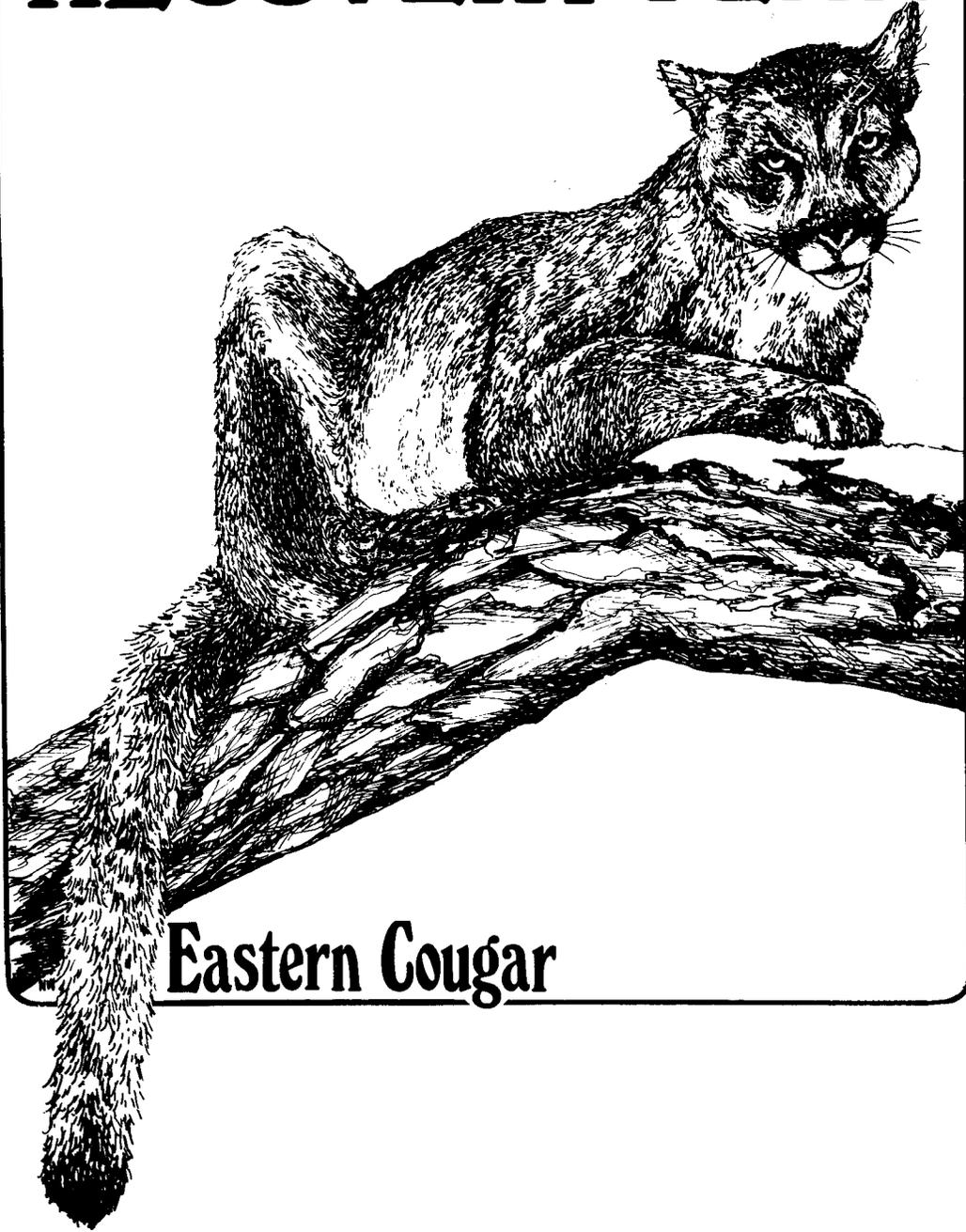


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RECOVERY PLAN



Eastern Cougar

EASTERN COUGAR RECOVERY PLAN

Prepared by

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Clemson, South Carolina 29631

