Shifting Baselines for Endangered Species Recovery:

When is a species **conservation-reliant** and why does this matter?

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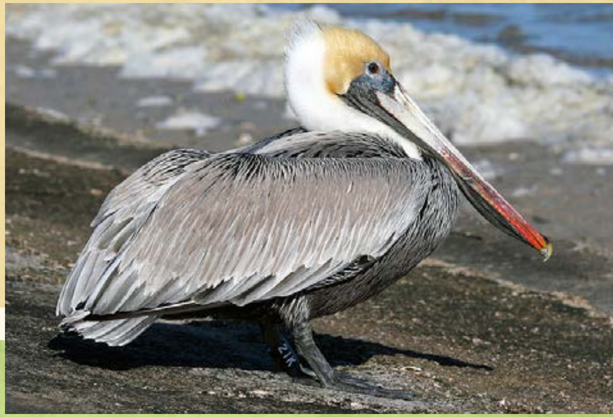
Listing and Recovery under the US Endangered Act

- Species added to federal list due to magnitude of threats and inadequacy of existing state-level regulations.
- Federal measures and revision of state-level regulations ameliorate threats into the foreseeable future.
- Species removed from the federal list and returned to state management.

Classic "emergency room" species



- Examples: Brown pelican, peregrine falcon
- Threats (pesticide pollutants) comprehensively addressed by new federal regulations: 1972 ban on DDT
- Time to recovery/delisting: 30-40 years

Species which face long-term challenges to recovery

- Example: Hawaiian native birds (Reed et al. 2012)
- Threats include non-native diseases (avian malaria), introduced predators, habitat loss.
- Time to recovery/delisting: ??

The Concept of Conservation-Reliant Species

- Defined by Scott et al. (2005, 2010): Any species requiring some form of conservation management for the foreseeable future.
- "Management" could include population augmentation, habitat management, or control of other species, pollutants, or overexploitation.
- Broad relevance: 84% of listed species are conservation-reliant (Scott et al. 2010).

The Challenge of Conservation-Reliant Species

- If most species require long-term intensive management, what is recovery?
- Is the ESA's classic template for listing and recovery "naïve" in a world transformed by human actions (the Antropocene Epoch)?
- Or is the "conservation-reliant" concept merely a stealth attempt to deemphasize the importance of biodiversity protection vs. other societal values?

The Challenge of Conservation-Reliant Species
The Policy Question

- Should society accept federal delisting even for species which still require intensive management of threats?
- Goble et al. 2012: "continued listing under the ESA for many currently listed species may not be the best way to achieve long-term persistence."
- Or do these species need to remain listed for decades or perhaps centuries?

Restoration of Population Connectivity Provides an Example of Conservation Reliance

- Ensuring long-term genetic health of populations via restoration of population connectivity may require long-term management of landscape matrix where humans live, which is a “hard problem”.
- Intensive management (translocation) offers an attractive option for avoiding these issues.
- Most references to conservation reliance in agency documents involve connectivity.

Congressional Intent Regarding the Scope of Recovery

- Intent of the Act is "to provide a means whereby the **ecosystems** upon which endangered species and threatened species depend may be conserved."
- "the purpose of the ESA is to promote populations that are **self-sustaining without human interference**" *Trout Unlimited v. Lohn* (2009).

How have the agencies interpreted the ESA's mandate for recovery of self-sustaining populations?

Inconsistently..

Intensive management of delisted populations is sometime seen as acceptable

- 2007: “Yellowstone grizzly bear…is a ‘conservation-reliant species’ ” [translocation acceptable after delisting]
- 2009: NRM gray wolf is “conservation-reliant”, [translocation acceptable after delisting]
- 2011: Kirtland’s warbler is conservation-reliant, “will always be dependent on annual habitat management and control of parasitic cowbirds”.

But at other times, not so much…

- 2000: [Controlled propagation] “not a substitute for addressing factors responsible for a…species' decline…All reasonable effort should be made to accomplish conservation measures that enable a listed species to recover in the wild.”
- 2012: NRM gray wolf “will not become ‘conservation-reliant’ ” .
- 2012: Wolverine: need for translocation (loss of natural connectivity) merits **listing** as threatened.

