Florida Panther Recovery Criteria

Proposed Revisions
DRAFT August 4, 2017

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Background

The Recovery Criteria for the Florida Panther Recovery Plan were established in 2008 (3rd Plan Revision). Additional science has become available since 2008 and the criteria have generated substantial discussion among stakeholders, conservationists, citizens and resources managers.

When the Florida Panther Recovery Implementation Team (PRIT) was established in 2013 one of the eight tasks that was taken up by this team included evaluating the Recovery Criteria. The Recovery Criteria sub-team of PRIT was established in 2015 to review and propose possible changes to the existing Recovery Criteria contained in the Florida Panther Recovery Plan. The sub-team was charged to address the topic of recovery criteria using the best available science and following the most current Service guidance and procedures for recovery planning (NMFS 2004).

The sub-team considered multiple options including keeping the existing Recovery Criteria, recommending edits or modifications to the existing criteria, or proposing new alternative criteria. The sub-team focused its work on recovery criteria and did not address other possible revisions to the Recovery Plan.

The 2008 Recovery Criteria

The 2008 Recovery Plan provides two Recovery Criteria for reclassification from Endangered status to Threatened status and two delisting Recovery Criteria. The Plan also provides a Recovery Strategy, a Recovery Goal, and three Recovery Objectives.

The **Recovery Strategy** is to maintain, restore, and expand panthers and panther habitat in south Florida, expand this population into south-central Florida, and reintroduce at least two additional viable populations within the historic range.

The **Recovery Goal** is to achieve long-term viability of the panther to a point where it can be reclassified from endangered to threated and then removed from the Federal list of endangered and threatened Species. (In the 2008 Recovery Plan, long-term viability is defined as a 95% probability of survival over 100 years.)

The 2008 Recovery Plan specifies three **Recovery Objectives:**

1) To maintain, restore, and expand the panther population and its habitat in south Florida and expand the breeding portion of the population in south Florida to areas north of the Caloosahatchee River.
2) To identify, secure, maintain, and restore panther habitat in potential reintroduction areas within the historic range and to establish viable populations of the panther outside south and south-central Florida.
3) To facilitate panther recovery through public awareness and education.

The existing **Recovery Criteria** are as follows:

"Reclassification will be considered when:

1. Two viable populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years (two panther generations; one panther generation is six years [Seal and Lacy 1989]).
2. Sufficient habitat quality, quantity, and spatial configuration to support these populations is retained/protected or secured for the long-term."

"Delisting will be considered when:

1. Three viable, self-sustaining populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years.
2. Sufficient habitat quality, quantity and spatial configuration to support these populations is retained/protected or secured for the long-term."

Statutory and Judicial Guidance

The Endangered Species Act defines an endangered species as one that is "in danger of extinction throughout all or a significant portion of its range." A threatened species is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The statute directs the Secretary to develop and implement recovery plans, which shall include "objective, measureable criteria which, when met, would result in a determination…that the species be removed from the list." Importantly, recovery criteria are guidance and not binding and enforceable. The Service recognizes there may be multiple paths to reclassification to threatened and eventual recovery and the final status when these objectives are achieved may look different than envisioned at the time of the plan. The criteria are intended to be a tool that allows the management agencies to assess progress towards recovery, and provide benchmarks for determining when the administrative process of proposing reclassification should be initiated by the Service.

The Endangered Species Act requires, and the courts have upheld, that classification decisions be based upon the status of the species relative to any of the five following factors:

(A) the present or threatened destruction, modification, or curtailment of its habitat or range;
(B) overutilization for commercial, recreational, scientific, or educational purposes;
(C) disease or predation;
(D) the inadequacy of existing regulatory mechanisms; or
(E) other natural or manmade factors affecting its continued existence.