August 1981

Approved:

Robert C. Spitzer
Director, U.S. Fish and Wildlife Service

Date:

8/2/82

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THIS IS THE COMPLETED EASTERN COUGAR RECOVERY PLAN. IT HAS BEEN APPROVED BY THE U.S. FISH AND WILDLIFE SERVICE. IT DOES NOT NECESSARILY REPRESENT OFFICIAL POSITIONS OR APPROVALS OF COOPERATING AGENCIES. THIS PLAN IS SUBJECT TO MODIFICATION AS DICTATED BY NEW FINDINGS AND CHANGES IN SPECIES STATUS AND COMPLETION OF TASKS DESCRIBED IN THE PLAN. GOALS AND OBJECTIVES WILL BE ATTAINED AND FUNDS EXPENDED CONTINGENT UPON APPROPRIATIONS, PRIORITIES, AND OTHER BUDGETARY CONSTRAINTS.

LITERATURE CITATIONS SHOULD READ AS FOLLOWS:

U.S. Fish and Wildlife Service. 1982. Eastern Cougar Recovery Plan.

U.S. Fish and Wildlife Service, Atlanta, Georgia. 17 pp.

Additional copies may be obtained from:

Fish and Wildlife Reference Service

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3840 York Street

Denver, Colorado 80205

TABLE OF CONTENTS

PART I - INTRODUCTION	1
Range Map	2
PART II - RECOVERY	8
A. Recovery Objective	8
B. Step Down Outline	9
C. Recovery Narrative	11
Literature Cited	14
PART III- IMPLEMENTATION SCHEDULE	15

PART I

INTRODUCTION

At one time, the cougar (Felis concolor) occurred in all the provinces of southern Canada, throughout the United States, and in most of Central and South America. The animal is known in the United States by several names, especially panther, painter, and catamount in the East; and puma, cougar, and mountain lion in the West. Today, sizeable populations are found in the United States only in the western mountains.

The eastern cougar (F. c. cougar), one of 27 subspecies presently recognized (Young and Goldman 1946; Charles O. Handley, Jr., pers. comm., April 28, 1981) originally occurred within South Carolina, Tennessee, Kentucky, Indiana, and all states to the north and east. The exact range is unknown because only eight F. c. cougar skulls were available to Young and Goldman (1946), all from West Virginia, Pennsylvania, and New York. To the south, only 17 Florida panther (F. c. coryi) specimens were available for study, 14 from southern Florida and 3 from northeastern Louisiana. To the west, the subspecies, F. c. schorgeri, was named based on three specimens from Wisconsin, Minnesota, and Kansas (Jackson 1955). The almost total lack of reference specimens from near the lines of separation between subspecies leaves those lines both unsupported and unchallenged. Figure 1 shows the accepted ranges of the three subspecies of F. concolor found in the Eastern United States and indicates the locations where each of the reference specimens (except the one from Kansas) used in determining the subspecies were found.

