federal protection, the USFWS will use data collected by State agencies and other partners to closely evaluate the status of wolves in the western Great Lakes Distinct Population Segment during the first 5 years after Federal de-listing. Annual estimates of wolf abundance will facilitate the evaluations during the 5-year period. After that period, the frequency and/or necessary precision of wolf abundance estimates may change depending on the type of management actions implemented and the relative size of the wolf population.

As a document that offers guidance at the strategic level, this plan does not outline the operational details of wolf population monitoring. Those details are available on the Michigan DNR website (www.michigan.gov/dnr) and will be updated as data needs, technology, and other aspects of management context change.

Actions:

1. Estimate wolf abundance each year for at least 5 years after Federal de-listing.

2. After wolves in Michigan have been federally de-listed for 5 years, assess the frequency and intensity of wolf abundance monitoring necessary to support the wolf management program.

3. Conduct monitoring to assess wolf presence in the northern LP.

6.2.2 Monitor the health of wolves in Michigan.

In Michigan, wolves have been or could be affected by several diseases and parasites (see 6.6 for additional information). Exposure to some diseases and parasites is continuous, and the wolf population has had the opportunity to develop individual or collective immunity to some of the more-common agents over time (Gillespie and Timoney 1981). Other diseases and parasites can be significant sources of mortality for wolves, but they are generally not considered to be limiting at the population level. In general, diseases and parasites are not expected to threaten the long-term viability of the wolf population (Kreeger 2003). However, the Michigan DNR will continue to monitor their prevalence and their impacts on Michigan wolves. Approaches for monitoring wolf health are outlined under 6.6.1.

6.2.3 Investigate biological and social factors relevant to wolf management.

Recent wolf research often focused on factors associated with the biological recovery of the species. As a result, many important biological and social questions regarding wolf management after recovery remain unanswered. An active wolf research program in Michigan could help answer these questions by focusing on two broad areas: 1) wolf ecology and the biological impacts of particular management approaches; and 2) attitudes of Michigan residents toward wolves and their management.

Actions:

1. Determine wolf population responses to selected management options.

2. Investigate the relationships between wolf and prey populations.

3. Periodically monitor public attitudes on wolves and investigate factors that influence public tolerance for wolves.

4. Assess public responses to selected wolf management practices (e.g., information and education activities, depredation-control measures).

6.2.4 Coordinate with partners to support a wolf research program.

In Michigan, an established network of research partners works in a coordinated manner to investigate questions regarding wolves and their management. Although these partners effectively conduct many types of research, the expertise required to investigate particular questions may sometimes be found in agencies, organizations and institutions outside the established network. Accordingly, the network will continue to expand to ensure the best possible expertise is applied to particular research questions.

In addition to allowing application of the best available expertise, coordination with research partners increases the funding and staff that are potentially available to support wolf research. Funding and staff available to the Michigan DNR alone are not sufficient to study all the important questions related to wolves. Thus, collaboration with a greater number of partners could accelerate the rate at which those questions are answered.

Actions:

1. Expand and maintain cooperative relationships with agencies, organizations and institutions interested in investigating biological, ecological and social questions regarding wolves and their management.

2. Seek funding from additional sources to complement agency contributions.

6.3 Enact and Enforce Regulations Necessary to Maintain a Viable Wolf Population.

Legal protection under Federal and State regulations was a key component in the recovery of wolves in Michigan and other areas of the Midwest. Although protection of Michigan wolves under the Federal Endangered Species Act is no longer warranted (USFWS 2007), legal protection remains necessary to help ensure the long-term persistence of a viable population. The following objectives focus on providing adequate legal protection, informing the public on regulations, and investigating and penalizing wolf-related violations.

6.3.1 Ensure adequate legal protection for wolves.

Options for general protection under State regulations involve designation of wolves as endangered, threatened, game, or protected animals. Any of those four designations would prohibit a person from taking (which includes killing or otherwise harming), selling or purchasing wolves, except under permit, license, or certain specified conditions. The Michigan Natural Resources Environmental Protection Act (Public Act 451 of 1994) defines each of those designations as follows.

'Endangered species means any species of fish, plant life, or wildlife that is in danger of extinction throughout all or a significant part of its range, other than a species of insecta determined by the [Michigan DNR] or the secretary of the United States [D]epartment of the [I]nterior to constitute a pest whose protection . . . would present an overwhelming and overriding risk to humans.'

'Threatened species means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'

'Game' is defined as a list of species that currently hold that designation. The definition does not reference permissible and restricted activities associated with such a designation. Game-animal status allows but does not require the establishment of a regulated harvest season.

'Protected animal means an animal or kind of animal designated by the [Michigan DNR] as an animal that shall not be taken.'

Wolves in Michigan have surpassed State recovery criteria, and their classification as State endangered or threatened is no longer appropriate. Designation of game-animal status in Michigan would require action by the State Legislature and is therefore outside the authority of the Michigan DNR. The Michigan DNR does have the authority to amend the Wildlife Conservation Order to designate wolves as protected animals. In the event wolves would not be designated as either endangered, threatened or game animals, the Michigan DNR would use that authority to designate them as protected animals and avoid a lapse in legal protection for the species.

Other regulations could protect the wolf population in more-specific ways. For example, in recent years, the coyote season has been closed in the UP and the northern LP during the November 15–30 firearm season to help prevent the killing of wolves misidentified as coyotes. This restriction and other regulations will be reviewed, modified or enacted as necessary to provide the wolf population with appropriate levels of protection.

Actions:

1. Remove wolves from the Michigan list of threatened and endangered species, provided the Michigan wolf population continues to exceed criteria that have been used to define biological recovery (USFWS 1992, Michigan DNR 1997).

2. Re-classify wolves as endangered or threatened under State regulations if population size declines to 200 or fewer wolves.

3. Review, modify and enact regulations, as necessary, to ensure appropriate levels of protection for the wolf population.

4. If necessary to avoid a lapse in legal protection, amend the Wildlife Conservation Order to designate wolves as a protected animal.

6.3.2 Inform the public on regulations pertaining to wolves.

The Federal and State legal classifications of wolves changed four times from April 2003 through March 2007. Wolf legal status may continue to change beyond the finalization of this plan. Frequent regulation changes can create public confusion regarding permissible and

prohibited activities. Public education on prevailing regulations could help reduce such confusion and prevent inadvertent violations.

Actions:

1. Increase public awareness regarding where to obtain information on wolf regulations.

2. Provide the public with information on wolf regulations as part of a wolf-based information and education program (see 6.1.1).

6.3.3 Investigate and penalize violations of wolf regulations.

A person who commits a violation regarding the possession or taking of most wildlife species with any of the four legal designations described in 6.3.1 (i.e., endangered, threatened, game, protected) is guilty of a misdemeanor punishable by imprisonment for not more than 90 days, or a fine of not less than $100 or more than $1,000, or both. Penalties for violations involving game and protected animals also include the costs of prosecution and loss of hunting privileges during the remainder of the year of conviction and the next three succeeding calendar years.

Penalties for a first offense involving the illegal sale or purchase of most endangered, threatened, game or protected animals are the same as those described in the preceding paragraph, except that a minimum fine is not required for a game or protected animal violation. Each subsequent offense involving the illegal purchase or sale of a game animal or a protected animal is a felony.

In addition, a person convicted of illegally killing, possessing, selling or purchasing an endangered, threatened, game or protected animal must reimburse the State for the value of the animal as established under State law. Reimbursable values are $1,500 per threatened or endangered animal, $100–500 per animal of most game-animal species, and $100 per animal of most protected-animal species.

Penalties and reimbursable values associated with some game and protected animals (deer, bear, wild turkey, moose, elk, hawk and owl) have been set higher than those described above for biological or social reasons. Penalties for wolf-related violations could be elevated in similar ways regardless of whether wolves are designated as endangered, threatened, game or protected animals. Penalties are established by the State Legislature.

To help deter wolf-related crimes, the Michigan DNR will make its best efforts to investigate violations and to pursue the appropriate penalties based on available evidence. Achieving this objective will require an efficient system for receiving and directing reports of violations, clear investigation procedures, and adequate training of staff.

Actions:

1. Increase public awareness regarding where to report suspected violations of wolf regulations.

2. As necessary, update and refine procedures for investigating violations of wolf regulations.

3. Train field staff on investigation procedures.

4. As appropriate, issue and pursue penalties for violations of wolf regulations.

6.4 Maintain Sustainable Populations of Wolf Prey.

Wolves prey on a variety of wildlife species (see 3.6 for additional information), and the importance of particular species as wolf food sources often varies seasonally and geographically (Voigt et al. 1976, Fritts and Mech 1981, Potvin et al. 1988, Fuller 1989, Mech and Peterson 2003). In Michigan, the primary prey for wolves during winter is white-tailed deer (Huntzinger et al. 2004), and maintenance of an adequate deer herd is necessary for the long-term persistence of a viable wolf population. Other prey, such as beaver, snowshoe hare and other small animals, are an important complement to deer in the diet of Michigan wolves (Huntzinger et al. 2004).

Many Michigan residents view the natural dynamics of wolf–prey relationships in a positive way (Beyer et al. 2006). Seventy-two percent of interested Michigan residents who responded to the most-recent public-attitude survey believed a 'very' or 'somewhat' important reason to have wolves in Michigan was reflected by the following statement: "As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations."

Despite general appreciation for the ecological role of wolves, some Michigan residents are concerned about the impacts of wolves on populations of deer and other wildlife (Beyer et al. 2006). They are concerned wolf predation may have adverse ecological consequences by reducing wildlife populations below sustainable levels. Some residents are also concerned wolf predation will reduce opportunities for hunting, trapping and other wildlife-based benefits.

The following objectives address the need to ensure the persistence of healthy wildlife populations that simultaneously provide adequate prey for wolves and sustainable benefits to humans.

6.4.1 Maintain prey populations required to sustain a viable wolf population.

Several studies have estimated the average number of deer killed per year by individual wolves. Some research indicates an individual wolf may kill roughly 15–19 deer per year (Mech 1971, Keith 1983, Fuller 1989), whereas other research indicates a single wolf may kill as many as 37–50 deer per year (Pimlott 1967, Huntzinger et al. 2004). Some amount of scientific uncertainty accompanies each of these estimates. This uncertainty derives from limitations of particular estimation techniques as well as geographic and temporal variability in kill rates. Additional research is necessary to refine estimates of the numbers of deer killed by wolves in Michigan.

Regardless of whether the average kill rate occurs at or even somewhat above the high end of the existing estimates, the deer herd in Michigan exceeds the size required to support the wolf population. Based on the higher estimated kill rates, a population of 509 wolves, as estimated to

occur in Michigan during late winter in 2007, could kill roughly 19,000–25,000 deer per year, which would have been roughly 6–7% of the estimated (2006) UP deer herd. Given this situation, deer availability is not expected to become a limiting factor for the wolf population, even if wolf numbers and deer numbers undergo significant inverse fluctuations.

Management activities that maintain deer and other prey at numbers similar to those that occurred in the UP during the past decade would continue to ensure a prey base that is more than adequate to sustain a viable wolf population. These management activities will be planned and implemented at several geographic scales (e.g., statewide, management unit, and deer management unit).

Action:

1. Ensure management of deer and other prey populations at multiple geographic scales addresses the need to provide sufficient food for wolves.

6.4.2 Maintain prey populations to provide for sustainable human uses.

Wolf–prey interactions are dynamic and complex. They are influenced by many factors, including the relative densities of wolves and prey, the responses of both wolves and prey to fluctuations in prey densities, and the effects of environmental conditions on wolves and prey (Mech and Peterson 2003). Each of these factors varies geographically and temporally, and the impacts of wolves on prey populations depend on local conditions. In some situations, wolves may significantly reduce local prey populations, whereas in others, the impact may be negligible (Mech and Peterson 2003). Thus, there is no general answer to the question of how wolves affect prey densities.

Prey and predators coevolved. As a result, prey possess physical and behavioral adaptations for avoiding predation (Mech and Peterson 2003). Adaptive behavioral shifts that cause deer to become more elusive to predators also may reduce deer sightability by humans and contribute to a public perception that deer populations have been heavily impacted by wolf predation. Despite these common perceptions, however, the efficacy of such adaptations generally allows prey populations to be sustained, even in areas with robust predator populations.

Although measurable impacts on prey populations can occur in localized areas, wolves are probably not causing significant reductions in the overall number of deer in the UP. Based on existing kill-rate estimates and recent population estimates, wolves annually kill only a small proportion of the UP deer herd (see 6.4.1 for additional information). Predation by wolves is a lesser source of mortality compared to the mortality collectively caused by other factors, such as vehicle collisions, hunter harvest, non-wolf predation, starvation and disease. Moreover, wolf predation may be compensatory to those other sources of mortality. In other words, mortality caused by predation may often replace mortality that would have otherwise occurred. Evidence that wolves tend to kill weak, sick or otherwise vulnerable individuals supports the notion that wolf predation is at least partially compensatory (Mech and Frenzel 1971, Fritts and Mech 1981, Huntzinger et al. 2004), but the extent of such compensation in wolf–deer systems is unknown.

Additional research is necessary to assess the compensatory nature of predator-induced deer mortality in Michigan.