Evaluation of Existing Criteria

Over the course of nineteen months (October 2015 through May 2017), the Recovery Criteria sub-team of the PRIT held 8 conference calls and met in person once to evaluate the existing Recovery Goal, Objectives, and Criteria. The sub-team retained and used the existing Recovery Goal and Recovery Objectives to frame its evaluation of the Criteria. The sub-team concluded that the existing Recovery Criteria are incomplete, founded on several hidden assumptions, and unnecessarily inflexible, and thus do not serve the Recovery Goal and Objectives as well as they could. In this document, the sub-team presents a proposal for revision of the Recovery Criteria. The recommendations from the sub-team are intended to inform the PRIT. Final decisions on whether to revise the Recovery Criteria, which would likely require a formal revision of the Plan, is not under the purview of this sub-team.

Proposed Framework

We propose a three-tiered structure for the Recovery Criteria, modeled after those used in the Polar Bear Conservation Management Plan (USFWS 2017), with explicit identification of (1) fundamental recovery criteria; (2) demographic and genetic recovery criteria; and (3) threats-based recovery criteria (fig. 1). The fundamental criteria describe the overarching aims of recovery and reflect the statutory language of the ESA, stating downlisting and delisting criteria in terms of the long-term risk of extinction. The demographic and genetic criteria are derived from the fundamental criteria and represent more proximate measures of the status of the listed entity and the future risks it faces. The threats-based criteria are derived from the fundamental, demographic, and genetic criteria, and link the status of the population to the threats it faces (as expressed by the five factors found in Section 4(a) of the ESA).

Comment [FK1]: What is figure 1

Other recovery plans often contain a mixture of these three types of recovery criteria but rarely present them in a complete and interrelated form (Doak et al. 2015). The consequences of inconsistent use of multiple types of criteria have been described by a number of authors (add citations), and include: inconsistency among the criteria within a plan; missing justification for the hierarchical relationships among the criteria; and inability to consider tradeoffs among criteria. The proposed framework addresses these concerns. Several features of the framework are notably important. (1) The use of fundamental recovery criteria provides overarching risk standards linked to statutory language. The policy judgments required to establish recovery criteria are largely located in the thresholds embedded in the fundamental criteria. (2) The other criteria (demographic, genetic, and threats-based) are derived from the fundamental criteria. Thus, they are a restatement of the fundamental criteria in a different form. The derivation requires the use of the best available scientific knowledge; thus, the second- and third-tier criteria could be modified in the future based on new information, without having to revisit the policy judgements of the fundamental criteria. (3) The demographic and genetic criteria provide more proximate metrics of status, hence, metrics that are more readily measured. (4) The threats-based criteria respond to the emphasis in the judicial history of the ESA on the importance of a threats analysis as described in Section 4 of the Act.

Comment [FK2]: Any citations?

Tier 1: Fundamental Criteria

At the fundamental level, reclassification from endangered to threatened will be considered when:

1. The probability of persistence of the Florida panther population is at least 95% over the next 25 years; and

2. Florida panthers are distributed and breeding in natural habitats south of the I-4 corridor both north and south of the Caloosahatchee River, and such distribution and breeding is expected to be maintained for at least the next 25 years; and

3. The expected loss of genetic diversity in the Florida panther population, with or without additional introgression, is less than 10 percent over the next five panther generations.

At the fundamental level, recovery will be achieved, and delisting considered, when:

1. The probability of persistence of the Florida panther population is at least 95% over 100 years; and

2. Florida panthers are distributed and breeding across Florida, including north of Ocala National Forest and the Florida Panhandle, as well as north and south of the Caloosahatchee River, and such distribution and breeding is expected to be maintained indefinitely; and

3. The expected loss of genetic diversity in the Florida panther population, without any additional introgression, is less than 10 percent over the next five panther generations.