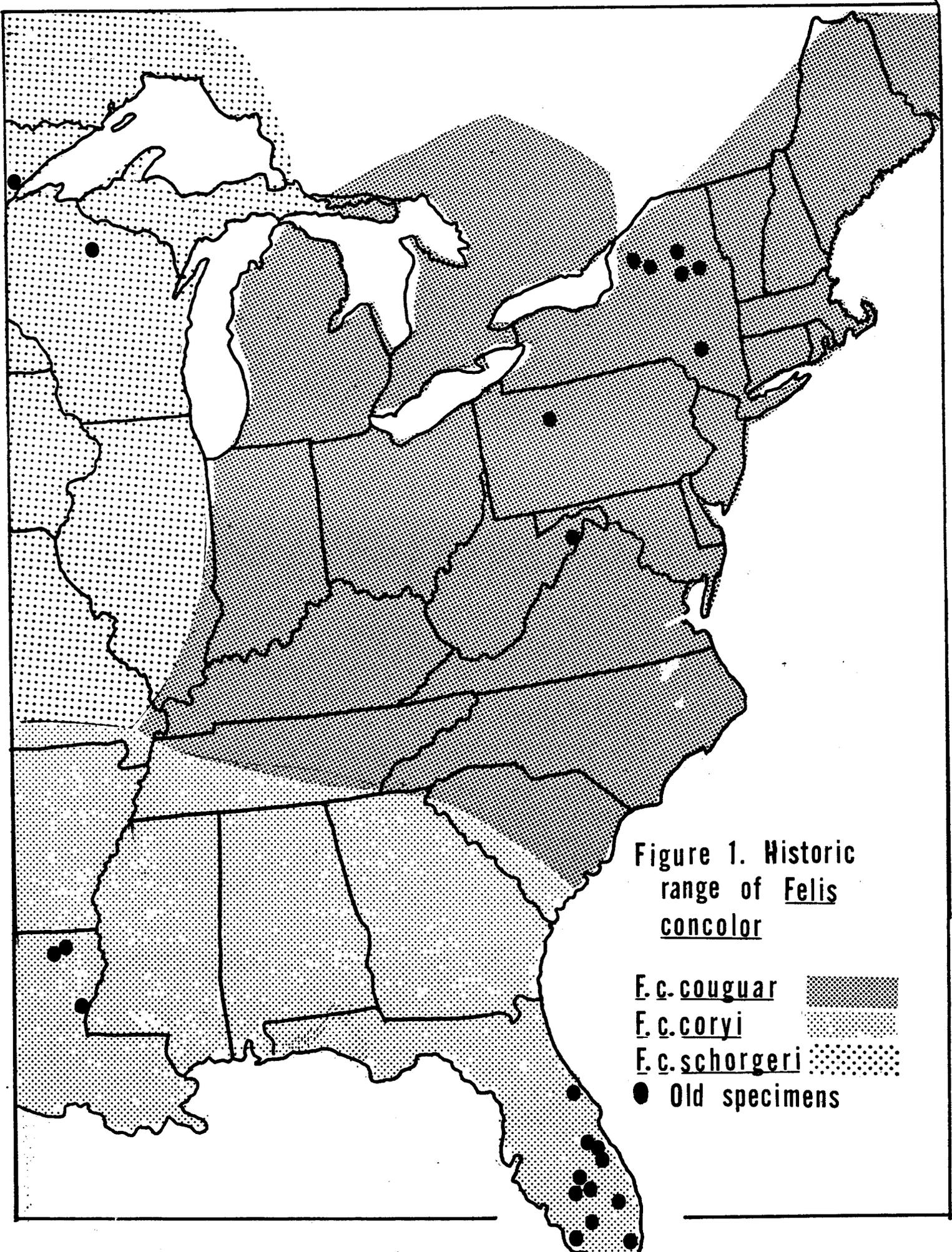


Figure 1. Historic range of *Felis concolor*

- F. c. cougar* [cross-hatched box]
- F. c. coryi* [dotted box]
- F. c. schorgeri* [stippled box]
- Old specimens

The eastern cougar was first called Cougar de Pensilvanie by Buffon in 1776. Kerr (1792) renamed it Felis cougar based on Buffon's description. True (1884) reassigned it to Felis concolor and Nelson and Goldman (1929) first used the present subspecific designation Felis concolor cougar. This subspecies was the first described among all North American subspecies and the name has always been reserved for specimens from the Northeastern United States and Eastern Canada. Stoner (1950), Wright (1972), and Lazell (pers. comm., January 4, 1981, August 6, 1981) list several additional specimens that have not been thoroughly examined by taxonomists, but they are also from the Northeastern United States or Eastern Canada. No specimens are known from the southern and western portions of F. c. cougar's accepted range.