Given relative wolf and prey densities, existing wolf kill-rate estimates, and the reduced impacts of wolf predation due to compensatory mortality, wolves do not pose a significant threat to the sustainability of prey populations in Michigan, nor are they expected to significantly reduce the number of deer and other prey available for public harvest or other human uses. The Michigan DNR will continue to manage the deer herd in a sustainable manner and take appropriate steps to ensure opportunities for public harvest of deer and other prey species. In addition, it will work with partners to educate the public about the ecological role of wolves and to further research the dynamics of wolf–prey interactions.

Actions:

1. Manage white-tailed deer in a sustainable manner to yield healthy fawns, does and bucks without negatively impacting habitat, other wildlife species, or creating undue hardship to private interests.

2. Conduct management activities to provide for public harvest of deer and other prey species.

3. Provide the public with information on wolf–prey interactions and the impacts of wolves on prey populations as part of a wolf-based information and education program (see 6.1.1).

4. Support research to investigate wolf–prey interactions and the impacts of wolves on prey populations (see 6.2.3).

6.5 Maintain Habitat Necessary to Sustain a Viable Wolf Population.

Wolves occupy a broad range of habitat types and do not require wilderness areas, as previously believed (Mech 1995). The suitability of any particular habitat is generally related to the availability of ungulate prey and the extent to which human-caused mortality can be avoided (Fuller 1995; see 3.8 for additional information).

Road density has been used as an index of wolf–human contact and appears to be related to illegal and accidental killing of wolves (Mladenoff et al. 1995). Using models that incorporated measures of deer density and/or road density, researchers recently estimated that approximately 11,000 square miles of suitable wolf habitat occurred in the UP (Mladenoff et al. 1995, Potvin et al. 2005) and approximately 1600–3,000 square miles of suitable habitat occurred in the LP (Gehring and Potter 2005, Potvin 2003).

The current amount of available wolf habitat is expected to be sufficient to allow the long-term persistence of a viable wolf population. Moreover, the amount of suitable habitat is expected to remain adequate into the foreseeable future. Based on an assessment of several factors, including land ownership and stability of protection, rates of land-use conversion, and changes in

human and road density, Hearne et al. (2003) predicted the suitable habitat expected to be available in Michigan and northern Wisconsin in 2020 would be sufficient to maintain a viable population.

To ensure the continued availability of sufficient habitat, management will focus on three areas: 1) maintaining habitat necessary to sustain adequate levels of wolf prey; 2) maintaining wolf habitat linkages; and 3) minimizing disturbance at known active wolf den sites.

6.5.1 Maintain habitat necessary to sustain adequate levels of wolf prey.

As stated previously, prey availability strongly influences the suitability of an area for wolves. Therefore, many wolf habitat needs will be met through the maintenance of habitat for sufficient levels of wolf prey, primarily white-tailed deer. Approaches for managing prey populations are outlined under 6.4 (Maintain Sustainable Populations of Wolf Prey).

6.5.2 Maintain habitat linkages to allow wolf dispersal.

Wolf recovery in the UP began with immigration of wolves from Minnesota, Wisconsin and Ontario (Thiel 1988, Mech et al. 1995). Migration and gene flow among these areas help to preserve or enhance genetic diversity within populations and to mitigate the detrimental effects of random demographic fluctuations and environmental catastrophes (Simberloff and Cox 1987, Boitani 2000). Thus, continued movement of wolves within and among jurisdictions will help ensure the long-term viability of the wolf population.

Wolves are effective dispersers (Forbes and Boyd 1997), and existing habitat linkages among the UP, Wisconsin and Minnesota appear to be adequate to allow long-distance movements. Between the early 1990s and 2006, researchers documented the movements of at least 14 marked wolves between the UP and either Minnesota or Wisconsin (Mech et al. 1995, B. Roell, Michigan DNR, unpublished data). In addition, there is evidence that wolves have moved between the eastern UP and Ontario (Jensen et al. 1986, Thiel and Hammill 1988).

The types of landscape features that represent barriers to wolf movements are poorly understood. Long-distance movements of wolves through human-dominated landscapes in Minnesota and Wisconsin suggest highways and roads are not barriers (Mech et al. 1995, Merrill and Mech 2000). Wolves are capable of traveling through crop and range land (Licht and Fritts 1994, Wydeven et al. 1998). They can also cross ice-covered lakes and rivers (Mech 1966) as well as unfrozen rivers during the summer (Van Camp and Gluckie 1979). However, a series of linear obstacles, such as a river flanked by roads, railways and disturbed habitat, may act synergistically and be more of a barrier to wolf movements (Blanco et al. 2005). Jensen et al. (1986) suggested areas of human settlement along the St. Mary's River were barriers to dispersing wolves, but some wolves have been able to pass through or around those areas (Mech et al. 1995).

Although few natural or artificial landscape features may absolutely prevent wolf dispersal, maintenance of habitat linkages across the landscape may facilitate regular exchange of individuals and genetic material among areas. The amount and distribution of public wild lands

in Minnesota, Wisconsin, Michigan and Ontario may facilitate efforts to conserve habitat linkages within the region.

Action:

1. Cooperate with Federal, State and tribal agencies and private landowners to identify and protect wolf habitat linkage zones.

6.5.3 Minimize disturbance at known active wolf den sites.

Wolves dig or otherwise establish sheltered dens to provide early protection for young pups. Early studies (Joslin 1967, Stephenson 1974, Allen 1979) suggested human disturbance can cause den abandonment or movements to new dens. Wydeven and Schultz (1993) documented possible abandonment of dens in Wisconsin as a result of nearby road construction and logging activity. However, some wolves have been tolerant of human disturbances, even denning near logging sites, open-pit mines, garbage dumps, moss harvesters and military firing ranges (Thiel et al. 1998).

The 1997 *Michigan Gray Wolf Recovery and Management* Plan recommended the seasonal protection of den sites. However, den sites are dynamic, often changing from year to year and even during the same year (Mech and Boitani 2003*b*). As a result, the detection of these areas is difficult, and only a small percentage of den sites have been identified in any given year. Although identified den sites have been protected during active use, most sites were not identified and did not receive active protection. The general lack of protection at most sites did not appear to hinder the recovery of the wolf population, and disturbance at den sites is not considered to be a significant threat.

The Michigan DNR does not plan to conduct systematic searches for wolf den sites. However, it will minimize management-related disturbance near the active den sites (i.e., sites currently used by wolf pups) that are identified on the land it manages. The agency will also work with management partners to help minimize disturbance near sites on other properties.

Actions:

1. Consider known active den sites during compartment reviews and other Michigan DNR management efforts.

2. Minimize management-related disturbance near known active den sites on land managed by the Michigan DNR.

3. Work with management partners to help minimize disturbance near known active den sites on other properties.

6.6 Monitor and Manage Adverse Effects of Diseases and Parasites on the Viability of the Wolf Population.

Michigan wolves have been or could be affected by a variety of diseases, including those caused by viruses (e.g., canine distemper, canine parvovirus, rabies), bacteria (e.g., Lyme disease,

leptospirosis, tularemia) and fungi (e.g., blastomycosis), as well as both internal (e.g., canine heartworm and intestinal worms of various species, echinococcosis) and external (e.g., sarcoptic mange, lice, ticks) parasites.

On account of their taxonomic and physiologic similarities, wolves and domestic dogs are susceptible to many of the same diseases. Moreover, in all but the most-remote areas of Michigan, wolves face virtually continuous exposure to some of these diseases (e.g., distemper, parvovirus) which cycle through the dog population. Others are enzootic in the wolf population itself (e.g., sarcoptic mange, echinococcosis), in prey (e.g., tularemia), or in the environment (e.g., *Blastomyces*). Consequently, the wolf population has had the opportunity to develop individual and collective immunity to some of the more-common agents over time, which in some cases can be lifelong and conferred to offspring through maternal antibodies (Gillespie and Timoney 1981). Although these established diseases can be significant sources of mortality for wolves, they are generally not considered to be limiting at the population level. Despite evidence of ubiquitous exposure, affected wolf populations demonstrate good recruitment, suggesting long-term stability of a robust Michigan population is likely to remain unaltered by these diseases (Kreeger 2003).

The following objectives and actions focus on monitoring the prevalence and effects of wolf diseases and parasites and on assessing the most-appropriate approach for managing their impacts.

6.6.1 Monitor the health of wolves in Michigan.

Wolf health will be monitored through necropsies of dead wolves and analysis of biological samples from captured live wolves. Necropsies provide information on condition, age, reproductive status, food habits, and cause of death, as well as the geographic distribution and prevalence of diseases and parasites. Analysis of biological samples such as blood, feces, and skin scrapings provide similar information on diseases and parasites. The Michigan DNR will continue to conduct these analyses at its Wildlife Disease Laboratory. In addition, the Michigan DNR will collaborate with researchers interested in studying wolf diseases and parasites.

Actions:

1. As necessary, update and refine procedures for collecting, submitting, and storing information on carcasses and biological samples.

2. Train field staff on collection and submission procedures.

3. Conduct necropsies and analyses of dead wolves and biological samples, respectively.

4. Work with management partners to develop and conduct studies of wolf diseases and parasites.

6.6.2 Assess the need to manage diseases and parasites in the wolf population.

In most cases, treatment of diseases and parasites in free-ranging wolves is not practical. Prior to 2004, wolves captured in Michigan for research purposes were administered vaccinations for canine distemper and parvovirus and were treated for sarcoptic mange. These procedures may have reduced the amount of natural mortality that would have otherwise occurred in the Michigan sample (although objective assessment of any such effect was essentially impossible). Discontinuing vaccination and treatment as part of handling procedures has eliminated this source of bias and has recently allowed more-accurate estimations of natural mortality.

At present, diseases and parasites do not pose a significant threat to the Michigan wolf population. With the exception of euthanizing wolves observed to be suffering from serious detrimental effects of infection, active management of diseases and parasites in the wolf population is not currently warranted or recommended. Thus, vaccinations are not expected to resume. However, if wolf-health monitoring indicates that diseases and parasites someday pose a significant threat to the wolf population, managers will evaluate options for more-active management.

Action:

1. Continue to evaluate the feasibility and need for vaccinations of captured and free-ranging wolves.

6.7 Achieve Compatibility between Wolf Distribution and Abundance and Social Carrying Capacity.

A principal goal of this plan is to maintain a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered. Therefore, the Michigan wolf population must exceed criteria that have been used to define biological recovery (USFWS 1992, Michigan DNR 1997). However, the minimum requirement to preclude listing is not necessarily sufficient to provide all of the ecological and social benefits valued by the public. Accordingly, management will be conducted to maintain the wolf population above the minimum size requirement and facilitate those wolf-related benefits while minimizing and resolving conflicts where they occur. This plan does not identify a target population size, nor does it establish an upper limit for the number of wolves in the State. As a result, public preferences regarding levels of positive and negative wolf–human interactions will strongly influence the extent to which wolf abundance and distribution exceed the minimum requirements for a viable population.

The attitudes and actions of society historically influenced the abundance and distribution of wolves on the landscape (Mech 1970, Beaufort 1987, Thiel 1993). Indeed, public intolerance of wolves led to the virtual extirpation of the species from the State. During recent decades, policies that reflected significant increases in public support for wolves facilitated the recovery of the Michigan population. Public attitudes still have the power to influence wolf population levels. People can take measures to either sustain or threaten the population. These measures

can be direct (e.g., maintenance of adequate prey, illegal killing) or indirect (e.g., litigation, legislation).

'Social carrying capacity' refers to the range bounded by the minimum and maximum levels of wolves society will tolerate. Inclusion of both a lower and an upper limit is critical to the definition, because society may not be willing to accept a decline in the wolf population below a certain level, nor may it be willing to accept the challenges and costs associated with wolves above a certain population level. Social carrying capacity is strongly influenced by the actual and perceived benefits and costs associated with particular levels of wolf abundance and distribution.

All segments of society do not value the benefits or bear the costs of wolf presence equally. Therefore, the minimum and maximum tolerable levels of wolves can vary regionally or by stakeholder group. Defining social carrying capacity becomes complicated when different segments of society hold different tolerances, because a social carrying capacity exists only when the ranges of tolerance held by different groups overlap. If the ranges of tolerance do not overlap, then a social carrying capacity can not be identified, and any goal for wolf abundance and distribution would be expected to encounter social resistance and conflict.

In such a situation, a social carrying capacity can be created only through a shift in tolerances at one or both ends of the range. Such a shift could be caused through: 1) management of the interactions between wolves and humans to reduce costs and/or increase benefits to affected stakeholders or 2) information and education programs aimed at factors that influence tolerances for wolves and wolf-related interactions.

The most-recent public-attitude study found that a social carrying capacity for wolves in different regions of Michigan did not exist (Beyer et al. 2006). That is, the minimum levels of wolves and wolf-related interactions some segments of society would tolerate were higher than the maximum levels others would tolerate. No particular level was acceptable to a majority of interested survey respondents.

Survey-respondent preferences regarding the levels of wolves within each region varied according to region of residence and stakeholder group (Beyer et al. 2006). For example, the preferred level of wolves in both the UP and northern LP was highest among residents of the southern LP and lowest among UP residents. Compared to non-hunters, hunters tended to be less tolerant of wolves. However, even among these two groups, hunters and non-hunters in the UP were less tolerant of wolves than were their counterparts in southern Michigan. As a group, livestock producers were much less tolerant of wolves than was the general public.