What direction do the courts give regarding the ESA’s mandate for recovery of self-sustaining populations?

Yellowstone Grizzly Bear

- 2007 delisting rule: species is "conservation-reliant", genetic connectivity may be acheived via artificial translocation (as a backup remedy)
- In *GYC v. Servheen* (2009), plaintiffs argued that translocation inconsistent with recovery of **wild self-sustaining populations**.
- Court concludes: 1) genetic concerns are distant threat, not within the "**foreseeable future**", 2) FWS has considered both the positive and negative effects of translocation (see *Trout Unlimited v. Lohn* 2009).

Emergent Questions from Case Law and Agency Policy

- How long is the "foreseeable future"? Should we care about distant threats?
- How much effort do agencies have to make to restore self-sustaining populations (natural connectivity) before falling back on intensive management (translocation)?

In the absence of guidance from case law or agency practice, can the concept of conservation-reliance inform policy?

It depends…

Why is a broad definition of conservation reliance problematic?

It confounds

- Normative decisions: what costs should society bear to conserve species?
- Ecological and technical characteristics of the threats to a species (how challenging are specific threats and how can we best address them?).

What would a more ecologically-based definition of conservation reliance look like?

In the case of connectivity, the definition would be based on:

- What level of connectivity is necessary for viability?
- What ecological challenges exist to restoring connectivity?

Connectivity and Recovery: Types of "Conservation-Reliance"

	Degree of connectivity required for recovery			
Socioeconomic cost to restore connectivity	Lowest *Genetic*	Low *Genetic*	Medium *Demographic*	High *Migratory*
Moderate	Grizzly bear	Gray wolf	Fender, Karner blue butterfly	Pronghorn antelope
High one-time	Concho water snake	Red-cockaded woodpecker		Columbia river salmon
Continuing	Many species due to climate change	S. Idaho ground squirrel, wolverine, greater sage grouse	Black-footed ferret	Peary caribou

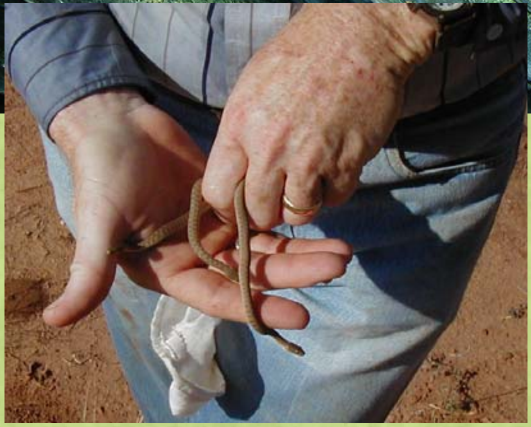
What does our classification reveal?

The broad definition of conservation reliance conflates:

- Species with costly threats (salmon)
- Species with distant threats (grizzly bear)
- Species with irresolvable threats: truly conservation-reliant species

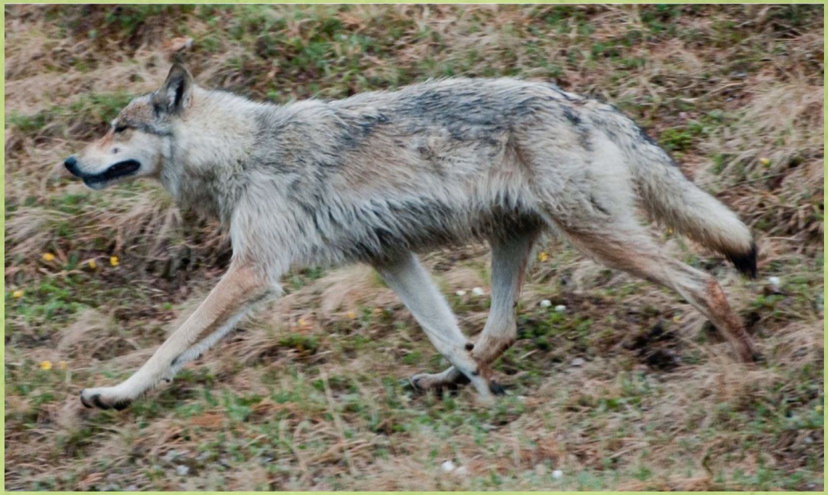
Costly Threats – Depend on society's willingness to pay

- Example: Dam removal to allow natural migration (Pacific salmon) or connectivity (Concho water snake).
- Technically feasible.
- Economically costly.