The lack of reference specimens from a substantial portion of F. c. cougar's range could cause some taxonomic confusion as to the subspecific identity of any cougar found within the accepted range of F. c. cougar. It is uncertain how animals from the southern and western portions of the eastern cougar's range would differ morphologically from those of the northeast. In addition, it is likely that there would be some hybridization in areas where two subspecies overlap. Western cougars, held in captivity in the East, and then released or escaped to the wild would add confusion to the taxonomic issue, especially if breeding with natural populations of eastern cougars occurred. Even if natural populations of eastern cougars remained "pure," recent inbreeding due to isolation of populations may cause certain morphological characteristics to be modified. The proper subspecific identification of any cougar found in the east may be difficult.

Before considering the present status of the cougar, let us first consider why it became endangered. The earliest settlers feared cougars and vigorously resisted the occasional depredations of this animal on their livestock. Cougars were frequently persecuted and many States offered bounties to persons who killed them. There is no doubt that cougars were virtually eliminated from each region soon after it became settled by European immigrants.

Nevertheless, cougars may have survived in a few localities because of their rugged terrain and lack of access, or because local hunters lacked the skills, dogs, or time needed to hunt them effectively. An example of the importance of special skills can be found by closely examining the records of cougar bounty payments for New York (Brocke, Rainer H., Senior Research Associate, Adirondack Research Center, in 1978 research proposal to the U.S. Fish and Wildlife Service). In the western Adirondacks in the late 1800's only one man, a George Muir was a successful cougar hunter. In the eight years between May 1879, and February 1887, Muir claimed 67 cougar bounties (the number killed may have been less than 67, with several bounties claimed for the same animals), while in those same years all the remaining citizens of New York claimed only four.

One way to judge the remoteness of an area and the persistence and skills of its hunters is to observe whether or not bear and deer were able to survive. The Jefferson-George Washington-Monongahela National Forests in Virginia and West Virginia, respectively, continuously supported deer, bear, or both, and although there are no verified kills of cougars there this century, seemingly reliable sighting reports have persisted and recent evidence of track and scat (July 1981), although not certain, suggests that at least one cougar lives in the area today. Pennsylvania, the New England

States and several Canadian Provinces have continuously supported deer and bear; and there is considerable evidence that cougars survived too, since many individuals have been reported killed (most cannot be confirmed) in the region since 1900 (Downing 1981) and the frequency of seemingly reliable reports is impressive (Helen McGinnis, pers. comm., August 12-14, 1981).

Deer and bear became quite scarce in the Appalachians of North Carolina by the late 1800's, but responded to protection on the Vanderbilt Estate (later becoming the Pisgah Game Preserve and Pisgah National Forest). This herd became large enough to experience a dieoff by 1908 (Ruff 1938) and was estimated to contain 1,000 deer by 1916. Large-scale purchases of land under the Weeks Act to form the National Forests began in 1914, and it is conceivable that the increasing solitude and deer populations allowed one or more small cougar populations to exist without experiencing fatal encounters with man. Several cougars were recorded killed (most records are unconfirmed) in the mountains of North Carolina and adjoining States during this century including some in the last decade (Downing 1981), suggesting that cougars were not extirpated. Seemingly reliable reports of cougar sightings have been increasingly frequent and widespread.

Cougar habitat is not necessarily synonymous with mountains, as attested by the Coastal Plain swamp habitat that comprises the last major stronghold of the Florida panther. Extensive swamps, some of which are called pocosins, are present in North Carolina in particular, and many of these were never devoid of deer or bear, and many do not have vehicular access to this day. There are fewer reports from the Coastal Plain than from the mountains, but the likelihood of cougars being present may not be directly related to the frequency with which they are reported, since man seldom penetrates these swamps.