The first fundamental criterion (persistence) indicates the conditions under which the population of Florida panthers would have sufficient resilience and redundancy to meet the risk standards expressed under the ESA. The second fundamental criterion (distribution) represents the conditions under which enough redundancy in distribution and representation of diversity in Florida panther behavior, ecology, and life-history was achieved to assure long-term persistence over a significant portion of the range. The third fundamental criterion (genetic diversity) represents the conditions under which enough genetic representation is retained to allow Florida panthers to adapt to future environmental conditions.

The reclassification criteria collectively represent the circumstances under which Florida panthers are no longer in danger of extinction, because the population has sufficient resilience, redundancy, and representation to avoid an imminent risk of extinction. The delisting criteria collectively represent the circumstances under which Florida panthers are not likely to become endangered in the foreseeable future.

Assessment of Fundamental Criteria

Evaluation of the probability of persistence requires forecasting the fate of the subspecies into the future, using a projection model like a population viability analysis (PVA). The model used for such an assessment should reflect the best available science, therefore its structure cannot be fully specified at this time, but it should take into account a number of considerations. (1) The demographic structure of the model should be based on current understanding of Florida panther population dynamics. (2) The demographic parameters in the model should account for past empirical observations, but should also account for future trends, as driven by the threats to the species. (3) The most important threats and their expected trajectory over time should be incorporated into the PVA. (4) For a reclassification from endangered to threatened, it is appropriate to assume the protections of the ESA will remain in force when forecasting the threats, but for a delisting, the forecasts of the threats must assume the ESA protections will be removed. (4) The model should account for environmental, demographic, and genetic stochasticity, as well as parametric uncertainty (McGowan et al. 2011). (5) At the time of this writing, not enough is known to reliably forecast Florida panther population dynamics at very low densities. Thus, we recommend using a quasi-extinction threshold of 30 individuals, rather than outright extinction, to evaluate the probability of persistence. If, in the future, the detailed density-dependent and genetic dynamics at low population density are better understood and incorporated into the population viability assessment, this substitution could be removed.

Tier 2: Demographic and Genetic Criteria

The fundamental recovery criteria are stated in terms of the long-term prognosis for the subspecies. They are unambiguous standards that provide multiple pathways to achievement. It is valuable, however, to also have more proximate criteria that translate the fundamental criteria into metrics that do not require detailed forecasting models. These more proximate metrics should be derived from the fundamental criteria. We described two sets of proximate criteria associated with demographic and genetic descriptors of the populations.

Demographic Criteria

The population of Florida panthers would meet the fundamental persistence criterion for reclassification to threatened, if it met the following four conditions:

1. The mean annual survival rate for prime-aged females (S_{AF}), both currently and as projected for the next 25 years, is greater than T_1;
2. The kitten survival rate at low density (S_0), both currently and as projected for the next 25 years, is greater than T_2;
3. The carrying capacity (the equilibrium population size in the absence of anthropogenic take), both currently and as projected for the next 25 years, is greater than T_3; and
4. The current population size (N_t) is greater than T_4.

The population of Florida panthers would meet the fundamental persistence criterion for delisting, if it met the following four conditions:

1. The mean annual survival rate for prime-aged females (S_{AF}), both currently and as projected for the next 100 years, is greater than T_5;
2. The kitten survival rate at low density (S_0), both currently and as projected for the next 100 years, is greater than T_6;
3. The carrying capacity (the equilibrium population size in the absence of anthropogenic take), both currently and as projected for the next 100 years, is greater than T_7; and
4. The current population size (N_t) is greater than T_8.

These four conditions describe the key demographic features of a viable panther population. Satisfactorily high adult survival rates confer resilience because they contribute to a high intrinsic rate of growth. Likewise, satisfactorily high kitten survival rates at low density confer resilience. We assume that kitten survival rate is density-dependent, so that as the population increases and competition for resources becomes stronger, the kitten survival rate decreases (Hostetler et al. 2010). This also means that if the population size decreases temporarily for some reason, the density-dependent increase in kitten survival rate helps the population rebound quickly. A high carrying capacity confers redundancy and buffering, so that a short-term reduction in the population does not lower the population size to perilous levels. The first three conditions need to be met both currently, and as forecast for the next 25 or 100 years, taking account of the threats faced by the population; in this way, the demographic criteria also reflect the long-term perspective of the fundamental criteria. The last criterion is only a current measure, and says that even if the first three criteria were met, you would still need to be assured that there

were enough animals in the population currently to provide a buffer against short-term extinction driven by stochastic variation.