Distant Threats –
Depend on definition of foreseeable future

- Example: Effects of genetic isolation on viability of small populations.
- May require many generations to have observed effect on viability.
- Restoring connectivity may be feasible, but given low priority due to lack of immediate threat.



Truly Conservation-Reliant Species

Those dependent on species-specific conservation measures that must be maintained in perpetuity due to lack of technical solutions to permanently reduce key threats.

Example of threats include:

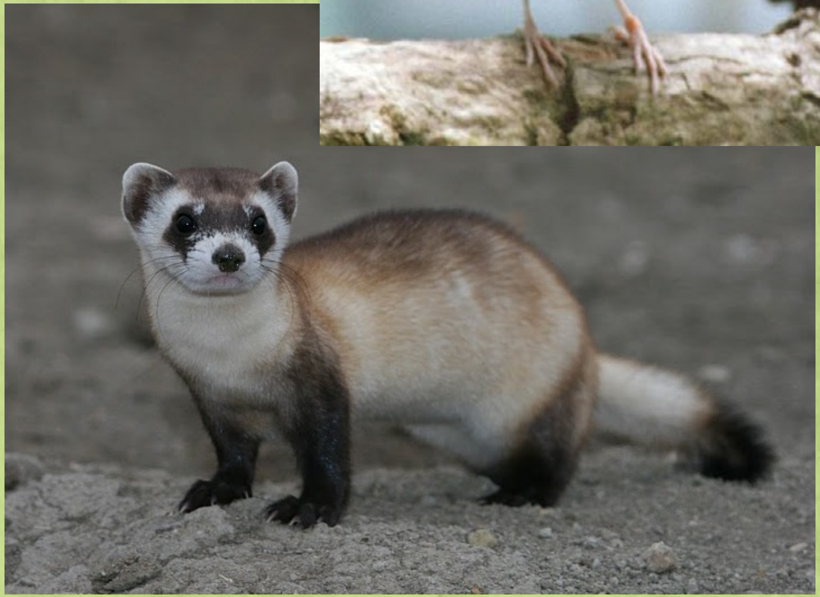
- Invasive species
- Altered disturbance regimes
- Climate change

Invasive Species

Introduced disease: avian malaria, sylvatic plague.

Predator species: Feral cats, rats, stoats, etc.

Competitor species: Barred owl->Spotted owl.

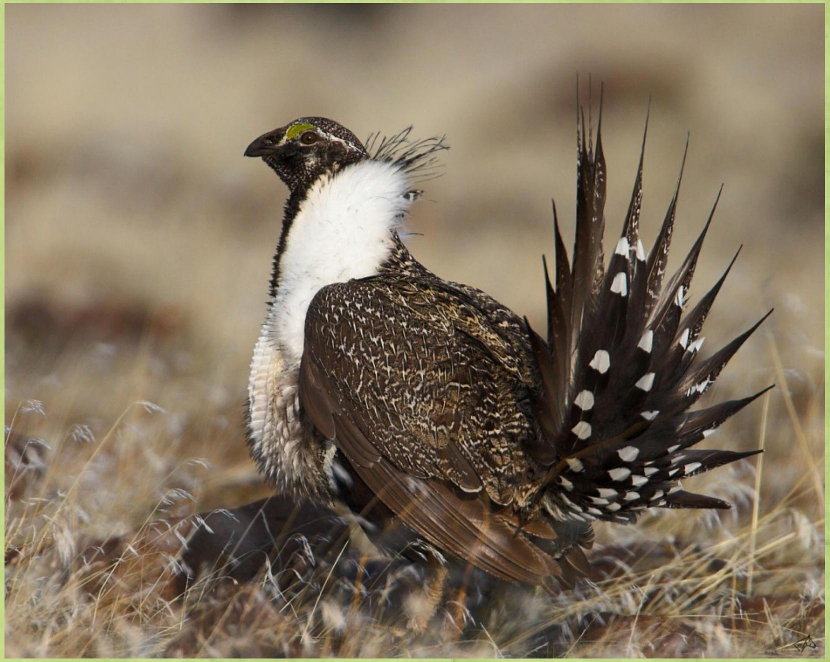


Altered Disturbance Regimes

Often operates in tandem with invasive species.

