

FISHER MANAGEMENT SYSTEM AND DATABASE

SEPTEMBER 1990

Maine Department of Inland Fisheries & Wildlife
Wildlife Resource Assessment Section
Mammal Group

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PART I. - FISHER MANAGEMENT SYSTEM

INTRODUCTION

This document describes the current system by which biologists of the Maine Department of Inland Fisheries and Wildlife (MDIFW) make fisher (Martes pennanti) management decisions on an annual basis. Part I outlines the decision-making process by which biological information indicates management options. Part II details techniques for estimating biological parameters used as inputs in the decision-making scheme presented in Part I. Goals, population and allowable harvest estimates, and habitat information were detailed in the 1985 fisher assessment.

This document addresses biological factors of current fisher management only. Social, political, and economic factors and goals are addressed in the 1985 fisher assessment.

MANAGEMENT GOAL AND OBJECTIVES

Goals and objectives for fisher management were established in the 1985 fisher species plan to guide management through 1990. Goals and objectives were based on recommendations made to MDIFW by a working group composed of individuals representing public groups interested in fisher management.

Management Goal

Maintain fisher populations at no lower than 1985 levels throughout the State.

Abundance objective

Maintain pre-harvest fisher populations at no lower than 1985 levels in all WMU's through 1990. Estimated densities: (fisher/mi² habitat) 0.47 in WMU 7, 0.44 in WMU 8, 0.43 in WMU 4, 0.42 in WMU 1, 0.37 in WMU 3, 0.36 in WMU 2, 0.15 in WMU 5, and 0.05 in WMU 6).

Harvest Objective

Maintain average harvest at 25% of the estimated population in each WMU or whatever level is needed to stabilize the population, and maintain use-opportunity (season length and timing) at current levels through 1990.

Assumptions

Fisher management goals and objectives are based on the following four assumptions from the 1985 fisher assessment:

- a 5% decline in habitat quantity statewide is projected for 1990, but habitat quality should remain stable. Carrying capacity will, therefore, drop about 5% during the same period.
- statewide populations are well below carrying capacity (estimated 56%). Populations in Wildlife Management Units (WMU) 7 and 8 are the only populations near carrying capacity.
- demand for fisher will remain high, although the number of trappers harvesting fisher is expected to decrease about 4% by 1990.

MANAGEMENT DECISION PROCESS

Management decisions primarily address the goal of maintaining a stable or increasing fisher population while providing opportunity for use of the resource.

Decision-making is a series of yes or no answers to questions related to fisher population status (Figure 1). Responses to questions are based on evaluation of all input criteria and the flow chart guides the manager to the appropriate and/or current management option.

For the purposes of this process, fisher carrying capacity is considered constant between 5-year assessments of habitat quality and quantity.