Given the disagreement in preferences and tolerances among different segments of the public, a shift in public attitudes is necessary to create a social carrying capacity for wolves in Michigan. Until management or education causes an adequate shift, any particular level of wolves will not be acceptable to society at large. The following objectives were designed to help achieve compatibility between wolf abundance and distribution and public tolerance.

6.7.1 Promote consistent public understanding and appreciation of the benefits and costs associated with particular wolf levels.

People can hold preferences and tolerances regarding wolf abundance and distribution without a complete understanding of all the relevant issues. For example, a person who is not willing to tolerate any wolves on the landscape may not be aware of or appreciate the benefits wolves provide to many residents. Intolerance can also be caused by an inaccurate, exaggerated perception of the problems wolves cause. Conversely, a person who demands the highest number of wolves the available habitat can support may be unaware of or may not appreciate the costs and risks such a level would impose on certain members of society.

Public education could help foster a realistic understanding of the positive and negative consequences associated with particular wolf levels. This education could allow some Michigan residents to place a higher value on wolves, alleviate concerns held by some Michigan residents, and thus increase general tolerance for the wolf population. It could also help other residents understand the real costs and risks associated with wolves and help them appreciate the potential adverse consequences of particular wolf levels for affected residents.

To some extent, personal preferences and tolerances will continue to reflect personal values, which are resistant to change (Fulton et al. 1996). However, education efforts may encourage attitude shifts that are based on consistent, accurate information and thus facilitate the creation of a social carrying capacity for wolves in Michigan.

Actions:

1. Increase public awareness regarding where to obtain information on the consequences of particular wolf levels.

2. Provide the public with accurate information on the benefits and costs associated with particular wolf levels as part of a wolf-based information and education program (see 6.1.1).

6.7.2 Manage wolf-related interactions to increase public tolerance for wolves.

Social tolerance for a population of any large predator depends on the benefits attributed to the population and on confidence that conflicts will be resolved effectively (Slovic 1987, Frost 1985, Wolstenholme 1996, Beyer et al. 2006). Therefore, facilitation of wolf-related benefits and effective conflict resolution could do more than serve the interests of Michigan residents. Those actions could also reduce levels of intolerance among some stakeholders and cause a shift in attitudes that leads to the development of a social carrying capacity for wolves in the State.

Section 5.2 describes the many types of benefits people can derive from the presence of wolves. In brief, these benefits can be: 1) ecological, as wolves fill an important ecological niche and improve ecosystem function; 2) cultural or religious, as people derive spiritual satisfaction or fulfillment from the presence of wolves; 3) personal, as the presence of wolves provides unique opportunities to interact with, study, and appreciate a particular component of the natural world;

and 4) economic, as wolf-based tourism and recreation could draw a greater number of people to local communities. The approaches that will be used to foster these types of wolf-related benefits are outlined under 6.8 and 6.12.

Conflicts associated with wolves can involve human-safety concerns regarding the presence of wolves near residential or recreational areas, depredation of domestic animals, and concerns regarding the impact wolves may be having on populations of other wildlife species. The approaches that will be used to manage specific types of wolf-related conflicts are outlined under 6.9, 6.10, 6.11 and 6.12.

Actions:

1. Facilitate positive wolf–human interactions and other wolf-related benefits (see 6.8 and 6.12).

2. Minimize and manage wolf-related conflicts (see 6.9, 6.10, 6.11 and 6.12).

6.7.3 Manage wolf distribution and abundance as necessary to maintain positive and negative wolf-related interactions at socially acceptable levels.

As stated previously (see 5.3.2), broadly based abundance and distribution goals may not be necessary or effective for managing most negative wolf-related interactions. Wolf-related conflicts in local areas are often caused by the behavior of a few individual wolves, and management at small scales can often address problems effectively. Accordingly, management of wolf–human conflicts under this plan will be conducted at the level of individual wolves or packs to the extent that it is expected to be effective and logistically feasible.

Some situations may warrant consideration of reducing wolf numbers in localized areas as a means to reduce the risk of negative interactions. Such consideration could be necessary if a high density of wolves in an area, rather than the behavior of individual wolves, was determined to be responsible for problems that could not otherwise be addressed through non-lethal or individually directed lethal methods. As of this writing, a situation of this type has not occurred in Michigan.

Many Michigan residents would support local reduction of wolf numbers if it would reduce problems caused by wolves (Beyer et al. 2006). The extent of public support appears to depend on the nature of the problem to be addressed. The percentage of interested survey respondents that supported reducing wolf numbers through lethal means was highest with regard to human-safety concerns (59%), intermediate with regard to depredation problems (54%), and lowest with regard to impacts on the number of deer available for hunting (49%).

The severity, immediacy and frequency of conflicts will determine whether active management of wolf abundance or distribution in local areas is necessary. More-conservative management methods will be applied when the risk of problems is considered to be relatively small and non-immediate, whereas increasingly aggressive methods may be applied as the severity, immediacy and frequency of problems increase.

According to the results of the most-recent public-attitude survey, the public generally desires some presence of wolves in the northern LP (Beyer et al. 2006). Indeed, 79% of interested survey respondents indicated they would be unwilling to accept the complete absence of wolves in that area. However, respondents would be willing to tolerate lower minimum and maximum levels of wolves in the northern LP than in the UP. Even the respondents who were most tolerant of wolves preferred a lower level of wolf abundance and interactions in the northern LP than in the UP.

Wolves will not be prevented from colonizing the LP. However, their presence in that area is not necessary to maintain a viable population in Michigan. Additionally, if a wolf population becomes established in the LP, the higher density of human residences and livestock operations in that area relative to the UP (see 6.10 for additional information) would create a higher potential for wolf-related conflicts. The severity, immediacy and frequency of conflicts would guide management responses in the LP, but given the preceding considerations, relatively aggressive responses may be warranted in many cases.

The presence of wolves in the LP would be unlikely to: 1) exacerbate the prevalence of tuberculosis in the deer herd, 2) spread the disease geographically, or 3) increase the risk of tuberculosis transmission to cattle. Indeed, the presence of a natural predator might be expected to reduce tuberculosis prevalence in the deer herd; by preying upon individuals weakened by tuberculosis, a predator would remove the deer most likely to spread the disease. Although all mammals, including wolves and other canids, can be infected with bovine tuberculosis in certain circumstances, canids are generally resistant to infection. Moreover, there is no evidence that wolves or other wild canids transmit the disease to each other or to other species. In Canada, where tuberculosis is present in free-ranging bison (*Bos bison*) in Wood Buffalo National Park and in free-ranging elk in Riding Mountain National Park, there is no evidence that the wolf populations in those areas have contributed to the spread of the disease (Carbyn 1982, Tessaro 1986).

Actions:

1. Effectively manage wolf-related conflicts at the smallest possible scale.

2. Allow wolves to colonize and remain in the LP to the extent that the accompanying negative interactions can be managed within socially acceptable levels.

3. Evaluate the outcomes of active management of wolf abundance and distribution.

6.8 Facilitate Positive Wolf–Human Interactions and Other Wolf-related Benefits.

A principal goal of this plan states the need to facilitate wolf-related benefits. Those benefits serve the interests of affected stakeholders and they foster the public support that is necessary for the long-term viability of the wolf population (USFWS 1992, Wisconsin DNR 1999, Bangs et al. 1995, Minnesota DNR 2001, Boitani 2003, Fritts et al. 2003). They can be ecological, personal, economic, and cultural or religious (see 5.2 for more information).

People hold diverse cultural values and religious beliefs regarding wolves. Wolves can play major or minor roles or be viewed positively or negatively within particular cultures and religions. As only one example among many different perspectives, the cultural and religious values regarding wolves are particularly important to many Native Americans. To help illustrate those values held by many Native Americans in Michigan, the representatives of the Chippewa Ottawa Resource Authority and the Great Lakes Indian Fish and Wildlife Commission on the Michigan Wolf Management Roundtable provided the following account of the story of Maahiingun and Nanaboozhoo:

> *"Nanaboozhoo, (half man/half spirit) was placed on the Earth at the beginning of time and given instructions by Gzhemnidoo (The Creator) and told to walk the Earth to name the plants, animals, insects and the entirety of everything that comprised the world of his time.*
>
> *"Throughout his travels, Nanaboozhoo began to notice that the animals he was tasked to name came in pairs and also had the ability to repopulate their species. Seeing the various animal families throughout all of creation, Nanaboozhoo became lonely and so he spoke of his feelings to Gzhemnidoo and asked "Why is there no other like me?" Gzhemnidoo answered, "I will bring you someone to walk, talk and play with" and in his infinite wisdom, Gzhemnidoo sent Maahiingun (the wolf) to be with Nanaboozhoo and together they set out to complete the task that Gzhemnidoo had asked.*
>
> *"In their journey, they became very close to each other, like brothers. It was through this closeness that they soon came to realize that they were also brothers to all of Creation.*
>
> *"Once they had finally completed the task that Gzhemnidoo asked of them, they talked with the Creator once again. Gzhemnidoo was pleased with what he heard but this time Creator curiously replied, "From this day on, you are to separate and go different ways. What happens to one of you will also happen to the other. You will be feared by some, respected by others, but misunderstood by all of the people who will come to inhabit these lands."*
>
> *"Reluctantly, Maahiingun and Nanaboozhoo set off on their different journeys. Their shared sadness is evident by Maahiingun's cry that can still be heard wherever the wolf still roams the Earth on his separate journey.*
>
> *"The teachings of Nanaboozhoo and Maahiingun serve as an important reminder for Indian People to this day. All of what Gzhemnidoo said to Nanaboozhoo and Maahiingun has come true. Indian and Maahiingun have come to experience the same things, both good and bad, that life has to offer. Both take a mate for life, have a Clan System, and also are part of a Tribe. Both have been stripped of their land and hunted for their skin. Both have been pushed to the brink of extinction yet somehow miraculously survive to this day.*

"It is our belief as Indian people that our ability to foretell our future is evident by looking at the wolf, who remains one of the most significant cultural indicators to our continued existence."

The following objectives focus on increasing public awareness regarding the benefits provided by wolves, ensuring an adequate distribution and abundance of wolves, and providing specific opportunities for people to experience and appreciate wolves.

6.8.1 Inform the public on benefits derived from the presence of wolves.

The benefits of wolves may not be apparent to many Michigan residents. Public education and outreach could help residents understand and appreciate those benefits.

Action:

1. Provide the public with information on the benefits of wolves as part of a wolf-based information and education program (see 6.1.1).

6.8.2 Maintain a distribution and abundance of wolves adequate to maintain benefits at levels acceptable to the public.

The size of some benefits depends on the abundance and distribution of wolves on the landscape. For example, an informed individual can derive personal satisfaction from the presence of a healthy wolf population only if such a population actually exists.

Maintenance of a viable wolf population will allow the level of positive wolf-related interactions desired and appreciated by many Michigan residents (Beyer et al. 2006). However, some people prefer higher levels of interactions than others, and some people prefer the level of interactions associated with the largest number of wolves the available habitat can sustain (Beyer et al. 2006). Both positive and negative interactions can increase as wolf abundance or distribution expands. Although some individuals may prefer the level of benefits associated with a maximum level of wolves, the corresponding level of negative interactions may not be acceptable to other segments of society. Therefore, wolf-related benefits will be maximized to the extent that the accompanying levels of negative interactions can be managed effectively.

Actions:

1. Facilitate the ecological, cultural, economic and personal benefits derived from the presence of wolves by maintaining a viable wolf population.

2. Facilitate the maximum level of positive wolf-related interactions that is possible while maintaining negative interactions at publicly acceptable levels.

6.8.3 Promote opportunities for people to experience and appreciate wolves.

Wolf-based programs and events can increase opportunities for people to appreciate the benefits of wolves. Such programs and events can provide participants with positive, unique experiences, increase public knowledge of the positive values of wolves, and generate support for the wolf population.

Actions:

1. Work with management partners to coordinate wolf-based programs and events.

2. When prudent, invite public and media participation in wolf-related projects.

3. Support efforts of management partners to provide positive wolf-related experiences.

6.9 Manage Actual and Perceived Threats to Human Safety Posed by Wolves.

Most Michigan residents place a high priority on wolf management that addresses public concerns for human safety (Beyer et al. 2006). Eighty-seven percent of interested respondents to the most-recent public-attitude survey indicated human-safety issues should be an important factor when considering whether to reduce the number of wolves in a particular area. At least 76% of interested respondents would support some type of active wolf management to address strong public concerns regarding human-safety risks posed by wolves.

The following objectives for the management of human-safety issues fall into three general categories. The first category focuses on educating the public on the actual safety risks posed by wolves and ways to reduce those risks. The second category focuses on managing the factors that influence the probability of wolf-related problems, including rabies and habituation of wolves to humans. The third category focuses on eliminating actual safety threats.

6.9.1 Promote accurate public perceptions of the human-safety risks posed by wolves.

Most wildlife has the potential to be dangerous to humans in certain situations. In most cases, people can take simple, sensible measures to avoid those situations and protect themselves against harm. Other cases may warrant higher levels of concern and professional assistance. Accurate perceptions of the human-safety risks posed by wildlife can facilitate appropriate levels of concern and responses to particular situations.