The four thresholds (T_1, T_2, T_3, and T_4 for reclassification; and T_5, T_6, T_7, and T_8 for delisting) could be described as point estimates, but are perhaps better described as ranges, because there are trade-offs among them in contributing to the probability of persistence. For example, the higher the prime-aged female survival rate, the lower the kitten survival needs to be to achieve the same probability of persistence. This underscores the fact that the demographic criteria are *means* objectives—they do not need to be achieved in themselves, but only so far as they contribute to the fundamental criteria.

Methods for Determining Thresholds

At this time, we do not have estimates for the four thresholds (or corresponding ranges for them). The thresholds could be derived from a PVA for Florida panthers, by asking what combination of prime-aged female survival, kitten survival, carrying capacity, and initial population size produce a probability of persistence of at least 95% over the next 25 or 100 years. The PVA needed for this derivation does not need to be as detailed as the PVA that would be needed for full assessment of the fundamental criteria; it only needs to connect the demographic parameters to the probability of persistence (it does not need to model the threats or their trends over time).

Additional assumptions will need to be made to derive the four thresholds from the fundamental criteria, because there will be more demographic parameters in the PVA than the four metrics. For instance, the model will need to assume that there are enough males to mate with all the females, the breeding rates of females is at a healthy rate and does not limit the population growth, sub-adult survival rates are at an acceptable level, etc. At this time, those demographic processes are not thought to be limiting for Florida panthers, so they were not included in the demographic criteria. These assumptions, however, would need to be described and justified.

State Variables for Monitoring

Two of the demographic parameters are methodologically straightforward (if not easy) to monitor. The prime-aged female survival rate can be estimated from mark-recapture or mark-resight data using appropriate statistical methods (Hostetler 2010). Likewise, the current population size can be monitored with a number of standard methods: line-transect surveys with distance sampling, mark-capture methods, or genetic mark-recapture methods (hair traps); the field implementation of these methods is challenging for panthers, but the methods exist. If the methods for unbiased estimation of population size are too difficult or expensive to implement, the minimum number known alive could be used as a conservative substitute.

Monitoring the kitten survival at low density is challenging because it is rare to be able to directly observe it. The metric of interest, S_0, is the y-intercept of a density-dependent function (fig. 2). Field studies of kitten survival rate (usually through mark-recapture) provide the kitten survival rate at the current population density, and may be lower than the survival rate at low density. Estimation of S_0 could be accomplished by analyzing the joint time series of population size and kitten survival.

Comment [FK3]: Figure 2?

Likewise, the equilibrium population size in the absence of anthropogenic take (the carrying capacity) cannot typically be observed directly, because populations are not usually at their

carrying capacity and there is often some level of anthropogenic take. Hierarchical modeling of a time series of population size and anthropogenic take, assuming perhaps a simple logistic model, could provide an estimate of carrying capacity (fig. 3). Alternately, the threats-based criterion associated with habitat quantity (see Tier 3, Factor A, below), which embeds the carrying capacity criterion, could be used as a measure of achievement.

Comment [FK4]: Figure 3?

Of course, monitoring can only provide an assessment of the historical and current values of these parameters, it cannot provide a forecast of the future values. To make that extension requires an assessment of the threats that could undermine these demographic parameters and an evaluation of whether those threats are likely to change in the future.