The Federal Government has responded to the rising interest in cougars by sponsoring several research and survey projects. Fish and Wildlife Service (FWS) Federal Assistance projects have been conducted in North Carolina and Virginia for F. c. cougar; and in Georgia, Florida, Mississippi, and Arkansas for F. c. coryi. The FWS Office of Endangered Species and World Wildlife Fund are sponsoring a project in New York and other northeastern States to define the most likely habitats and to interpret cougar sighting reports in the vicinity of each. Another project at Clemson, South Carolina, solicits reports and other evidence, investigates as many of these as possible, trains observers, and conducts searches for tracks and other sign in the vicinity of the most promising reports. This project is supported by the Forest Service, the Fish and Wildlife Service, and the National Park Service.

✓ At least one small population of F. c. coryi is well known in South Florida. As many as four small populations are strongly suspected in southern and western Arkansas (Sealander 1979), northern Louisiana (Lowery 1974), and eastern Oklahoma based on seven kills and numerous sightings and tracks in the last 33 years. A small cougar population may also occur in Minnesota (Wm. E. Berg, pers. comm., December 5, 1980).

No breeding cougar populations have been substantiated within the former range of F. c. cougar since the 1920's, but investigations have begun in the North Carolina and West Virginia areas to determine if there are viable populations there. Sighting reports continue to be received from many public lands, especially those in mountainous regions. Many of these sightings are accompanied by requests to the responsible agencies to protect the cougars from the people or vice versa. Managers of lands where cougars have been seen but not confirmed have the awkward choice of committing resources to an animal that has not been proven to occur or ignoring the reports and possibly managing in a manner detrimental to the species.

The decision to manage for or ignore cougars requires supporting information. The logical approach is to conduct thorough searches of each area where the animal has been reported before any management plans are formulated. But what constitutes a thorough search? What do we look for? Where do we look? How much effort does it take? Researchers and professional hunters in the West often are able to find cougar tracks within a couple of days where dusty roads bisect the area and often can find "scratch hills" and scats rather easily away from roads, especially where populations are high and stable. But cougar activity may be much more difficult to confirm in the East, especially in the mountains, because there are few sandy roads, populations are small, and territories may be poorly defined. Because there is such a large and diverse area to be searched, we must be prepared to train a large number of workers to perform these searches in the most efficient possible manner. Basic research to describe the abundance, distribution, persistence, and observability of sign is badly needed to guide search planning. Such information can only be collected in areas known to contain cougars, such as Florida, the West, and perhaps Arkansas, Minnesota, North Carolina, and West Virginia. Searchers not only need to know where to look to find cougar sign, they need to know when to stop looking in one area and move to another. By quantifying the frequency and variability of observing positive sign, the level of searching effort necessary to say within acceptable confidence limits that cougars do not exist in an area could be determined.

Hopefully, eastern cougars still survive in the Eastern United States. Even with improved conditions, the cougar may not be recoverable according to the definition that follows in Part II. This recovery plan spells out, in as much detail as is possible considering our present limited knowledge, what needs to be done to speed the recovery and remove the threat of extinction to the eastern cougar.

PART II

RECOVERY

A. Recovery Objective

Recovery of the eastern cougar will have been satisfactorily accomplished when at least three self-sustaining populations have been found or established in the United States. Each population (which may consist of two or more separate but interbreeding nuclei) will be considered self-sustaining if it contains a minimum of 50 breeding adults, and if losses of these adults are being replaced through reproduction and/or immigration from nearby populations. Trends in ownership and management of the habitat and in behavior of the human population must be such that the minimum numbers above are expected to be sustained indefinitely. One population with a minimum of 50 breeding adults would allow consideration of downlisting of the cougar to Threatened. Reaching even this stage may be difficult. Suitable habitat is minimal and where such habitat does exist the cougar's use of it may be in conflict with man's utilization of the habitat. In all probability, the cougar will always be Endangered. The number of breeding adults, 50, is based on inbreeding research on other large carnivores. This is the minimum number thought necessary to prevent reduced fecundity and survivorship and to ensure fitness for at least short-term survival. Little is known about cougar population dynamics and this number may or may not be applicable to the cougar. It is, however, the best estimate presently available. Therefore, it will be used until new information requires its modification.