Segments of the public can overestimate or underestimate the actual human-safety risks posed by wolves. Some people may feel the mere presence of a wolf population poses a serious safety threat, whereas others may not recognize that wolves could be dangerous to people in certain situations. Perceptions and attitudes regarding safety risks can vary by geographic region and stakeholder group (Beyer et al. 2006). For example, the most-recent public-attitude study showed that urban residents placed a lower priority on wolf-related safety concerns than did rural

residents. Compared to the general public, livestock producers as a group were more concerned about wolf-related safety risks.

In Michigan, wolves are not likely to attack any person who does not deliberately invite aggression (i.e., by provoking or feeding wolves). As of this writing, a wolf attack on a human has never been documented in Michigan or in any of the other 47 contiguous States. However, wolves have attacked people in other areas of North America (McNay. 2002*a, b*), and concerns for public safety are warranted in some situations. Regardless of the extent to which wolves pose a threat to human safety, anxieties over a perceived threat can impact the quality of life of affected residents as well as public tolerance for the wolf population.

Public education could help foster a realistic understanding of the human-safety risks associated with Michigan wolves. This education could help alleviate concerns held by some Michigan residents, and thus increase general tolerance, if not support, for the wolf population. It could also help other residents understand that some wolf-related human-safety concerns are legitimate, and thus help them appreciate the consequences of those concerns for affected residents.

Actions:

1. Increase public awareness regarding where to obtain information on wolf-related threats to human safety.

2. Provide the public with accurate information on the human-safety risks posed by wolves as part of a wolf-based information and education program (see 6.1.1).

3. Provide prompt responses to requests for information regarding wolves and human safety.

6.9.2 Provide timely and professional responses to reports of human-safety risks posed by wolves.

The protection of human safety is a top priority, and the Michigan DNR, USDA Wildlife Services, and other management partners will make their best efforts to respond to reports of habituated, sick or injured wolves in a timely and professional manner. Achieving this objective will require an efficient system for receiving and directing reports, clear investigation procedures, and adequate training of staff.

Actions:

1. Increase public awareness regarding where to report wolf-related threats to human safety.

2. As necessary, update and refine procedures for the investigation of reported threats to human safety.

3. Train field staff on investigation procedures.

6.9.3 Minimize the incidence of rabies in wild and domestic populations.

Worldwide, most documented wolf attacks on humans during the past century involved rabid wolves. For example, from 1900 through 2002, rabid wolves were involved in more than 80% of documented attacks in Europe and 70% of documented attacks in areas of Asia (Linnell et al. 2002, U.S. National Park Service 2003).

The role of rabies in wolf attacks has been smaller in North America than in other parts of the world. In a summary of wolf attacks in Canada and Alaska since 1900, McNay (2002*a, b*) reported that only 12 of 80 (15%) reviewed attacks involved rabid wolves. This low incidence may reflect the implementation of programs designed to minimize the incidence of rabies in domestic and wild animals (Centers for Disease Control and Prevention 1999, USDA Wildlife Services 2002). Rabies has not been documented in Michigan wolves, and the potential for the disease to affect wolves in the State is small.

Actions:

1. Support programs to assess and minimize the incidence of rabies in wild and domestic animal populations.

2. Euthanize wolves and other animals suspected to be infected with rabies.

6.9.4 Prevent or minimize the habituation of wolves.

The most-important factor contributing to wolf attacks in Canada and Alaska appears to be habituation to humans. Of the 80 wolf attacks reviewed by McNay (2002 *a, b*), 29 cases (36%) involved habituated wolves. Wolves can become habituated and lose their fear of humans by having frequent and increasingly closer contact with humans, and by receiving food rewards for their boldness.

Several human behaviors can attract wolves and contribute to habituation. Directly feeding wolves is the most obvious way to cause habituation. Drawing deer into residential areas by feeding them also can attract wolves and other predators. Feeding pets outside and leaving pets outside unattended also may attract wolves. Avoiding these behaviors can reduce the chance a wolf will become habituated and lose its fear of humans.

In addition to avoiding the behaviors listed above, people can take other, active measures to prevent wolf habituation. Wolves can be deterred by strange odors, sights or sounds (USDA 2002), and devices designed to scare wolves may help prevent problems. Some examples of scare devices include lighting systems, sirens and other noisemaking devices, flagging (fladry), and movement-activated guard devices (Beyer et al. 2006).

Public education on ways to avoid attracting wolves and technical assistance on the appropriate use of scare devices could help prevent the habituation of wolves and help reduce associated risks to human safety.

Actions:

1. Provide the public with information on ways to help prevent wolf habituation as part of a wolf-based information and education program (see 6.1.1).

2. Provide property owners and residents with technical assistance on methods to help prevent wolf habituation.

3. As warranted, recommend modifications in law, policy or enforcement that could more-effectively discourage human activities that lead to the habituation of wolves.

6.9.5 Eliminate actual human-safety threats where they occur.

A habituated, sick or injured wolf in or near areas of human activity can represent an actual threat to human safety. Where actual threats are identified, the Michigan DNR, USDA Wildlife Services and other management partners will take the steps necessary to eliminate those threats.

The severity, immediacy and frequency of safety threats will guide management responses. More-conservative management methods will be applied when the risk of physical harm to humans is considered to be relatively small and non-immediate, whereas increasingly aggressive methods may be applied as the severity, immediacy or frequency of threats increase.

This strategy places a high priority on developing, evaluating and applying non-lethal management methods to reduce human-safety threats. Non-lethal methods will be applied wherever they are expected to be effective and where the severity and immediacy of a threat do not warrant more-aggressive action. Non-lethal methods can include elimination of wolf attractants (see 6.9.4), use of scare devices (see 6.9.4), and aversive conditioning. Aversive conditioning involves a stimulus (e.g., rubber bullets) that causes discomfort, pain or an otherwise negative experience without permanently injuring or killing a wolf.

To the extent non-lethal methods are effective at eliminating actual threats to human safety, lethal control of wolves will not be necessary. However, when such practices prove to be ineffective, are not expected to be effective, or are infeasible, lethal control may be necessary to prevent problems. Reserving lethal control as a management option allows the potential use of all the tools that might be required to help ensure the protection of human safety. Results of the most-recent public-attitude survey showed that at least 76% of interested respondents supported some form of lethal control to address strong public concerns regarding human-safety risks posed by wolves. The Michigan DNR and its management partners will apply lethal control methods as necessary to eliminate demonstrable threats to human safety.

Additionally, current regulations allow a person to remove, capture or kill a wolf when it poses an immediate threat to human life, and they require reporting of any such action to the Michigan DNR within 24 hours. A situation of this type has not occurred in Michigan, nor is one expected. However, maintaining these provisions, regardless of the future legal classification of wolves, would ensure people can legally protect themselves and others in the unlikely event of an ongoing or imminent wolf attack. It would also allow the Michigan DNR and its management partners to investigate and document such an incident in a timely manner.

Relocation of wolves is often proposed by the public as a method to reduce wolf-related conflicts. However, eliminating a threat to human safety through wolf relocation is not reasonably possible. Data from radio-collared wolves indicate relocated wolves rarely settle in the areas where they are released, and relocated wolves may return to their original territories (D. E. Beyer, Michigan DNR, unpublished data). Even if habituated wolves were relocated and did not return to the areas of capture, they would still be fearless of humans and would probably continue to cause human-safety threats elsewhere. Relocating wolves is problematic for additional reasons. Given the current widespread distribution of wolves across the UP, unoccupied, suitable release areas are no longer available, and any relocated wolves may be killed by resident packs. Also, residents have expressed opposition to the release of wolves near their communities.

Actions:

1. Support the development, evaluation and appropriate use of non-lethal and lethal management methods to reduce human-safety threats.

2. As necessary, update and refine management responses according to the severity, immediacy and frequency of human-safety threats.

3. Train field staff on response procedures.

4. Preserve the legal authority for individuals to remove, capture or kill a wolf when it poses an immediate threat to human life.

5. Continue to require individuals who capture, remove or kill a wolf in response to a human-safety threat to report the incident to the Michigan DNR within 24 hours.

6.10 Manage Wolf Depredation of Domestic Animals.

A depredation event occurs when a predator kills or injures one or more animals at a given time. Wolves normally kill or injure wild prey and competitors, but they may sometimes attack domestic animals. Although its frequency is currently lower in Michigan than in Minnesota or Wisconsin, wolf depredation of domestic animals in Michigan has become an important management issue.

In the United States, farmers and ranchers as an overall group still hold strong negative views of wolves (Fuller et al. 2003, Nie 2003). Indeed, the most-recent Michigan public-attitude study

indicated that livestock producers were far less supportive of having wolves in the State than was the general public. Whereas 73% of all interested respondents to the general-public survey indicated approval for having wolves in the State, only 24% of interested livestock producer survey respondents indicated such approval. Sixty-four percent of interested livestock producers disapproved of having wolves in the State. These results indicate a strong need to address livestock-producer concerns and thus foster greater tolerance for wolves. Without relief from depredation problems, intolerant stakeholders may adopt indiscriminate anti-wolf behaviors that could have adverse impacts on the population (Fuller et al. 2003).

More than 900 livestock farms occur in the UP (USDA 2004). From 1998 through 2007, the Michigan DNR and USDA Wildlife Services verified 70 wolf–livestock depredation events on 45 (5%) of those farms. However, the most-recent public-attitude study found that 31% of interested livestock producers in the UP suspected wolves had been responsible for recent livestock losses on their farms in at least 1 out of 5 years (Beyer et al. 2006). In Michigan, the annual frequency of depredation has been influenced more by the behavior of a small number of individual wolves or packs than by wolf population size. Annual frequency of verified depredation events in Michigan has not shown a discernible trend through time.

More than 2,100 livestock farms occur in the northernmost 21 counties of the LP (USDA 2004). There is an average of one farm per 5.1 square miles in this area versus an average of one farm per 18.1 square miles in the UP. To date, no wolf depredation events have been verified in the LP. However, if a wolf population becomes established in the northern LP, the higher density of livestock farms in this region suggests the number of wolf depredations could be higher than what has been experienced in the UP.

In addition to livestock, wolves sometimes attack domestic dogs. These attacks may be caused by inter-specific aggression or by perception of dogs as potential prey (Fritts and Paul 1989). Between 1996 and 2007, the Michigan DNR and USDA Wildlife Services verified 40 wolf attacks on domestic dogs in Michigan. Forty-three percent of those attacks involved bear-hunting hounds in the field. However, some dogs were attacked in close proximity to their owners' residences.

Many Michigan residents place a high priority on wolf management that addresses depredation of domestic animals (Beyer et al. 2006). Eighty-four percent of interested respondents to the most-recent general-public attitude survey indicated that "the number of farm animals actually lost to wolves" should be an important factor when considering whether to reduce the number of wolves in a particular area. Sixty-one percent and 85% of interested survey respondents respectively indicated that "the number of hunting dogs lost to wolves in the field" and "the number of pets actually attacked by wolves near the pets' homes" should be 'somewhat' or 'very' important factors in a decision to reduce wolf numbers in a particular area. At least 75% of interested respondents would support some type of active wolf management to address wolf depredation of domestic animals.

The following objectives for the management of depredation of domestic animals fall into three general categories. The first category focuses on educating the public and providing technical assistance on ways to reduce the risk of wolf depredation. The second category focuses on

managing ongoing depredation problems. The third category focuses on compensation for losses of livestock caused by wolves.

As a document that offers guidance at the strategic level, this plan does not describe the operational methods of preventing and eliminating wolf depredation problems. A description of those methods is available on the Michigan DNR website (www.michigan.gov/dnr) and will be updated as regulations, technology, and other aspects of management context change.

6.10.1 Provide timely and professional responses to reports of suspected wolf depredation of domestic animals.

The causes of depredation are not always apparent, and other causes of death or injury can often be mistaken for wolf depredation. For example, at least 27% of the wolf-depredation complaints submitted by Michigan residents in 2004 were prompted by depredations that were actually caused by dogs or coyotes. Another 23% of the alleged wolf-depredation events reported in 2004 could not be attributed to a specific cause because the available physical evidence was insufficient.

Given multiple potential causes and the need to assess the available evidence, professional investigation of a depredation event is necessary to determine whether it was caused by a wolf. On-site investigations also provide responding agencies with opportunities to provide affected stakeholders with information and technical assistance that may help them reduce future depredations.

To the extent possible, the Michigan DNR, USDA Wildlife Services, and other management partners will respond to reports of suspected wolf depredation in a timely and professional manner. Achieving this objective will require an efficient system for receiving and directing reports, clear investigation procedures, and adequate training of staff.

Actions:

1. Increase public awareness regarding where to report wolf depredation of domestic animals, the need to report depredation events rapidly, and how to preserve evidence at depredation sites.

2. As necessary, update and refine procedures for the investigation of suspected wolf depredation of domestic animals.

3. Train field staff on investigation procedures.

6.10.2 Minimize the risk of wolf depredation of domestic animals.

Certain human behaviors and practices can attract wolves and thus increase the risk of depredation of domestic animals. Directly feeding wolves is the most obvious way to invite depredation problems. Baiting and feeding other wildlife can attract and concentrate natural prey and thus attract wolves and other predators. Feeding pets outside and leaving pets outside

unattended also may attract wolves. Avoiding these behaviors and practices can help reduce the risk of depredation.