Adaptive Implementation
As more is learned about the population dynamics of Florida panthers, the thresholds for the demographic criteria and perhaps even the demographic criteria themselves might need revision. Such revision is an appropriate change based on new scientific information, and does not require revision of the policy elements of these recovery criteria. It is expected that the demographic (and threats-based) criteria may be updated over time, but will still rely on the fundamental criteria for their derivation.

Genetic Criteria

A population would be considered genetically viable, and thus eligible to contribute toward the fundamental criteria, if it met the following conditions:

a) Genetic Variation
   i) The Florida panther may be considered for downlisting from endangered to threatened when the measure of allelic richness (Kalinowski 2005) remain >4.5 for 5 consecutive generations (23 years; Hostetler et al. 2013).
   ii) The Florida panther may be considered for downlisting from endangered to threatened when the measure of allelic richness (Kalinowski 2005) remain >5.5 for 5 consecutive generations (23 years; Hostetler et al. 2013).
b) Prevelance of cryptorchidism
   i) The Florida panther may be considered for downlisting from endangered to threatened when the proportion of male panthers documented as being cryptorchid is <10% per generation for 5 consecutive generations (23 years; Hostetler et al. 2013).
   ii) The Florida panther may be considered for delisting when the proportion of male panthers documented as being cryptorchid is <5% per generation for 5 consecutive generations (23 years; Hostetler et al. 2013).
c) Effective population size is a concept that is important in assessing genetic viability. If panther effective population size is determined relative to actual population size this may be an additional way to measure genetic viability.

Tier 3: Threats-based Criteria

The five threat factors listed in Section 4(a) of the ESA emphasize the causes that generate a risk of extinction. In some ways, the most proximate measures of the status of a species concern the degree to which such threats are operating and an evaluation of the five factors is required for a reclassification or delisting. Here, we propose recovery criteria tied to the five threat factors. The intention is that these are derived from the fundamental (Tier 1) and demographic (Tier 2) criteria.

Factor A: Destruction, Modification, or Curtailment of Habitat or Range

Extent and Quality of Habitat

Habitat loss has been identified as a key factor affecting the long term survival and recovery of the Florida panther (Maehr 1996, USFWS 2008, Onorato et al. 2010). Historical loss of panther habitat in Florida has been estimated over three time frames: 1936-1987; 1987-2003; and 2003-2015. Forest cover has repeatedly been demonstrated to comprise a key component of landscapes used by panthers in Florida (Belden et al. 1988, Maehr and Cox 1995, Comiskey et al. 2002, Cox et al. 2006, Kautz et al. 2006, Land et al. 2008, Onorato et al. 2011). Kautz (1993) reported that 4.3 million acres of Florida forests were converted to agricultural or urban uses between 1936 and 1987. During the same period, forests in 10 south Florida counties that included the current range of the panther declined by 0.98 million acres (Kautz 1994). A change detection analysis that compared land use/land cover in Florida between 1987 and 2003 (Kautz et al. (2007) revealed that that 90,600 acres of natural habitats in the Florida panther Primary Zone (Kautz et al. 2006) and 59,400 acres of natural habitats in adult panther habitat (Frakes et al. 2015) were converted to other uses during this time frame. A comparison of south Florida habitats between 2003 and 2015 by a Florida Fish and Wildlife Conservation Commission (FFWCC) researcher (Robert Kawula, unpublished data) revealed that 27,700 acres of natural and semi-natural habitats in the Florida panther Primary Zone and 14,100 acres in the adult panther habitat area were converted to other uses in this time frame.

Loss of habitat is likely to continue to be a threat in the foreseeable future based on two separate analyses of future patterns of human development in south Florida. First, GIS databases of Developments of Regional Impact, Planned Urban Developments, approved sector plans, and lands proposed for development in the East Collier Rural Lands Stewardship Area show that approximately 69,900 acres of the Florida panther Primary Zone and approximately 45,300 acres of adult panther habitat have been proposed for conversion to urban uses, most likely within the next 25-50 years. Second, an analysis future development in Florida from 2010 through 2070 (Carr and Zwick 2016) predicts a loss of approximately 124,400 acres of Primary Zone habitat and approximately 93,900 acres of adult panther habitat through 2070, assuming no additional protection of panther habitats through public land acquisition or purchase of conservation easements.