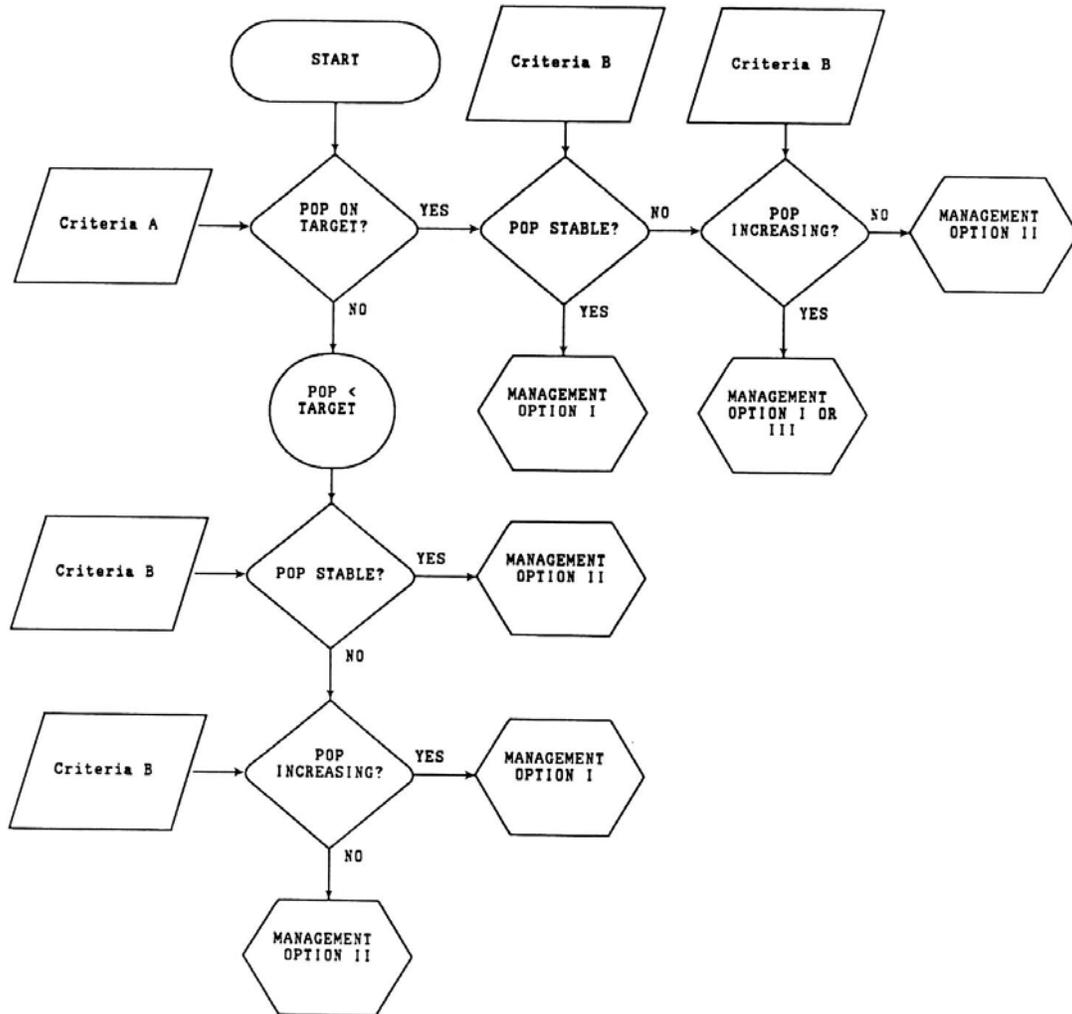
Input Criteria for Fisher Management

The decision process for fisher management uses two sets of input criteria. Criteria A are harvest and long-term trend data to compare the present fisher population with the target (1985) population. Criteria B are short-term trends used to assess population stability. Fisher populations are assessed separately for each management unit.

Criteria A

This input consists of a 2-step process. Step 1 compares the current harvest in each management unit with an estimate of the maximum allowable harvest. If harvests exceed the estimated allowable limits, the population is assumed to be below the target (1985 population). Step 2 compares the present population in each management unit

FIGURE 1. CURRENT FISHER MANAGEMENT DECISION MAKING PROCESS.



with the target. This step uses trends in harvest, trapper success rate, and effort for all years beginning with 1985 and ending with the current year. If the trends suggest a population decline since 1985, then the population is assumed to be below the target.

Step 1: The maximum allowable harvest for each management unit is calculated as follows:

- a. Habitat is evaluated using a habitat suitability index model, and the number of habitat units (HU) is calculated for each management unit.
- b. The potential fisher population is calculated for each management unit as $0.9 \times \text{HU}$.
- c. Actual populations are assumed to be somewhat less than the potential in all units. Thus, the potential populations are reduced by amounts determined by evaluating recent harvest results and input from regional biologists, wardens, and local citizens.
- d. Allowable harvests are determined to be 25% of the existing populations, based on the assumptions that adult females constitute 36% of the population, are one fourth as susceptible to trapping as other fishers, and can sustain a harvest of 10%. For a population recovering after a period of overharvest, the allowable harvest will be set to 19%.
- e. If the harvest was $>25\%$ of the estimated population in any 2 management units for 2 consecutive years, or $\geq 30\%$ of the estimated population in any 1 management unit for 2 consecutive years, then the population is assumed to be below the target and management action is indicated. Populations deemed to be

below target according to these criteria will be assumed to be back on target when the harvests in the affected management units have been $\leq 19\%$ of the estimated populations for a period of 5 years, provided that trends described under Step 2 do not suggest otherwise.