In addition to avoiding the behaviors and practices describe above, livestock producers can help prevent depredation of livestock through certain animal husbandry practices. For example, prompt and proper disposal of livestock carcasses may eliminate attractants that could draw wolves to particular farms. Barrier fencing, monitoring and pasturing of livestock based on their vulnerability, lighting systems, sirens and other noisemaking devices, flagging (fladry), movement-activated guard devices, and livestock-guarding animals are a few of the other tools and techniques that may help reduce the risk of depredation of livestock (Beyer et al. 2006).

There is an inherent risk to dogs allowed to range in areas frequented by wolves, but individuals who hunt with dogs can also take measures to reduce the risk of an attack on their animals (Wisconsin DNR et al. 2004). Avoiding specific areas that are currently being used by wolves or where problems have occurred previously may be the most-effective way to reduce the risk of a wolf–dog conflict. The Michigan DNR will provide information on its website (www.michigan.gov/dnr) and at local DNR offices to help hunters identify and avoid areas of probable or previous conflicts. Staying close to dogs, using collars with bells or beepers, and avoiding bait sites recently visited by wolves are other techniques that may reduce the chance of a wolf attack on a hunting dog.

The Michigan DNR cannot compel residents to adopt any of the practices or techniques described above. However, public education, information-sharing, and technical assistance could provide valuable information, encourage the use of beneficial practices and techniques, and thus help reduce the risk of depredation of domestic animals.

Actions:

1. Provide the public with information on ways to help reduce the risks of wolf depredation as part of a wolf-based information and education program (see 6.1.1).

2. Provide livestock producers, individuals who hunt with dogs, property owners and other residents with technical assistance on methods to help prevent or minimize wolf depredation.

3. Share information on areas of probable or previous conflicts between wolves and dogs and advise avoidance of those areas.

4. As warranted, recommend modifications in law, policy or enforcement that could more-effectively discourage human activities that increase the risk of wolf depredation.

5. As warranted, recommend modifications in law, policy, enforcement or practice that could reduce wolf visitation to bear-bait sites.

6.10.3 Eliminate or minimize ongoing wolf depredation of domestic animals.

Many techniques can effectively prevent or deter depredation. However, the effectiveness of some techniques may be temporary, and some techniques may fail to work altogether in certain situations. Where depredation occurs despite reasonable efforts to prevent it, the Michigan DNR, USDA Wildlife Services and other management partners will take appropriate steps to eliminate or minimize ongoing problems.

The severity, immediacy and frequency of depredation problems will guide management responses. More-conservative management methods will be applied when the risk of depredation is considered to be relatively small and non-immediate, whereas increasingly aggressive methods may be applied as the severity, immediacy and frequency of problems increase.

This strategy places a high priority on developing, evaluating and applying non-lethal management methods to reduce depredation problems. Non-lethal methods will be applied wherever they are expected to be effective and where the severity and immediacy of a problem do not warrant more-aggressive action. Non-lethal methods can include the elimination of wolf attractants, the use of improved husbandry practices and scare devices (see 6.10.2), as well as aversive conditioning. Aversive conditioning involves a stimulus (e.g., rubber bullets) that causes discomfort, pain or an otherwise negative experience without permanently injuring or killing a wolf.

To the extent non-lethal methods are effective at eliminating or minimizing depredation problems, lethal control of wolves will not be necessary. However, when such practices prove to be ineffective, are not expected to be effective, or are infeasible, lethal control may be necessary to prevent problems. Reserving lethal control as a management option allows the potential use of all the tools that might be required to help prevent depredation problems. Results of the most-recent public-attitude survey showed that at least 75% of interested respondents supported some form of lethal control to address wolf depredation of domestic animals.

Lethal control will be a management option in situations where loss of livestock has been documented or where a wolf is in the act of depredating livestock; it will not be used as a preventative measure in areas where livestock depredation has not yet occurred. Similarly, lethal control will be a management option in specific areas where wolf attacks on free-ranging hunting dogs have been documented, but it will not be used as a preventative measure where attacks have not yet occurred. In addition, lethal control will be a management option in specific areas where wolf attacks on dogs and other pets have occurred near human residences.

Relocation of wolves is often proposed by the public as a method to reduce wolf-related conflicts. However, reducing depredation problems through relocation has become increasingly problematic and is no longer recommended as a management tool in Michigan. Data from radio-collared wolves indicate relocated wolves rarely settle in the areas where they are released, and relocated wolves may return to their original territories (D. E. Beyer, Michigan DNR, unpublished data). Even if depredating wolves were relocated and did not return to the areas of

capture, they may cause depredation problems elsewhere. Relocating wolves is problematic for additional reasons, which are outlined under Objective 6.9.5.

Actions:

1. Support the development, evaluation and appropriate use of non-lethal and lethal management methods to prevent or minimize wolf depredation of domestic animals.

2. As necessary, update and refine management responses according to the severity, immediacy and frequency of depredation problems.

3. Train field staff on response procedures.

6.10.4 Develop a program to allow livestock producers to control depredating wolves on their property.

The level of personal control with regard to depredation problems appears to be the most-important factor that influences livestock-producer tolerance for wolves (Beyer et al. 2006). Eighty-five percent of interested livestock producers recently surveyed indicated that being prevented from controlling or removing wolves that posed a threat to their livestock had 'greatly decreased' their willingness to have wolves in their farming area. Seventy-eight percent of surveyed livestock producers indicated they would be 'very' or 'somewhat' satisfied with a management program that, among other things, empowered them to remove problem wolves from their own property. By contrast, only 20% of respondents indicated they would be 'very' or 'somewhat' satisfied with a management program that lacked such a provision. Seventy-five percent of interested respondents to the general-public attitude survey approved of empowering livestock growers to handle their own depredation problems.

Given this information, a carefully regulated program that allowed livestock producers to control depredating wolves would be generally acceptable to the public and it would address a major concern of livestock producers. At the same time, it could assist efforts to maintain a viable wolf population. Although such a program could cause the deaths of a small number of wolves, it could help prevent an increase in the prevalence and intensity of the negative attitudes that lead historically to widespread indiscriminate killing by intolerant stakeholders. Indeed, a program that allowed responsible and effective personal control could allow livestock producers to tolerate a greater abundance and distribution of wolves on the landscape.

Personal control of depredating wolves by livestock producers could involve non-lethal (see 6.10.3) and lethal methods. Lethal control would not be authorized when problems could be addressed through other, non-lethal methods. However, a livestock producer could be authorized to kill problem wolves when reasonable efforts to deter depredation have failed or when other feasible options are unavailable. Only the minimum level of lethal control necessary to resolve an ongoing depredation problem would be authorized.

Any program allowing personal control of depredating wolves by livestock producers would be administered to ensure it does not have adverse consequences for the long-term viability of the wolf population. Monitoring, reporting and enforcement would be conducted to help ensure compliance with program requirements.

Actions:

1. Develop a permitting process to allow livestock producers to control wolves on their property, as necessary, following a verified wolf depredation event.

2. Develop a system to allow livestock owners to kill wolves in the act of livestock depredation.

3. Monitor and enforce compliance with program requirements.

6.10.5 Facilitate financial compensation for livestock losses caused by wolves.

In the United States and other countries, compensation programs have been designed to assist livestock producers by reimbursing them for losses attributable to wolves, with the intention of increasing overall public acceptance for wolf populations (Fritts et al. 2003). An expectation that compensation will increase tolerance for wolves is often based on an assumption that livestock producers primarily perceive wolf depredation as an economic problem. Recent research has shown that other, non-economic factors more strongly influence livestock-producer attitudes toward wolves, and that compensation programs have not substantially improved tolerance among this group (Naughton-Treves et al. 2003, R. B. Peyton, MSU, personal communication).

Current Michigan law requires the State to compensate livestock owners for livestock killed by wolves, regardless of the extent to which efforts have been made to reduce depredation risks. The Michigan Animal Industry Act (Public Act 466 of 1988) defines livestock as "those species of animals used for human food and fiber or those species of animals used for service to humans. Livestock includes, but is not limited to, cattle, sheep, new world camelids, goats, bison, privately owned cervids, ratites, swine, equine, poultry, aquaculture, and rabbits. Livestock does not include dogs and cats." The Michigan Department of Agriculture provides payment to livestock owners, but it may do so only if the Michigan DNR or its designated agent (USDA Wildlife Services) verifies that the depredation was caused by a wolf. The Michigan Department of Agriculture may seek reimbursement from the Michigan DNR for the costs of compensation.

Current Michigan law limits State compensation payments to the value of a livestock animal at the time it was lost. As a result, the full expected fall market value of an animal lost during early summer, for example, can not be provided by State funds. A private fund contributed by Defenders of Wildlife and a private individual and administered by the International Wolf Center has been used to pay the difference between the animal values at the time of loss and fall market values. As with any funding source, use of that private fund depends on satisfying certain conditions stipulated by the contributors. Through the end of 2007, the State paid $24,178 and Defenders of Wildlife paid $4,827 to compensate for wolf-related livestock losses in Michigan.

Livestock producers in Michigan strongly desire financial compensation as part of a depredation-management program, and they overwhelmingly support the use of tax dollars for this purpose (Beyer et al. 2006). A majority (58%) of interested respondents to the most-recent general-public attitude survey strongly or somewhat supported the use of tax dollars as compensation for lost livestock (excluding privately owned cervids).

Current Michigan law does not require or allow the State to compensate owners for dogs killed by wolves. The lack of State compensation for wolf depredation of dogs is consistent with the public preference on this issue (Beyer et al. 2006). Opposition (45% opposed) was greater than support (35% supported) for the use of tax dollars to compensate for hunting dogs lost to wolves. Support and opposition for the use of tax dollars to compensate for other pets were virtually identical, but support was indicated by less than a majority (40%) of interested survey respondents.

Actions:

1. Investigate the causes of depredation to facilitate compensation to livestock producers for livestock losses caused by wolves.

2. To the extent specified by law, reimburse the Michigan Department of Agriculture for costs incurred for compensation for livestock losses caused by wolves.

3. Maintain and develop partnerships that facilitate compensation for the full expected value of livestock verified to be lost to wolf depredation.

6.10.6 Work with partners to discontinue compensation for privately owned cervids lost to wolves.

Cervids (i.e., deer, elk and other members of the Cervidae family) are the natural prey of wolves. Enclosures that contain privately owned cervids, often at unnaturally high densities, are expected to attract wolves. A wolf that gains entry to such an enclosure would be expected to exhibit natural predatory behavior.

The public generally does not support compensation for privately owned cervids lost to wolf depredation (Beyer et al. 2006). Thirty-three percent and 45% of interested respondents to the most-recent public-attitude survey respectively supported and opposed the use of tax dollars for that purpose.

The Michigan DNR does not recommend compensation for privately owned cervids lost to wolf depredation. However, privately owned cervids are defined as livestock under the Michigan Animal Industry Act (Public Act 466 of 1988) and current Michigan law requires the State to provide compensation for livestock lost to wolves. Elimination of the requirement to provide compensation for privately owned cervids would require modification of existing law.

Actions:

1. Work with partners to eliminate the requirement for the State to provide compensation for privately owned cervids lost to wolf depredation.

2. If legally feasible, discontinue compensation for privately owned cervids lost to wolf depredation.

6.11 Minimize the Negative Impacts of Captive Wolves and Wolf–Dog Hybrids.

Captive wolves and wolf–dog hybrids that are released or escape pose a threat to both people and the wild wolf population. These animals could pose risks to human safety, they could cause adverse biological impacts, and they could reduce social acceptance for the wild population because the public is unlikely to distinguish between problems caused by released captive or hybrid wolves and those caused by wild wolves. The following objectives focus on reducing the risks posed by these animals.

6.11.1 Minimize and deter the possession of captive wolves in Michigan.

Well-designed wolf exhibits at zoos open to the public may serve an educational function, but possession of captive wolves by private individuals will not help save the species in the wild, regardless of intentions. Conservation of the species is better achieved through management of the wild population rather than efforts to save or breed individual animals. Given the risks posed by captive wolves, minimizing their possession in Michigan will help protect human safety and the wild wolf population.

The capture of wild wolves for possession in captivity is illegal in Michigan. However, regulations in place as of this writing do not prohibit the importation and possession of wolves that were legally obtained in other States and countries. Designation of wolves as a game animal or a protected animal or other amendment of the Michigan Wildlife Conservation Order could allow the Michigan DNR to regulate the possession of such animals. In addition, amendment of the Michigan Large Carnivore Act (Public Act 274 of 2000) to include wolves would provide another tool for limiting the possession of wolves in captivity.

When a severely injured wolf (e.g., hit by a vehicle) is encountered, euthanizing the animal is often more humane and prudent than subjecting it to long-term captive treatment and rehabilitation. Severe injuries often result in permanent damage to an animal, making it unfit for release into the wild. Captivity is a traumatic experience for any wild animal, and whether a wolf would be readily accepted into a pack after extended confinement is unknown. The Michigan DNR does not advocate rehabilitation of sick or injured wolves.

Actions:

1. Amend the Wildlife Conservation Order as necessary to prohibit the possession of wolves in captivity, except under permit.