B. Step-down Outline

Step I. Find and delineate cougar populations.

I.1 Research and training.

I.11 Perform research needed to quantify frequency and variability of observing positive sign under a variety of eastern conditions.

I.12 Develop search techniques of sufficient intensity to say within acceptable confidence limits that, if no evidence is found, cougars are not present.

I.13 Train personnel to recognize sign and to adapt search procedures to their particular areas.

I.2 Perform systematic searches in likely places throughout former range.

I.21 Analyze habitat characteristics and reported sightings, map potential cougar habitat, and assign priorities for searches.

I.22 Conduct systematic searches.

I.221 If cougars are found, go to Step II.

I.222 If no cougars are found, consider declaring F. c. cougar extinct.

Step II. Study and provide interim protection for cougars that are found.

II.1 Organize advisory committee at each location.

II.2 Provide interim protection, habitat management, and public education.

II.3 Study cougars to determine population dynamics and behavior.

II.31 Determine productivity and mortality patterns.

II.32 Track movements of each individual.

II.33 Study behavior.

II.4 Salvage specimens for subspecific identification (Step III).

II.5 Refine search techniques (Step I).

Step III. Taxonomic evaluations

III.1 Taxonomy of available specimens of F. c. cougar.

III.11 Measure 18th and 19th Century specimens and define parameters of variation using modern statistical techniques.

III.12 Develop techniques for identifying live cougars to subspecies. Apply in Step III.2.

III.2 Taxonomic identification of existing populations of eastern cougars.

III.21 If population is assignable to F. c. cougar, go to Step IV.

III.22 If population is assignable to F. c. coryi, apply Florida Panther Recovery Plan.

III.23 If population is assignable to any other subspecies, consider removing if other populations representing true F. c. cougar are present elsewhere.

III.24 If no true F. c. cougar are found, protect and manage those assignable to other subspecies in case F. c. cougar genes are present but are not detectable morphologically.

Step IV. Develop and implement a permanent management plan.

IV.1 Provide protection, habitat management, and public education.

IV.2 Continue studies (Step II.3) to determine requirements (including critical habitat) and most efficient means of supplying these needs.

IV.3 Determine whether each population is self-sustaining or if trend is in that direction. If neither, consider Step V.

Step V. Capture F. c. cougar from the wild as required for management purposes such as restoration, augmentation of small populations, and/or captive propagation.

Step VI. When one self-sustaining population of 50 breeding adults is found or established, consider downlisting to Threatened. When three such populations are reached consider delisting.

C. Recovery Narrative

The recovery plan is summarized by the step-down outline. At the present time all the effort must be concentrated on Step I, "Find and delineate cougar populations."

Research to determine the frequency and variability of observing positive cougar sign (Step I.11) must first be done in areas where a confirmed F. concolor population occurs, such as in Florida, Canada, or the Western United States. Then, by quantifying the frequency and variability of observing positive sign, the level of search effort necessary to say within acceptable confidence limits that cougars do or do not exist in a particular area can be determined (Step I.12). Information and techniques from these areas must then be adapted for use in areas within F. c. cougar's range and taught to private, State, and Federal personnel (Step I.13) so that they can systematically search likely places within their jurisdictions (Step I.2). Searches should be performed on a priority basis, taking into account habitat characteristics and recently reported sightings (Step I.21). Searching should continue until all areas have been searched adequately. If cougars are found during these searches (Step I.221), interim protection (Step II) will be immediately provided. Representatives of the landowners and resource management agencies in the vicinity of each population will be organized into an advisory committee (Step II.1) to plan interim protection, habitat management, and public education programs (Step II.2). This committee will also suggest studies needed to determine population dynamics and behavior (Step II.3) and will select and oversee the research team doing the work. This information will be used to aid in management and also to aid in Step I.1. By performing the same studies on actual F c. cougar populations, data obtained using other subspecies can be more accurately interpreted (Step II.5).