Example: Transformation of sagebrush ecosystems by introduced cheatgrass and altered fire regime.

Restoration may be difficult if ecosystem reaches alternate stable state.

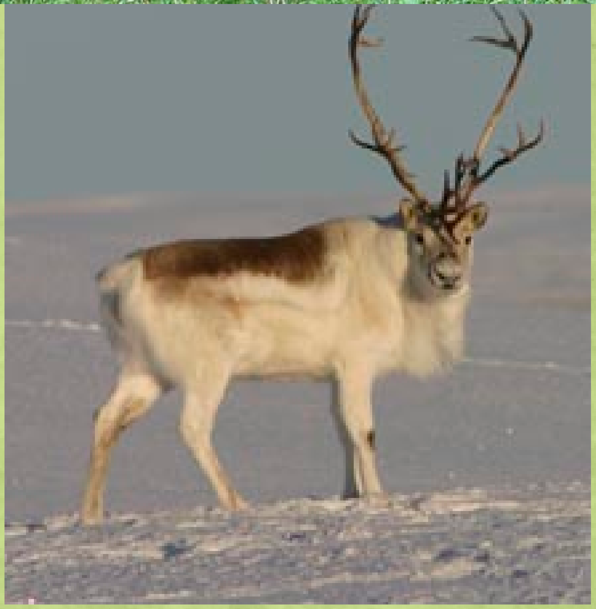


Climate change

Current carbon emissions have a long half-life, so effects will persist even if future emissions are reduced.

Climate change has or will cause loss of habitat (Peary caribou), shifts in distribution of suitable habitat, and increased isolation of core areas (wolverine).

Translocation between newly isolated areas and artificial migration to newly suitable areas have been proposed as means of reducing extinctions due to climate change.



Why are these examples “truly” conservation-reliant species?

- No technical solution available in the foreseeable future to recover self-sustaining populations and avoid need for ongoing intensive management.
- This fact is irrespective of society’s normative decision on the priority of biodiversity protection vs. other values.

Why do definitions matter?

In aggregate, the Services' decisions on when to delist have far-reaching implications for the ultimate status of biodiversity, and the "esthetic, ecological, educational, historical, recreational, and scientific value [that species provide] to the Nation and its people".

The Three Rs – Resiliency, Redundancy and Representation

- The Services commonly use the 3-R framework (resiliency, redundancy, and representation) to define recovery.
- To be considered recovered, a species should be present in many large populations arrayed across a range of ecological contexts.
- Allowing delisting of conservation-reliant populations lowers the likelihood that such populations will achieve the 3 Rs.

Ecosystem Conservation and SPR

- Intensive management actions such as translocation benefit individual species, but restoration of habitat and natural fire regimes to restore connectivity may benefit entire ecosystems.
- Species which are well-distributed in dispersal corridors outside of core habitat are more likely to achieve recovery throughout all "significant portion[s] of the range".

Do truly conservation-reliant species merit delisting? A technical and normative question

What regulatory structure can best ensure an effective long-term framework for intensive conservation management?

Does the ESA already offer sufficient flexibility (e.g., Section 9)?

Or are new tools needed to better prioritize long-term recovery efforts?

Do non-conservation-reliant species merit delisting while still under intensive management?

A normative question: **Is self-sufficiency in the wild one of the conditions of recovery**?

An answer of “no”:

- “Zookeeper” paradigm - recovery of intensively-managed, narrowly-distributed populations.

An answer of “yes”:

- “Restoration” paradigm – recovery of self-sustaining populations that can play their historic role in ecosystems.

The End