Step 2: Long-term trends are evaluated by calculating regressions of annual harvest and trapper success rate for all years beginning with 1985. Trends in harvest and success will then be compared with changes in trapper effort during the same period. A trend index will be judged to have changed if the slope of the regression is significantly different from 0, with $P \leq 0.2$ during any one year, or $P < 0.4$ during three consecutive years. These probability levels are necessary because of the large variance in fisher harvests between years.

Harvest trend = the number of fisher registered by trappers during each year in each WMU.

Success Rate = (no trapping limit in effect) the number of trappers that catch at least one fisher divided by the number that catch at least one fisher, marten, bobcat, fox, or coyote (i.e., successful land trappers), determined for each WMU. If a limit is put into effect (see management option II), then the denominator in this calculation will be the number of trappers requesting tags for fisher trapping.

Effort = the percent change from the previous year in prices paid for marten, fisher, mink, coyote, and red fox pelts statewide. Changes in effort will be assessed as follows:

Average prices reported by Maine furbuyers during each season will be determined for marten, fisher, mink, coyote, and red fox. Changes in these prices between 2 consecutive years will be determined according to the formula:

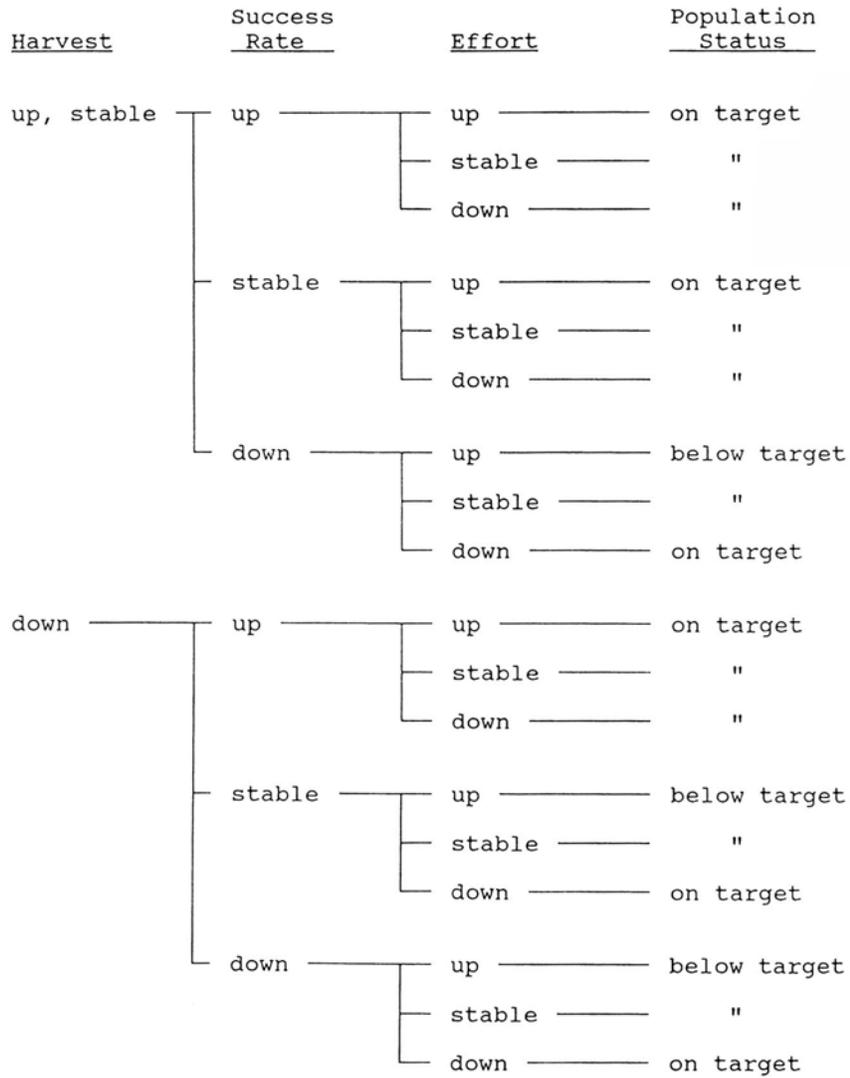
$$\text{Percent change} = \frac{\text{Year 2 price} - \text{Year 1 price}}{\text{Year 1 price}} \times 100$$