One method to address the threat of continued loss of habitat would be to protect a sufficient area of land, either through fee-simple acquisition or less-than-fee purchase of conservation easements, of suitable quality habitats to support a viable population of panthers. The area needed to protect a viable population of panthers can be estimated using the results of population viability models and the results of studies of panther densities.

The demographic criteria associated with carrying capacity, described above (Tier 2, T_3 and T_7) and derived from the fundamental criterion for persistence, provide a measure of the number of animals that need to be supported by the habitat to achieve the recovery criteria. If we couple these thresholds with estimates of the density of panthers that good quality habitat can support, we can estimate the extent of habitat needed to support recovery.

Sollmann et al. (2013) estimated panther densities in the Picayune Strand Restoration Project (PSRP) area at one panther per 6,024-6,135 ha (14,886-15,160 acres). Recently, Dorazio and Onorato (2015) estimated the density of the panther population in the Addition Lands of Big Cypress National Preserve (BCNP) at one panther per 7,299 ha (18,036 acres), but D. Onorato (personal communication) estimated that density in the Florida Panther National Wildlife Refuge (FPNWR)/Picayune Strand Restoration Project area may be as high as one panther per 2,857 ha (7,060 acres). These results suggest that the increasing panther population has resulted in higher densities in occupied high-quality habitats on public lands, but densities in other areas within the range of panthers have not been studied.

These density estimates can be used to calculate the area needed to support populations of varying size that PVA models indicate may provide a measure of persistence. For this document, density estimates from Dorazio and Onorato (2015), Sollmann et al. (2013), and D. Onorato (FFWCC, unpublished data) were used to estimate the area needed to support 100, 120, 180, and 230 individuals (adults and subadults) (Table 1). These carrying capacities are only used as placeholder at this time to demonstrate the method; estimates of T_3 and T_7 would need to be calculated from a PVA to complete the calculation suggested here.

Table 1. Habitat extent required to provide adequate carrying capacity to confer a high probability of persistence, as a function of panther density and desired carrying capacity.

	Panther Density		Area Needed for Panther Population (Acres)			
Site for Density Estimate	**Ha**	**Acres**	**N=100**	**N=120**	**N=180**	**N=230**
Addition Lands of BCNP[1]	7,299	18,036	1,803,650	2,164,380	3,246,569	4,148,394
PSRP Area[2]	6,135	15,160	1,515,951	1,819,141	2,728,712	3,486,687
FPNWR/PSRP Area[3]	2,857	7,060	706,000	847,200	1,270,800	1,623,800

[1]Dorazio and Onorato (2015); [2]Sollman et al. (2013); [3]D. Onorato (unpublished data)

These results suggest that approximately 1.5-1.8 million acres of protected lands with habitat quality similar to that of the Addition Lands of BCNP or the PSRP area could support 100 panthers. These results also suggest that approximately 2.0-4.0 million acres of habitat with quality comparable to that in the Addition Lands of BCNP or the PSRP area would be needed to protect a population of 120-230 panthers, and that larger populations approaching 230 would have increasing chances of demographic persistence and genetic resiliency. If 2.0-4.0 million acres of contiguous habitat were protected, an additional population of 180 panthers on approximately 3.2 million acres of conserved lands with habitat quality comparable to that found on the Addition Lands of BCNP may provide may provide a degree of redundancy and resiliency

needed by panthers to resist future extinction. Based on these findings, the following criteria are suggested to address the threat of destruction, modification, or curtailment of habitat or range:

1. The Florida panther may be considered for reclassification as a threatened species when sufficient quantity (to be determined *) of suitable connected and contiguous habitat in south and south-central Florida supporting panthers has been placed in protected status by either fee simple acquisition or by less-than-fee conservation easements dedicated to the preservation of panther habitats.