Specimens should be used for the taxonomic work necessary to insure correct subspecific identification (Step II.4). Only live animals or those found dead should be used for this purpose. No animal should be sacrificed. If no cougars are found after all likely areas in the United States (and probably Canada) have been thoroughly searched, then it will be necessary to confront the painful task of declaring F. c. cougar extinct (Step I.222).

Before the permanent management plan (Step IV) can be put into effect, each population must be assignable to F. c. cougar. The required taxonomic evaluation (Step III) will entail a detailed study of all available 18th and 19th Century specimens (Step III.11) and the development of techniques for recognizing the most distinctive features in live cougars, so that none will have to be killed (Step III.12).

To accurately identify the subspecies F. c. cougar, a set of discriminating criteria based upon morphological and physiological variations should be established for use on live animals. Such criteria could be determined using radiological and electrophoretic techniques. Such a list of criteria is presently used for the red wolf.

Considerable time may pass, perhaps a decade or more, before enough wild contemporary specimens can be examined to establish population means for any characteristic (Step III.2). Some tough decisions are anticipated since there may be differences of opinion about how to interpret certain morphological differences and likenesses in view of the small number and limited distribution of 18th and 19th Century specimens. The presence of two or more populations may further complicate the decisions. The range of alternatives is spelled out in the outline. If more than one cougar population is found, such decisions cannot be made by the local advisory committees

because they may not have a national or international perspective. Therefore, a national or international committee must be formed to decide all issues encountered in Steps III, IV, V, and VI. At least one representative of each local advisory committee will serve on the national or international committee.

The permanent management plan (Step IV) will be a long-range plan designed to enable the cougar to survive and increase its numbers. However, continued research (Step IV.2) may be necessary to better define their needs and behavior to ensure that the proper management is prescribed. It will also be necessary to monitor population size and structure regularly (Step IV.3) so that calamitous events will not go unnoticed and so that downlisting or delisting, if either becomes appropriate, can proceed without undue delay. If population monitoring reveals that there are surplus animals, these may be captured (Step V) for restocking uninhabited areas, for enriching the gene pool in other populations, or for captive propagation. Capture of an entire wild population for captive propagation may also be appropriate (another tough decision) if only a few animals are left and these appear unlikely to survive in the wild.

Step VI, to consider downlisting or delisting when appropriate is self-explanatory. Hopefully, the eastern cougar will recover to such an extent that either decision will be an easy one.

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PART III.

IMPLEMENTATION SCHEDULE

Priorities within this section (Column 4) have been assigned according to the following:

- Priority 1 - Those actions absolutely necessary to prevent extinction of the species.
- Priority 2 - Those actions necessary to maintain the species' current population status.
- Priority 3 - All other actions necessary to provide for full recovery of the species.

IMPLEMENTATION SCHEDULE

Eastern Cougar

General Category	Plan Task	Task Number	Priority	Task Duration	Responsible Agency			Estimated Fiscal Year Costs			Comments/Notes	
					FWS	Region	Program	Other	FY 83	FY 84		FY
R 6	Develop adequate search techniques.	I.12	1	Unknown	4			Other Fed. and State Agencies as needed.	40,000	40,000		Administration and coordination
O 1	Train appropriate State and Federal personnel in search techniques.	i.13	1	Unknown	4				Included in above costs.	Included in above costs.		
R 14	Assign search priorities.	I.21	1	Unknown	4				Included in above costs.	Included in above costs.		
R 6	Perform systematic searches.	I.22	1	Unknown	4			Other Fed. and State Agencies as needed.				Administration and coordination All actions dependent upon availability of funds

GENERAL CATEGORIES FOR IMPLEMENTATION SCHEDULES *

Information Gathering - I or R (research)

1. Population status
2. Habitat status
3. Habitat requirements
4. Management techniques
5. Taxonomic studies
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contaminant
13. Reintroduction
14. Other information

Management - M

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

Acquisition - A

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

Other - O

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

* (Column 1) - Primarily for use by the U.S. Fish and Wildlife Service.