The mean percent change (MPC) will be determined over all years since 1985. If MPC of fisher pelts increases by >10%; **or** if the MPC of fisher pelts is unchanged (<10% increase or decrease) and MPC for the other furbearers (averaged together) decreases by >10%; then effort will be assumed to have increased.

If MPC of fisher pelts decreases by >10%; **or** if MPC of fisher pelts is unchanged and MPC of other furbearers increases by >10%; then effort will be assumed to have declined.

Otherwise, effort will be assumed to be constant.

The status of the fisher population will be determined according to the following chart (assuming that harvests are below the allowable limits):



Criteria B:

Population stability is examined using the trends described under Step 2, assessed over the most recent 5year period only. Decisions regarding population stability will be made using the rules described above.

Management Options and Recommendations*Management Option I*

Maintain current harvest levels through season length, timing, and trapper effort.

Management Option II

Decrease harvest to $\leq 19\%$ of estimated population for a period of 5 years. This may be accomplished by limiting the number of fishers each trapper can take. When first put into effect, this limit will be set to 5. If additional reductions are required, the limit will be reduced to 3, 2, 1, or the season will be closed.

Management Option III

Increase harvest by increasing or removing limits, if in effect.

CHRONOLOGY OF FISHER MANAGEMENT ACTIVITIES

Fisher pelts tagged	November-December
Harvest data entered	December-January
Pelt price survey	November-April
Meeting with MTA and furbuyers	March
Harvest, license, and other data analyzed	May
Recommendations for rule changes	May-June
Public hearings	June-July
Regulation changes adopted	July-August

PART II. - FISHER MANAGEMENT DATABASE

FISHER DATA COLLECTION SUMMARY

Fisher Harvest Data

Law requires that each harvested fisher be tagged by an agent or personnel of MDIFW (Appendix I). Data recorded at the time of tagging include trapper name and license number, month of capture, and township of capture. These data are recorded in registration booklets (Appendix II). Books are inspected by the Warden Service and submitted to the Data Entry Section of the Bureau of Resource Management. There, data are coded and entered on the IBM mainframe computer of the Bureau of Data Processing. Harvest data are analyzed and summarized by a series of computer programs (Appendix III) that provide information on total catch by township, WMU, and statewide, number of trappers catching fisher, harvest St/Mi2, harvest by trapper, and historical harvest summary.

Harvest versus Allowable Harvest

Harvest figures are obtained through the summary of pelt tagging data. Estimates of fisher densities were derived from telemetry studies, winter track counts, and harvest data.

Studies in Waldo County indicate the following characteristics for a harvested fisher population:

- 1) Adult males use larger ranges and have greater mortality than adult females, thus we assume a population sex ratio of 2 AF : 1 AM.
- 2) Estimated fecundity is 1.25 juveniles : AF. This is equal to 2 AF : 2.5 juveniles.

- 3) We assume equal mortality for juveniles and adult males; thus the population will consist of 2 AF : 3.5 others.
- 4) In an intensively trapped population, adult female fishers are 1/3 as likely to be trapped as are other fishers; in a moderately trapped population we assume adult females will be 1/4 as likely to be trapped as other fishers.