2. The Florida panther may be considered for removal from the US endangered and threatened species list when sufficient habitat (to be determined *) across Florida in the historic range, including north of Ocala National Forest and Florida panhandle as well as north and south of the Caloosahatchee River has been placed in protected status by either fee simple acquisition or by less-than-fee conservation easements to support a breeding population indefinitely.

** Acres needed will be added once population size, T_4 from demographics above is determined.*

Comment [FK5]: The acreage needed will be calculated once the population size T_4 is determined.

Prey

The Florida panther is a top predator and is not typically preyed upon by other species. The primary prey of panthers are white-tailed deer (*Odocoileus virginianus*), wild hogs (*Sus scrofa*), raccoons (*Procyon lotor*), accounting for 70% of their diet (FWC, 2017). Prey density or availability can affect panther home range size, density across the habitat, and productivity. Because panthers are adaptable and can consume a wide variety of other animals, they have some resilience to variations of prey availability. For example, in areas where hogs are present, hogs tend to comprise a significant portion of panther diet. However the same adaptability that allows panthers to shift prey selection can result in depredation of domestic pets and livestock. If abundance and availability of native prey declines, increases in depredations may result. Deer are typically a primary food source of puma across North America. Ideal panther habitat in Florida should include a robust white-tailed deer population as well as other native prey. Published habitat models have not included prey abundance and/or availability as a factor in defining potential or occupied panther habitat. Therefore a unique recovery criterion that focuses on prey is recommended. White-tailed deer are a valuable state-trust species that are monitored and managed by the FWC. Therefore, inclusion of this recovery criterion is well within the scope of agency authority.

Reclassification should not be considered unless the following criterion is met:

1. Panther prey bases are sufficient to support a stable or growing panther population, and important prey species such as white-tailed deer are monitored and managed for long-term sustainability.

Factor B: Overuse

Factor C: Disease or Predation

Reclassification should not be considered unless the following criterion is met:

1. The collective threat from disease on the Florida population should not have a significant, long-term impact on the probability of persistence of the Florida panther population as defined at the fundamental criteria level.

Factor D: Inadequacy of Existing Regulation

In the event of reclassification from endangered to threatened, the regulatory provisions of the ESA, and the protections derived from them, remain in place. Thus, additional regulatory criteria are not needed for a reclassification. In the event of delisting, however, the regulatory protections of the ESA are removed. The following two additional recovery criteria are needed to ensure the long-term persistence of Florida panthers after delisting.

Recovery Criterion for Post-delisting Management: Develop with partners a Conservation Strategy to guide management in the absence of Federal ESA protections (i.e., after delisting). This strategy should identify potentially significant stressors that are likely to persist after delisting and clearly articulate how these factors will be managed in the absence of Federal ESA protections (i.e., after delisting). The Conservation Strategy's commitments to manage these potentially significant stressors should be incorporated into regulation, where possible and appropriate. Such commitments would only be necessary for potential stressors that have a meaningful likelihood to have population level impacts.

Recovery Criterion for Post-delisting Monitoring: In cooperation with partners, develop and implement a post delisting monitoring plan to confirm that the species remains secure after removal of ESA protections. This monitoring plan would span multiple generation times (e.g., multiples of ~5 years which is indicative of the time period it takes a female to replace herself in the population) and consider the rate at which such residual stressors might manifest their effects on the species. It is anticipated that such monitoring would be initiated several generations leading up to delisting, if possible, to prove its effectiveness. Practically, it is likely that such monitoring would be a continuation of monitoring that occurred while listed.

Factor E: Any other Natural or Manmade Factors

Reclassification should not be considered unless the following criterion is met:

1. The collective threat from human-caused mortality on the Florida population should not have a significant, long-term impact on the probability of persistence of the Florida panther population as defined at the fundamental criteria level.

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