2. Support inclusion of wolves as animals covered by the Michigan Large Carnivore Act (Public Act 274 of 2000).

3. Treat injured wolves in ways that avoid long-term captivity.

6.11.2 Minimize and deter the possession of wolf–dog hybrids in Michigan.

Wolf–dog hybrids are produced when a wolf interbreeds with a dog or another wolf–dog hybrid. Ownership and proliferation of these animals in Michigan could threaten public safety. Most wolf–dog hybrids are poorly adapted as pets and are difficult to train (Jenkins 1991, Warrick 1991, Sikarskie 1993). Hybrids are frequently destructive of their owners' property, attack people and domestic animals, and are generally too wary of people to be effective guard animals. In one instance in the UP, wolf–dog hybrids killed the pet dog of the owner and bit another person. Those animals were subsequently killed for rabies testing, but other hybrids have either escaped or been released by their owners into the wild (B. Roell, Michigan DNR, personal communication).

Ownership and proliferation of wolf–dog hybrids could also threaten the viability of the Michigan wolf population in multiple ways. First, escaped or released hybrids may breed with wild wolves and thereby introduce dog genes into the wolf population. The Michigan DNR has documented the assimilation of at least one hybrid wolf into a pack of wild wolves in the UP (B. Roell, Michigan DNR, personal communication). This behavior can jeopardize the genetic integrity of the population and cause population-wide changes in morphological and behavioral characteristics. Second, a desire to breed and raise wolf hybrids may prompt some people to capture wild Michigan wolves illegally. Third, problems caused by released hybrids are often incorrectly attributed to wolves and thus reduce social acceptance for a wolf population.

The Michigan Wolf–Dog Cross Act (Public Act 246 of 2000) currently prohibits the ownership and possession of wolf–dog hybrids, except under permit. Maintaining the prohibitions and penalties under that law would help deter possession of hybrids and thus reduce the risks associated with them.

In many cases, wolf–dog hybrids can be difficult to identify. Although the Michigan DNR does not have regulatory authority for the management of such animals, it can offer expertise to other agencies, law-enforcement officials, and local animal-control agents for the purpose of identifying and managing hybrids.

Actions:

1. Support prohibitions and penalties associated with the possession of wolf–dog hybrids, as outlined under the Michigan Wolf–Dog Cross Act (Public Act 246 of 2000).

2. Train staff on the identification of wolf–dog hybrids.

3. Assist other agencies, law-enforcement officials, and local animal-control agents in efforts to identify and manage wolf–dog hybrids.

6.12 Develop and Implement a Socially and Biologically Responsible Policy Regarding Public Harvest of Wolves.

Harvest (i.e., hunting and trapping) of wolves by the public is a controversial issue that often polarizes stakeholder groups. Indeed, "the issue of hunting and trapping wolves—a public take—after they become delisted is perhaps the most divisive and potentially explosive issue in the entire wolf debate" (Nie 2003: 59). Public harvest of wolves is also biologically complex. The effects of harvest on a wolf population are determined by a suite of factors, including population size, age and sex structure, immigration and emigration rates, birth rates, and natural and human-induced mortality rates (Beyer et al. 2006).

In certain situations, members of the public could be authorized to take wolves in the absence of a designated harvest season (e.g., with a permit issued by the Michigan DNR), regardless of the State legal classification of wolves. However, a public harvest during a regulated season would require that wolves be classified as game animals. Game-animal status in Michigan may be designated only by the State Legislature. In addition, only the State Legislature could authorize the first harvest season. If such designation and authorization were conferred, the Michigan Natural Resources Commission would then need to enact regulations pertaining to the methods and manner of public harvest. Although the decisions regarding establishment of a harvest season will be made outside the purview of this plan, this strategy offers some relevant recommendations.

The following objectives separate the issue of a public wolf harvest into two categories. The first category deals with harvest that addresses a need to reduce wolf-related conflicts. The second category deals with harvest as a recreational or utilitarian benefit, independent of any need to reduce wolf-related conflicts through management. Public support for a public harvest appears to differ according to the primary purposes reflected in those two categories.

6.12.1 Develop and implement a policy regarding public wolf harvest for the purpose of reducing wolf-related conflicts.

Wolf-related conflicts are often caused by the behavior of a few individual wolves, and management at small scales can often address problems effectively. To the extent that it is expected to be effective and logistically feasible, conflict management under this plan will be conducted at the level of individual wolves or packs.

Some situations may warrant consideration of reducing wolf numbers in localized areas as a means to reduce the risk of negative interactions. Such consideration could be necessary if a high density of wolves in an area, rather than the behavior of individual wolves, was determined to be responsible for problems that could not otherwise be addressed through non-lethal or individually directed lethal methods. As of this writing, a situation of this type has not occurred in Michigan.

Many Michigan residents would support reduction of wolf numbers in localized areas if it would reduce problems caused by wolves (Beyer et al. 2006). The extent of public support appears to depend on the nature of the problem to be addressed. The percentage of interested survey respondents that supported reducing wolf numbers through lethal means was highest with regard to human-safety concerns (59%), intermediate with regard to depredation problems (54%), and lowest with regard to impacts on the number of deer available for hunting (49%).

Current public attitudes also vary according to management methods. Public support for the use of trained, paid professionals to reduce wolf numbers is generally weak. Thirty-eight percent and 26% of interested survey respondents supported the use of professionals to either shoot or trap wolves, respectively. Opposition to the use of paid professionals to either shoot or trap wolves was expressed by 49% and 59% of respondents, respectively. By contrast, the public indicated moderate or strong support for the use of licensed hunters and trappers during a controlled public harvest season. Sixty-seven percent and 60% of respondents supported the use of licensed hunters and licensed trappers, respectively. Opposition to the use of licensed hunters and licensed trappers was expressed by 26% and 31% of respondents, respectively.

The efficacy of using licensed hunters and trappers to reduce local wolf numbers would depend on the behavioral and reproductive responses of wolves and the method and manner of take. Wolves are prolific and can quickly re-colonize areas through immigration (Fuller et al. 2003). As a result, wolf populations can remain stable or increase despite relatively high mortality rates (Fuller 1989, Mech 2001). Recent public wolf harvests in Alaska, Canada and other parts of the world did not cause long-term reductions in wolf populations (Boitani 2003); however, population reduction was not necessarily a goal of those harvests. Where efforts to reduce wolf population sizes have been successful, the methods that were used (e.g., poisoning, aerial shooting) are generally considered to be politically and socially unacceptable (National Research Council 1997, Boitani 2003). Public harvest with those methods will not be authorized in Michigan. Any legal public harvest in Michigan would be conducted with socially and biologically responsible methods.

This strategy reserves the option to evaluate and apply, as appropriate, the use of hunters and trappers as a management tool for addressing conflicts that can not otherwise be resolved. This strategy does not recommend or oppose establishing a regulated harvest season on wolves. Rather, it recommends evaluating local situations on a case-by-case basis, and then applying the assistance of hunters and trappers, as prudent, to reduce wolf-related risks to acceptable levels. If such action is deemed necessary, it will be planned based on the best available research and its effects will be evaluated to ensure it does not threaten the long-term viability of the Michigan wolf population.

Actions:

1. Evaluate conflict situations to determine whether localized reduction of wolf numbers is necessary to reduce wolf-related conflicts.

2. Evaluate the potential impacts of licensed hunters and trappers on local levels of wolf-related conflicts and the local and regional wolf population.

3. If prudent, develop a program to recruit and use licensed hunters and trappers to reduce levels of wolf-related conflicts in localized areas.

6.12.2 Develop and implement a policy regarding public wolf harvest for reasons other than managing wolf-related conflicts.

Although the public generally supports the use of licensed hunters and trappers to reduce wolf-related conflicts, it is more ambivalent on the issue of a public wolf harvest specifically for recreational or utilitarian purposes (Beyer et al. 2006). Fifty-five percent of interested survey respondents supported a controlled hunting season "in those areas of Michigan where wolf population could be hunted without endangering the population" and 33% of interested respondents opposed such a hunt. Forty-eight percent and 41% of interested respondents respectively supported and opposed a controlled trapping season "in those areas of Michigan where wolf population could be hunted without endangering the population."

Although members of the Michigan Wolf Management Roundtable reached consensus on every other issue, they did not reach agreement on whether a regulated wolf hunting/trapping season should be provided in the absence of any need to reduce wolf-related conflicts. Some Roundtable members supported such a hunting/trapping season because many Michigan residents would place an important value on and derive benefits from the opportunity to harvest wolves. Other members opposed a hunting/trapping season in the absence of a specific need to reduce local wolf abundance because it would conflict with the cultural and personal values of many other Michigan residents. After substantial deliberation, the group concluded consensus on any guiding principles regarding the issue was not possible because the disagreement focused primarily on important differences in fundamental values.

In other areas of the world where public wolf harvests recently have occurred, including Canada and Alaska, wolf populations appeared to remain stable or increase, even when hunters and trappers annually removed as much as 28% of local populations (Boitani 2003). In the event a public wolf harvest is authorized in Michigan, the effects of particular levels of take on the wolf population would depend on a variety of factors, including local conditions and population characteristics. Analyses of those factors would be important for the regulation of a sustainable harvest that does not threaten population viability.

Given the absence of a strong public preference, lack of specific guidance from the Roundtable, and the need to assess the biological effects of different levels of take, the following actions focus on the need to gather and evaluate additional biological and social information regarding a general wolf harvest.

Actions:

1. Evaluate the potential biological effects of a public wolf harvest specifically for recreational or utilitarian purposes.

2. Monitor and evaluate the demand for and public acceptability of a public wolf harvest specifically for recreational or utilitarian purposes.

3. If biologically defensible, legally feasible, and supported by the public, develop a program to offer opportunities for the public to harvest wolves for recreational or utilitarian purposes.

7. PLAN MONITORING AND REVIEW

Regular communication among agencies, stakeholder groups and the general public would allow interested parties to monitor progress made toward implementation of this plan. It would also provide opportunities for management agencies to receive input on specific management issues. To facilitate these benefits, the Michigan DNR will establish a wolf management advisory group. The group will convene on an annual basis, or as otherwise needed, to discuss management goals, educational opportunities, conflict resolutions, and other topics. Membership of this group will represent the diversity of wolf-related interests and management responsibilities in Michigan. The role of the advisory group will differ from that of the Michigan Wolf Management Roundtable, which fulfilled its charge and was disbanded following its review of this plan.

Wolf abundance and distribution, attitudes of Michigan residents, and wolf legal status may continue to change through time. To address ecological, social and regulatory shifts in a timely manner, the Michigan DNR will review and update this plan at 5-year intervals. The plan-revision process will include review of the best available scientific information and substantial involvement by affected stakeholder groups and the general public.

8. FUNDING

Costs of wolf management are associated with salaries, wages, contracts, travel, equipment, facilities, livestock compensation, and information and education materials. These costs have been significant for many of the agencies and partners involved in wolf management. Given persistent management needs, they are expected to remain significant into the foreseeable future.

The Federal status of wolves does not influence the amount of funding available to the Michigan DNR for wolf management. The levels and sources of funding that supported wolf management prior to the 2007 Federal wolf de-listing decision (USFWS 2007) continue to be available to support the implementation of this plan. Similarly, the continuing contributions of USDA Wildlife Services to the Michigan wolf management program do not depend on the Federal status of wolves.

At all ten wolf-focused public meetings hosted by the Michigan DNR in May 2005, the public expressed diverse concerns pertaining to funding for wolf management. Some people were concerned about the large expense of population monitoring and other management activities. Others desired assurance that sufficient funds would be available to maintain adequate staffing levels and allow timely agency responses to depredation complaints and other concerns. Others objected to a funding approach that has traditionally caused some stakeholder groups (i.e., hunters and trappers) to disproportionately bear the financial costs of wolf management.

Most funding for wildlife management has traditionally been derived from revenues generated by sportspersons. For example, the Michigan Game & Fish Fund is generated by State hunting and fishing license revenues, and the Federal Aid in Wildlife Restoration Act (a.k.a. Pittman–Robertson Fund) provides funds derived from an excise tax on purchases of firearms and sporting goods. In the absence of many other funding alternatives, the Michigan DNR wolf management program has been supported primarily by these two funding sources. As a result, sportspersons have played a critical role in the recovery, conservation and management of Michigan wolves.

Other agencies, tribes and private organizations also have played an important role by addressing education, conservation and research needs. The financial and staff resources applied by these groups have complemented traditional funding sources in ways that have broadened the wolf management program.

Sportspersons and other management partners have provided most of the funding for wolf management, but they currently represent only a small proportion of all Michigan residents. Regardless of the inequities that may be associated with such a system, a funding approach that relies on the disproportionate contributions of these groups may become inadequate, especially if the prevalence of sportspersons within the general population continues to decline.

Successful efforts to obtain funding from alternative sources could spread the financial support for wolf management among a greater variety of stakeholder groups than traditional funding sources currently allow. Such an approach could help sustain the required levels of funding, and it could provide the general public with a greater stake and interest in wolf management.

The Michigan DNR will work with management partners to explore opportunities to identify new funding sources and to distribute the financial support for wolf management more-evenly among a greater diversity of stakeholders. It will also assist its management partners in their efforts to maintain the funding required for their wolf management activities. Finally, the Michigan DNR will take other prudent steps to ensure sufficient funding will be available to address management needs and to ensure funding is used in a responsible, efficient manner.