A stable fisher population with fecundity of $1.25/AF$ requires AF survival of 0.8 and survival of other fishers of 0.4. Given non-trapping mortality rates equal to those found in Waldo County (10% for AF, 15% for other fishers), the allowable harvest rate for AF is 0.10; the allowable harvest for other fishers is $(4 \times 0.10) = 0.40$.

Given an age/sex structure of 2 AF : 3.5 others, the population can sustain a harvest of:

$$(2 \times 0.10) + (3.5 \times 0.40) = 1.6 \text{ harvested} / 5.5 \text{ fishers, or } 29\%.$$

Thus, the allowable harvest for a population near carrying capacity that has not been trapped intensively during recent years will be 29%. To be conservative, the allowable harvest under normal circumstances will be set to 25%. If a population has been subject to intensive trapping, the ratio of AF : others will be less and the relative vulnerability of AF to trapping will be greater. Thus, for a population that has recently been over-harvested and is now in the process of recovery, the allowable harvest level will be set to 19%.

Effort

Trapping effort is assumed to be directly related to the average price paid for fisher pelts, and inversely related to prices paid for pelts of marten, fox, coyote, and mink. This information is determined from a monthly mail survey of furbuyers, conducted from November to April each year (Appendix IV).

Regional and Trapper Observations

When harvest analyses and summaries have been completed, copies are sent to regional biologists and to the Maine Trappers Association (MTA). Meetings are held to discuss regional and trapper observations in conjunction with harvest analysis information. These meetings provide supplemental information from people that spend time in the field to help support or refute conclusions drawn from harvest data.

LIST OF APPENDICES

- I. Rules governing the tagging of fisher pelts.
- II. Sample page from pelt tagging registration book.
- III. Summary of computer programs and analyses applied to fisher pelt tagging and trapper data.
- IV. Monthly pelt value mail survey form.

APPENDIX I. Rules governing the tagging of fisher pelts.

H. Tagging Procedure

It shall be unlawful for any person to possess, sell, give away, buy, accept as a gift, offer for transportation or transport any raw fox, bobcat, marten, fisher, coyote, raccoon, beaver, mink, or otter skins unless each skin is tagged.

All raw skins of these species must be presented to a warden, or other agent designated by the Commissioner, and each raw skin legally presented shall be tagged. All information requested relating to the taking of each skin shall be accurately and truthfully reported. A fee of 25¢ shall be paid for each skin tagged.

All raw fox, marten, fisher, coyote, raccoon, bobcat, beaver, mink, and otter skins shall be presented for tagging within 10 days after the closing of the open season thereon, except the raw skins of all bobcat taken during the open bobcat hunting season shall be presented, by the person who killed said bobcat, for tagging within 72 hours of killing said animal.

Any raw skins of these species that come into this State in any manner from any other state, country, or province shall bear the official stamp, tag, or seal of such other state, country, or province. Any such skins that does not require an official stamp, tag, or seal, shall be tagged in accordance with this section by the person possessing such raw skins. The fee for tagging such imported raw skins shall be 25¢ for each tag so issued. Licensed taxidermists who import raw skins for the purpose of taxidermy are exempt from the provisions of this paragraph.

I. Raccoons

Raccoons may be hunted at night during the open season only when the hunter (i) is accompanied by a dog, (ii), uses an electric flashlight to locate raccoons that are treed, or held at bay, by a dog or dogs, and (iii) is in possession of, an uses a rifle, pistol, or revolver of no greater power or caliber than one which uses .22 caliber long rifle ammunition; said rifle to be loaded only when being used to dispatch a raccoon that is treed or held at bay by a dog or dogs.

J. Size of Traps

Animals may be trapped with any common ordinary steel trap.

APPENDIX II. Sample page from pelt tagging registration book.

FUR TAGGING SHEET

(see instructions outside and inside front cover)

License Type ¹	License Number ²	Seal Number ³	Species ⁴	Month ⁵	Year ⁶	Town Caught (use complete Township ID) ⁷	County ⁸	B S
41	+1673	71976	Red Fox	11	86	Moore River	Southern	
41	+1673	71977	Marten	11	86	+ Moore River	"	
41	+1673	71978	"	11	86	"	"	
41	+1673	71979	"	11	86	"	"	
41	+1673	71980	"	11	86	"	"	
41	+1673	71981	"	11	86	"	"	
41	+1673	71982	"	11	86	"	"	
41	+1673	71983	"	11	86	"	"	
41	+1673	71984	"	11	86	"	"	
41	+1673	71985	Marten	10	86	"	"	

APPENDIX III. Summary of computer programs and analyses applied to fisher harvest and trapper data.

Description of furbearer data analysis and information system.

Program	Input Data	Outputs	Users
TRAPLIST SAS	License data (tape)	Alphabetical listing by county of trapping license holders.	Requests from outside sources.
LISTTRAP SAS	License data (tape)	Numerical listing by license and alphabetical listing by name of trapping license holders.	1) Furbearer Project 2) Warden Service
LICSUM SAS	License data (tape) Township data (disk)	Summary of licenses by type by region and WMU.	1) Furbearer Project 2) Regions 3) Administration
PRELIMHV SAS	Harvest data (tape)	Summary of harvest by WMU for each species.	1) Furbearer Project 2) Regions 3) Administration 4) Public
COUNTYHV SAS	Harvest data (tape)	Summary of harvest by county for each species.	Requests from outside sources.
TAPEFIX1 SAS	Harvest data (tape) License data (tape)	Correct license type in harvest file and create disk file.	
TAPEFIX2 SAS	Harvest data (tape)	Write corrected harvest file back onto tape.	
LANDSUC SAS	Harvest data (tape)	Number of successful marten trappers, marten harvest, number of trappers taking ≤ 10 marten, and number of marten caught by those taking ≤ 10 marten.	Marten Management System

Continued

Program	Input Data	Outputs	Users
FURTAG SAS	Harvest data (tape) Township data (disk)	Harvest data are summarized by township in data set on disk (FURBEAR, TWNHRVnn). Harvest and harvest/mi ² listing is produced by township, WMU, region, WMU within region, and statewide.	1) Furbearer Project 2) Regions 3) Public
TOWNSUM SAS	FURBEAR, TWNHRVnn data sets (disk) Township data (disk)	Harvest and harvest/mi ² listing is produced for all years since 1976. Long term and short term averages are computed for all groupings. Summary data set is produced (FURBEAR, TOWNSUM).	1) Project 2) Regions 3) Administration
TOWNSUM2 SAS	FURBEAR, TWNHRVnn data sets (disk)	Harvest listing is produced for last 2 years by township within region.	Lists are used by regional biologists and public in providing information to Wardens.
LICTAG SASNEW	Harvest data (tape) License data (tape) Township (disk)	Harvest by WMU by harvester (trapper, hunter and combined) data set is created (FURBEAR, TRPHRVnn). Trapper listing by WMU is produced. Summary of harvest in WMU by region of residence (carpet-bagger) is produced to monitor trapper movement.	1) Regions 2) Project

Continued

Program	Input Data	Outputs	Users
TYPETAG SASNEW	FURBEAR. TRPHRVnn data set (disk)	Listing of harvest, catch/successful harvester, and successful harvesters by license type and general category by WMU and statewide is produced. Summary data set is created (FURBEAR. TYPHRVnn).	Project
HARUSUM SAS	FURBEAR. TRPHRVnn data sets (disk)	Tables of historical harvest and success rate by general category and produced by WMU and statewide and plots of harvest, successful users, and success rate statewide.	1) Region 2) Project 3) Administration
WARDNTAG SAS	Harvest data (tape) License data (tape) Township data (disk)	Summary of harvest by individual within each warden district is produced. A summary of pelts tagged by warden district and division is produced.	Warden Service
TGSEARCH SAS	Harvest data (tape)	Search for all information on specific tag number.	Warden Service
TRSEARCH SAS	Harvest data (tape)	Search for all information on specific trapper.	Warden Service
BIOLIST SAS	Biological data (tape) Township data (disk)	Biological data file for all years is created on tape (FURBEAR. BIODATA). A listing by ID number within township is produced.	1) Project 2) Regions 3) Public (age requests)