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10. APPENDIX:

MICHIGAN WOLF MANAGEMENT ROUNDTABLE REPORT

RECOMMENDED GUIDING PRINCIPLES

FOR

WOLF MANAGEMENT IN MICHIGAN

REPORT OF THE MICHIGAN WOLF MANAGEMENT ROUNDTABLE

TO

THE DIRECTOR OF THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES

NOVEMBER 2006

MICHIGAN WOLF MANAGEMENT ROUNDTABLE

Primary Representatives
Gaylord Alexander, Michigan Resource Stewards
Benjamin Bartlett, Michigan State University Extension
Thomas Courchaine, Michigan DNR Law Enforcement Division
David Cromell, Michigan Sheriffs' Association
James Dabb, Safari Club International, Michigan Chapters
Jason Dinsmore, Michigan United Conservation Clubs
Douglas Erickson, Central Upper Peninsula Planning and Development Commission
Miles Falck, Great Lakes Indian Fish and Wildlife Commission
John Hongisto, Upper Peninsula Sportsmen's Alliance
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Gary Modlin, Upper Peninsula Whitetails Association
Kerry Mullin, Michigan Humane Society
Richard Pershinske, Michigan Farm Bureau
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Matthew Wood, Michigan Hunting Dog Federation

FACILITATOR'S NOTE

I believe it is important to convey the depth of thinking and the process that created this document. From June through September 2006, delegates from 20 Michigan organizations and agencies met for 10 full days to define wolf-management issues, review the relevant social and biological science, and address the difficult task of reaching consensus on guiding principles for wolf management in Michigan. The intellectual growth and experience this diverse group shared during that time allowed the development of guiding principles that are informed, considered and fair.

Delegates represented their organizations, their agencies, and the people of Michigan equally well. Collectively, they comprise a group that knows more and has thought more deeply about wolf management in Michigan than any other single group of organizations and agencies in the State. As the facilitator of the Wolf Management Roundtable process, I am grateful for their personal talents, sacrifices and persistence, and I am proud of the work they have done to produce this document for the people of Michigan.

R. Ben Peyton
Wolf Management Roundtable Facilitator
Department of Fisheries and Wildlife
Michigan State University

INTRODUCTION

We, the Michigan Wolf Management Roundtable, present this report to the Michigan Department of Natural Resources (DNR) to help guide the management of wolves and wolf-related issues once the species is removed from the Federal list of threatened and endangered species. We ask the DNR to apply the guiding principles contained herein in its efforts to develop a wolf-management plan that addresses the diverse interests of Michigan society.

Need to Revise the Existing Wolf Plan

The DNR developed the *Michigan Gray Wolf Recovery and Management Plan* in the early 1990s, following the natural re-colonization of wolves in the State. Since that time, the number of wolves in Michigan, as well as in Wisconsin and Minnesota, has increased substantially. Recently, the U.S. Fish and Wildlife Service proposed removing wolves in the western Great Lakes region, including Michigan, from the Federal list of threatened and endangered species.

When wolves in the western Great Lakes region achieve both biological and statutory recovery, anything that prompts a need to reclassify them as threatened or endangered would be detrimental to both the wolf population and the citizens of Michigan. The DNR has stated its commitment to maintain a viable Michigan wolf population above a level that would require its reclassification as threatened or endangered. To achieve that goal, the DNR must implement a wolf plan that assures adequate protection and management of the species. Although the existing State plan has been a valuable tool for recovery of the species, wolf population size and distribution have changed and understanding of wolf biology has improved significantly since it was written. To continue to manage the wolf population based on the best available scientific information, the DNR has initiated review and revision of the existing plan.

Planning Challenges

Many Michigan citizens derive benefits from the presence of wolves. As top predators, wolves fill an important ecological niche and are indicators of environmental health. Wolf-based tourism may provide significant economic benefits to local economies. Many people value the presence of wolves for cultural and religious reasons. Many people also find personal enjoyment and satisfaction by observing wolves in the wild or by simply knowing they exist. Provision of these benefits fosters public support for a wolf population and thus serves the best interests of both wolves and Michigan citizens.

The presence of wolves also poses significant costs and concerns for some Michigan residents, and effective management must minimize and resolve wolf-related conflicts. Conflict-resolution is important to affected stakeholders, but it is also critical to wolf conservation. Citizen support for a wolf population depends, in part, on confidence wolf-related conflicts will be resolved effectively. Failure to address conflicts could foster negative attitudes that lead to adverse impacts on wolf distribution and abundance. Thus, effective management of wolf-related conflicts benefits affected stakeholders as well as the wolf population as a whole.

The needs to maintain a viable population, to provide wolf-related benefits, and to resolve conflicts are broadly accepted, but determining the methods that should be used to meet those needs tends to be more controversial. Interested parties often disagree on the ways wolves should be managed, and those disagreements often originate from differences in values and beliefs held within different segments of society. Although multiple management approaches could be used to achieve wolf-management goals, some of those approaches may not be acceptable to some stakeholder groups or to society at large. Effective planning must identify goals and objectives that are supported by Michigan society.

Guidance from the Roundtable

To help it develop a wolf plan that is acceptable to a wide range of stakeholder interests, the DNR convened the Michigan Wolf Management Roundtable. We, the members of that group, were selected to represent the diversity of Michigan interests in wolves. Our membership includes 20 agencies and organizations, which represent environmental and ecological interests, hunting and trapping interests, livestock-producer interests, public-safety interests, tourism and resource-development interests, Tribes, and wolf-protection interests. Our membership includes Upper Peninsula and Lower Peninsula residents in roughly the same numbers to ensure adequate representation of the different regions of the State. Our charge, as given by the DNR, was to develop principles to guide management of Michigan wolves and wolf-related issues following Federal de-listing.

The original *Michigan Gray Wolf Recovery and Management Plan* addressed issues at the strategic level. That is, it identified an overall goal for wolf recovery and management and it identified management objectives pertinent to specific issues; it did not outline the operational details of how those goals and objectives should be achieved. The revised plan will also be a strategic plan. Accordingly, the DNR asked us to develop guiding principles that addressed planning needs at a strategic level. We were not asked to provide recommendations regarding specific methods that should be used to achieve goals and objectives.

We have developed guiding principles consistent with the direction we were provided. Consequently, the DNR will have considerable latitude to select and implement specific methods for achieving strategic goals and objectives. We trust the DNR will, to the extent legally and practically possible, develop a strategic plan that is consistent with our recommendations. In the following sections, we have offered explanations to clarify our intent and thus ensure correct interpretation of the guiding principles.

Approval of the specific language for each guiding principle required consensus among all members of the Roundtable. Given the breadth of values and beliefs represented on the group, achieving consensus was often challenging and would not have been possible without considerable commitment and sincere, objective thinking by each member. The guiding principles are the product of months of substantial deliberation and compromise. We developed them after review of the best available science and with consideration and respect for all of the diverse perspectives represented.

We recommend the following guiding principles with the belief they will serve the best interests of the Michigan wolf population and the people of the State.

WOLF ABUNDANCE AND DISTRIBUTION

We believe the goal of managing wolf abundance and distribution should be to maintain acceptable levels of positive and negative interactions while ensuring the long-term viability of a wolf population. Setting numeric goals for wolf abundance at large geographic scales (e.g., the entire State, the entire Upper Peninsula) would therefore be inappropriate, because it would not reflect the unequal distribution of wolf habitat, human activity and the potential for positive and negative interactions. Moreover, wolf numbers alone do not necessarily predict the frequency of certain types of interactions. In an area of abundant natural prey and few human residences, for example, a large number of wolves could cause a relatively low level of negative interactions. Conversely, a small number of wolves could create an unacceptably high level of negative interactions in local areas where natural prey is scarce or where human population density is high. Therefore, setting numeric goals for wolf abundance at large geographic scales should be avoided because it would not necessarily reduce negative interactions, could unacceptably restrict positive interactions desired by the public, and could promote an inaccurate public perception regarding the relationship between wolf numbers and the risk of conflict.

Previous management experience suggests most wolf-related conflicts are best handled on a case-by-case basis, and managing individual conflicts by reducing wolf numbers at a broad geographic scale would be inappropriate. However, we recognize some unique situations may warrant consideration of reducing wolf numbers in local areas as a means to reduce the risk of negative interactions. The potential feasibility and efficacy of such an approach in Michigan remains uncertain. Wolves are prolific and have quickly re-colonized other areas where population-control efforts have been conducted. Whether management could effectively reduce wolf numbers in local areas of Michigan, especially over the long-term, has not yet been proven. Moreover, conflicts in local areas are often caused by a few individual wolves, and the potential efficacy of generally reducing wolf numbers to manage conflicts remains unclear. Given this uncertainty, we stress that consideration of local population reduction should be approached with caution. If such action is ever deemed necessary, it should be planned based on the best available research, and its effects should be evaluated thoroughly to ensure the future use of the action is appropriate.

Guiding Principles:

- Goals for wolf management should be based on wolf impacts (positive and negative) rather than wolf abundance or numbers. When establishing strategic goals for wolf abundance and distribution on multiple geographic scales, the DNR should consider the importance of:
    - maintaining a wolf population to ensure adequate genetic diversity and population sustainability;
    - providing ecological and social benefits associated with wolves;
    - maintaining sustainable populations of wildlife and their habitats;

- minimizing risks to human safety; and
- limiting depredation of dogs, livestock and other domestic animals.

- Conflicts should be managed at an appropriate scale. Whenever applicable, wolf conflicts should be resolved at the individual and pack level. If wolf numbers are determined to be the cause of increased conflicts significantly affecting human safety, depredation of dogs, livestock and domestic animals, or sustainable wildlife populations, then population management at the broader scale can be considered.

- Wolf population management should be done in an adaptive management framework. Strategies should be researched and outlined to afford timely response to population-management needs. Application of control should include an evaluation component.

- In recent years, Michigan wolves have been killed on a case-by-case basis by government personnel for the purpose of addressing wolf-related conflicts. All reason suggests wolves will continue to be killed for this purpose. The DNR can use hunters for this management need. Satisfying, in part, the interest to recreationally hunt would be an outcome of killing wolves to address wolf-related conflicts.

- If wolves expand naturally into regions within the Lower Peninsula to the extent that social acceptance permits such expansion, proactive education should be aimed at developing tolerance among the public and understanding the value of the cost and benefits of living with wolves.

BENEFITS OF WOLVES

We recognize wolves provide benefits to many citizens of Michigan. Accordingly, we feel the revised wolf plan should address ways to maximize those benefits and foster positive interactions associated with wolves. Although we were not able to agree on all of the positive experiences wolves provide or could provide, we did agree the presence of wolves is associated with the following benefits.

Cultural Values: Wolves are a species of great significance to Native Americans. Today, Native American communities in Michigan value the return of Ma'iingan (i.e., the wolf) as an intrinsic spiritual component in the reaffirmation and continued viability of their own cultural well-being.

Effects on Tourism and Recreation: A Michigan public-attitude survey conducted by Michigan State University in 2005 indicated the presence of wolves in an area would attract some citizens while deterring others, but nearly half of survey respondents indicated the presence of wolves would not be a consideration when choosing a vacation area. A marketing strategy that promotes the values of wolves could attract members of this latter group to local communities, thus yielding tourism and economic benefits.

Personal Appreciation: Many citizens feel the wolf has an 'existence value' and they benefit from knowing wolves exist as a healthy, thriving wild population in the State. This benefit can be realized whether or not people are able to see or hear those animals. The presence of wolves

signifies 'wilderness' for many people and those individuals may place a higher value and feel a sense of stewardship on Michigan's wolf range.

Nature Appreciation: The presence of wolves provides an exciting opportunity for those Michigan citizens who enjoy studying and observing nature. Although the opportunity to hear, see, photograph or study wolves in the wild of Michigan may be restricted to a relatively small portion of citizens, the experience and the option of having that experience are highly valued by those individuals.

Ecological Benefits: Not all citizens view the ecological role of the wolf in a positive way but most believe the wolf is an important component of a complex and dynamic ecosystem. Nearly three-quarters of interested Michigan citizens who responded to the 2005 public-attitude survey believed the ecological benefits were a 'very' or 'somewhat' important reason to have wolves in Michigan. Many Roundtable members viewed the presence of a self-sustaining population of wolves over time to be a positive indicator of ecosystem health.

Guiding Principles:

- The DNR should work with other agencies, Tribes and private organizations to foster benefits associated with wolves and to provide positive wolf–human interactions.

- Information describing the cultural and spiritual significance of wolves to Native Americans should be drafted in consultation with Michigan Tribes and appear in the body of the wolf-management plan.

WOLF–RELATED CONFLICTS

We recognize the presence of wolves imposes more costs on some groups of Michigan citizens than others. These costs range from actual losses of domestic animals to anxieties over the presence of wolves in residential or recreational areas. The following guiding principles were developed to help minimize the incidence of wolf-related conflicts, provide relief to citizens adversely affected by the presence of wolves and certain wolf behaviors, and thereby foster public acceptance and long-term viability of the wolf population.

We accept lethal control of wolves should be an option for response to conflicts involving wolves and livestock. However, the revised wolf plan should place a high priority on developing, evaluating and applying non-lethal management methods to reduce negative wolf impacts wherever possible. The guiding principles regarding lethal removal of wolves that attack livestock apply to situations where livestock losses have been documented or where a wolf is in the act of livestock depredation; they do not recommend lethal removal of wolves as a preventative measure in areas where problems have not yet occurred.