Continued

Program	Input Data	Outputs	Users
BIODATA SAS	FURBEAR.BIODATA (disk)	Complete tables of sex and age data are produced. Reproductive data are summarized.	Project
HRWEEK SAS	FURBEAR.BIODATA (disk)	Tables of frequency of juvenile harvest by sex by date are produced. Tables of sex and age breakdown by week of fall season are produced.	Project
HRVCHRON SAS	FURBEAR.BIODATA (disk)	Bar graphs of chronology of harvest and produced by WMU and statewide.	1) Project 2) Regions
MCIRMOD SAS FCIRMOD SAS MCIRJUV SAS FCIRJUV SAS	Biological data output Warden data output License data output (data form)	Change-in-ratio model to estimate exploitation rate for males and females of juvenile and older age classes	Project
POPMODEL SAS	Biological data output Harvest data output Exploitation rate output (data form).	Life equation type population model used to evaluate management options.	Project
TRAPLONG SAS	Trapper Longevity File	Updates longevity file with current year's license sales.	Project

Continued

Program	Input Data	Outputs	Users
TRAPLONG PRINT	Trapper Longevity File Trapper Listings	Update longevity file when license number is unknown.	Project
TRAPLONG MODEL	Trapper Longevity File	Life equation type population model of trappers.	Project
QUESTnn SAS	Trapper Questionnaire File	Analysis of trapper questionnaire data.	1) Project 2) Administration

APPENDIX IV. Monthly pelt value mail survey form.



John R. McKernan, Jr.
Governor

William J. Vail
Commissioner

DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

Telephone (207) 289-3371

Wildlife Resource Assessment Section
P. O. Box 1298
Bangor, ME 04401-1298
Telephone (207) 941-4472

November 23, 1987

Dear Maine Furbuyer:

We need your help again this year to keep our fur value information up-to-date. As in previous years, we will mail monthly Furbuyers Report Forms to you throughout the 1987-88 furtaking seasons.

Please report the average pelt price you pay to trappers and hunters each month. We do not need to know about the prices of fur you buy from other sources. The enclosed forms are for the month of October and November; each has a self-addressed, stamped return envelope attached. You will receive a Furbuyer Report form at the end of each of the coming winter and early spring months.

Each completed Furbuyers Report Form is destroyed as soon as the price information is transcribed. Only price information is retained in our files; no names are recorded to ensure your confidentiality.

We appreciate your cooperation in our efforts to monitor prices paid for Maine fur. Please feel free to contact us in writing or by telephone (941-4471) if we can be of assistance.

Sincerely,

Ken Elowe, Leader
Furbearer/Bear Project

MONTHLY FURBUYERS REPORT (VOLUNTARY)

Please record the average price you paid for the pelts of each of these species bought in Maine from trappers and hunters during the month indicated. This price information will be combined with information from other buyers to develop an average statewide price. To protect your confidentiality, this report will be destroyed after recording the prices given. If you did not purchase any pelts during the month, check "NO" and return the form anyway. If you have any questions, please contact us by mail or phone. A stamped, addressed envelope is enclosed for this report. This form will be mailed to you monthly through April, 1988.

Thank you for your assistance.

Wildlife Division
 Maine Dept. Inland Fisheries & Wildlife
 P.O. Box 1298
 Bangor, ME 04401-1298
 (941-4471)

Name of Furbuyer: _____

Month: December

Did you buy pelts during this month: YES ___ NO ___

<u>Species</u>	<u>Average Price</u>	<u>Species</u>	<u>Average Price</u>
Beaver	_____	Bobcat	_____
Coyote	_____	Grey Fox	_____
Red Fox	_____	Pine Marten	_____
Fisher: Male	_____	Mink: Male	_____
Female	_____	Female	_____
Muskrat	_____	Otter	_____
Raccoon	_____	Skunk	_____
Weasel	_____		