An attack on a dog that enters the territory of a wolf pack is a predictable, normal behavior of wild canines and, in itself, does not justify removal of all or some wolves in the pack. Not until such attacks become a chronic occurrence should removal of all or some of the wolves in the pack be considered.

We also place a high priority on avoiding abuse of management options (e.g., lethal removal of depredating wolves by livestock owners). The revised wolf plan should ensure lethal removal of wolves will be accompanied by whatever reporting, monitoring and enforcement is necessary to prevent excessive or inappropriate use.

Guiding Principles:

Depredation of Livestock

- The DNR should provide timely and professional responses to wolf–livestock complaints.

- Economic and other incentives, including compensation for losses at fair value, should be provided to livestock producers who voluntarily implement best management practices that decrease the potential for wolf–livestock conflicts.

- The DNR should take an incremental approach to addressing wolf–livestock conflicts that is guided by severity and frequency of conflicts. When severity and frequency of conflicts are low, more conservative methods should be applied whereas increasingly aggressive control methods may be applied as the severity and frequency of conflicts increase.

- As part of the incremental approach to addressing livestock losses, a suite of approaches must be used, including technical support and non-lethal and lethal methods. After depredation losses have been confirmed, lethal take permits to landowners on private land may be issued if non-lethal methods are determined to be ineffective.

- Livestock owners should be allowed to kill wolves in the act of livestock depredation without a permit on private property. All such incidents must be reported immediately and investigated. Abuses should be referred for prosecution.

Depredation of Dogs in Non-residential Areas

- We acknowledge there are conflicts between wolves and dogs.

- We recognize there is an inherent risk to dogs allowed to range in areas frequented by wolves. The primary responsibility for avoiding or minimizing conflicts between wolves and dogs, which includes making good-faith efforts to avoid areas the DNR has identified as having had wolf–dog conflicts, rests with the dog owners. The DNR should provide timely and professional responses to conflicts between wolves and dogs. Further, the agency response should be guided by the severity and frequency of conflicts. Lethal control should not be used unless wolf-attacks on dogs become a chronic occurrence and non-lethal methods are determined to be ineffective.

- The DNR should make pack territory information in known areas of probable or previous conflicts between wolves and dogs available to the public in an effort to reduce those conflicts.

- In an attempt to reduce conflicts between wolves and dogs, the DNR should work with the Natural Resources Commission and stakeholders to allow voluntary alternatives to reduce wolf visitation to bear bait sites.

Depredation of Pets in Residential Areas

- The DNR should provide timely and professional responses to wolf–pet complaints.

- The DNR should take an incremental approach to addressing wolf–pet conflicts that is guided by severity and frequency of conflicts.

Habituated Wolves

- The DNR should provide timely and professional responses to reports of habituated wolves and take necessary measures to minimize or eliminate human-safety risks posed by identified habituated wolves.

- We support the concept of a legal framework to hold persons accountable for intentionally engaging in behaviors that lead to the habituation of wolves.

WOLF HARVEST FOR REASONS OTHER THAN MANAGING WOLF-RELATED CONFLICTS

As addressed in the earlier section on wolf abundance and distribution, we accepted harvest of wolves by licensed hunters and trappers as a possible management tool to reduce wolf-related conflicts under specific conditions. We also considered the separate issue of whether a regulated wolf hunting/trapping season should be provided in the absence of any need to reduce wolf-related conflicts through management, provided good scientific data showed the harvest would be sustainable and would not threaten the viability of the wolf population.

We considered the available science and thoroughly explored many diverse perspectives on this issue. Some of us supported a hunting/trapping season in the absence of a specific need to reduce local wolf abundance because many Michigan residents would place an important value on and derive benefits from the opportunity to harvest wolves. Others of us opposed a hunting/trapping season in the absence of a specific need to reduce local wolf abundance because it would conflict with the cultural and personal values of many other Michigan residents. After substantial deliberation, we concluded consensus on any guiding principles regarding this issue was not possible because the disagreement focused primarily on important differences in fundamental values.

INFORMATION AND EDUCATION

The 1997 *Michigan Wolf Recovery and Management Plan* stated an extensive public information and education (I&E) campaign was needed to develop a supportive social environment for the recovery of wolves in Michigan. The plan outlined five I&E objectives:

1. Develop a coordinated information and education plan.
2. Develop materials for specific educational needs.
3. Maintain public contact.
4. [Participate in] public presentations and events.
5. [Provide] training for agency personnel.

Those objectives are still valid today. In fact, given the larger wolf population and greater potential for wolf–human interactions, the public need and demand for I&E regarding wolves is even greater now than it was in 1997. We believe the DNR should give a high priority to planning and implementing an effective I&E program regarding wolves. As with all management, an important component of this effort should include a periodic needs assessment and an evaluation of program effectiveness.

During our deliberations, we identified many specific issues that an I&E program should address. In no particular order, some of the I&E needs include:

- Educate residents, legislators and other decision-makers about wolf ecology and natural history.
- Educate residents, legislators and other decision-makers about the benefits and risks associated with wolves.
- Inform livestock producers how to reduce risks of depredation of livestock.
- Inform dog owners how to reduce risks of wolf-attacks on dogs at locations away from their residences.
- Inform users of wild lands of the risk of conflicts between wolves and dogs in an effort to reduce those conflicts.
- Inform pet owners how to reduce risks of depredation near their residences.
- Inform residents how to help prevent habituation of wolves.
- Educate Lower Peninsula residents to prepare them for the potential presence of wolves in their region.
- Disseminate information emerging from current research programs on wolves and their relationships to the Great Lakes ecosystem.

These needs include separate information and education components. The information component should address immediate needs of residents regarding possible interactions with wolves. The education component should be designed to provide a broader understanding of the wolf and its presence in Michigan. This component should address a broad audience and include public school audiences.

We identified the lack of sufficient communication staff and resources in the DNR to be one barrier to an effective I&E program. Overcoming this barrier will require extensive cooperation and partnering among the DNR, other agencies, Tribes and private organizations to develop and disseminate informational materials and educational programs. The wolf-management advisory council (recommended later in this report) should play an instrumental role in helping the DNR identify and respond to I&E needs.

There is a public perception the DNR lacks a clear policy regarding the types of wolf-related information that should be provided to the public. The revised plan should address this apparent lack of policy and develop an open, systematic process for responding to information requests at all levels. In the past, requests for information often failed to receive a response from the DNR. However, the addition of a wolf coordinator in the Wildlife Division in recent years has improved the DNR response to information requests and this position should be maintained.

Guiding Principles:

Information

- The DNR should provide timely information to support education and management efforts.

Education

- The DNR should coordinate, and evaluate the effectiveness of, a comprehensive education program.

- The DNR should initiate discussion with diverse user groups and provide information and technical expertise so the groups can develop educational materials to meet specific needs of their constituents.

RESEARCH

The gray wolf in Michigan is a component of a large and complex Great Lakes ecosystem. As such, the species presents many complicated management challenges. In our deliberations, we identified many instances where available science was not adequate to guide recommendations for wolf management. For example, we identified needs for more research regarding:

- the interactions between wolves and humans;
- the efficacy of different management options to address wolf-related conflicts (e.g., depredation of domestic animals);
- the complex interactions and population dynamics involved in wolf–ungulate systems;
- the nature and extent of the relationship between wolf population size and wolf-related conflicts; and
- the efficacy of wolf population reduction as a means to reduce the frequency of wolf-related conflicts.

We believe the DNR should place a high priority on wolf-related research. However, we recognize funding available to the agency will not be sufficient to study all the important questions related to wolves. For this reason, the DNR should continue to collaborate with partners to address research needs.

Guiding Principle:

- The DNR should continue an active wolf research program, with a focus on projects that clarify factors influencing the Great Lakes wolf population. This program should include investigations of biological and social questions to support science-based wolf management.

FUNDING FOR WOLF MANAGEMENT

As stated in its mission statement, the DNR is committed to the conservation, protection, management, use and enjoyment of the State's natural resources for current and future generations. Since wolves have become re-established in Michigan, they have once again become an integral part of the natural resources of the State. Given the DNR's mission and its implicit trust responsibilities for the State's wildlife, we believe the DNR should expend funds to conduct research and management of wolves.

We recognize most funding for wildlife management has traditionally been derived from revenues generated by sportspersons. The Michigan Game & Fish Fund is generated by State hunting and fishing license revenues, and the Federal Aid in Wildlife Restoration Act (a.k.a. Pittman–Robertson Fund) provides funds derived from an excise tax on purchases of firearms and sporting goods. In the absence of many other funding alternatives, the current DNR wolf-management program has been supported primarily by these two funding sources.

We recognize the important contributions of sportspersons toward the recovery and management of the Michigan wolf population. We also acknowledge the contributions of agencies, Tribes and private organizations that have addressed wolf education, conservation and research needs in places where traditional funding has fallen short.

We recognize wolf management will require significant expenditures by the DNR into the foreseeable future. Costs associated with the DNR wolf program may include expenses for salaries, wages, travel, equipment, facilities, livestock compensation, information and education materials, and other program elements. In the face of growing DNR budget challenges, it will be increasingly difficult to adequately meet wolf-management needs using only traditional funding sources. In light of these anticipated challenges, we encourage the DNR to pursue additional and alternative funding sources and partnerships for the management of wolves. We believe the use of alternative funding sources and partnerships could spread the financial support of wolf management among a greater variety of user groups than traditional funding sources currently allow.

Guiding Principle:

- The DNR, in collaboration with other agencies, Tribes and private organizations, should seek and develop funds to support effective implementation of the wolf management program.

WOLF–DOG HYBRIDS

Wolf–dog hybrids are produced when a wolf interbreeds with a dog or another wolf–dog hybrid. Ownership and proliferation of these animals in Michigan could threaten the viability of the Michigan wolf population for multiple reasons. First, released hybrids may breed with wild wolves and thereby introduce dog genes into the wolf population. This behavior can jeopardize the genetic integrity of the population and cause population-wide changes in morphological and behavioral characteristics. Second, a desire to breed and raise wolf hybrids may prompt some people to capture wild Michigan wolves illegally. Third, problems caused by released hybrids are often incorrectly attributed to wolves and thus reduce social acceptance for a wolf population. Collectively, these adverse consequences on the Michigan wolf population can be significant, and we believe the concerns expressed in the 1997 *Michigan Gray Wolf Recovery and Management Plan* are still valid today.

Guiding Principle:

- We are concerned wolf–dog hybrids will have negative effects on the wild wolf population in Michigan.

CAPTIVE WOLVES

Captive wolves that are released or escape pose a threat to both people and the wild wolf population. These wolves could pose risks to human safety; they could also reduce social acceptance for the wild population because the public is unlikely to distinguish between problems caused by released captive wolves and those caused by wild wolves. Given these adverse effects potentially caused by released or escaped captive wolves, we do not believe private citizens should be allowed to possess wolves in captivity in Michigan.

The Michigan Large Carnivore Act (Public Act 274 of 2000) prohibits the possession of several large carnivore species, except under permit. However, the list of species covered by this law does not currently include wolves. To provide a tool for limiting the possession of wolves in captivity, we feel the law should be amended to include wolves.

Guiding Principle

- We support adding the wolf as a species covered by the Michigan Large Carnivore Act (Public Act 274 of 2000).

WOLF-MANAGEMENT PLAN REVIEW PROCESS

Wolf abundance and distribution, attitudes of Michigan residents, and wolf legal status are likely to change after the revision of the wolf plan is complete. To address ecological, social and regulatory shifts in a timely manner, the wolf plan should be reviewed and revised at regular intervals. We ask the DNR to conduct timely reviews that incorporate adequate public input.

Guiding Principles:

- We encourage the DNR to include a provision in the plan for a wolf-management advisory council to continue to identify and discuss management goals, conflict resolutions, and public-education opportunities on an annual basis.

- The DNR should formally review and update the wolf management plan at 5-year intervals. The review process should provide for public input.

CERTIFICATION

We, the members of the Michigan Wolf Management Roundtable, as the designated representatives of our respective organizations and agencies, reached consensus on all of the preceding guiding principles and hereby certify we support the recommendations set forth in this report.

Gaylord R. Alexander — 11-2-06
Gaylord Alexander — Date
Michigan Resource Stewards

Benjamin Bartlett — 11-2-06
Benjamin Bartlett — Date
Michigan State University Extension

Thomas C. Courchaine — 11/2/06
Thomas Courchaine — Date
Michigan DNR Law Enforcement Division

David Cromell — 11/2/06
David Cromell — Date
Michigan Sheriffs' Association

James Dabb — 11-2-06
James Dabb — Date
Safari Club International, Michigan Chapters

Jason Dinsmore — 11/2/2006
Jason Dinsmore — Date
Michigan United Conservation Clubs

Douglas Erickson
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Miles Falck
Great Lakes Indian Fish and Wildlife Commission

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John Hongisto
Upper Peninsula Sportsmen's Alliance

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Michigan DNR Wildlife Division

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Kerry Mullin
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11.2.2006
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National Wildlife Federation

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Marvin Roberson
Sierra Club

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Steven Schaub
Timber Wolf Alliance

11-2-06
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John Talsma
Michigan Farm Bureau

11-2-06
Date

Michael Thorman
Michigan Hunting Dog Federation

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John Vucetich
The Wildlife Society

11/6/06
Date

Nancy Warren
Defenders of Wildlife

11/2/06
Date