

Supplementary Material Table S1. Examples of the use of the concepts of resilience, redundancy, and representation in rules for endangered species developed by the U.S. Fish and Wildlife Service.

1. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Coaster Brook Trout as Endangered Tuesday, May 19, 2009 74 FR 23376-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

2. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Proposed Rule To Reclassify the Oregon Chub (*Oregonichthys crameri*) From Endangered to Threatened Friday, May 15, 2009 74 FR 22870-01

... species' range is an area that is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... of the range where the species is in danger of extinction pursuant to section 4(c)(1) of the Act. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the species' range. Resiliency allows the ...

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

3. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Final Rule To Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and To Revise the List of Endangered and Threatened Wildlife Thursday, April 2, 2009 74 FR 15123-01

... unoccupied portions of the species' historic range, both in and beyond the NRM DPS. Others indicated that the concepts of resiliency, redundancy, and representation need to be addressed over a much broader area. Some believed that our interpretation of recovery led us ...

... wolf habitat in the contiguous United States has been so modified by people that it is currently unsuitable for wolves. Resiliency, redundancy, and representation (described in detail in the Conclusion of the 5-Factor Analysis section below) are important factors in the long-term ...

... Stein 2000). Within the NRM DPS, each of the States and each of the recovery areas meaningfully contributes to its resiliency, redundancy, and representation. Across the lower 48-States, the three wolf populations in the lower 48-States (WGL DPS, NRM DPS, and Mexican ...

4. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Final Rule To Identify the Western Great Lakes Populations of Gray Wolves as a Distinct Population Segment and To Revise the List of Endangered and Threatened Wildlife Thursday, April 2, 2009 74 FR 15070-01

... the portion of the DPS that provides an adequate wild prey base, suitably low levels of human-caused mortality, and sufficient representation, resiliency, and redundancy to buffer the impacts of disease and parasite-induced mortality. These biological needs, and the threats to gray wolves ...

5. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Yellow-Billed Loon as Threatened or Endangered Wednesday, March 25, 2009 74 FR 12932-01

... species' range is an area that is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

6. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx Wednesday, February 25, 2009 74 FR 8616-01

... Habitat section in the proposed rule, the inclusion of the Minnesota unit is important in applying the conservation principles of representation, resiliency, and redundancy to the critical habitat designation for lynx. Focusing lynx conservation efforts, including critical habitat designation, on areas with ...

7. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List Five Penguin Species Under the Endangered Species Act, and Proposed Rule To List the Five Penguin Species Thursday, December 18, 2008 73 FR 77303-01

... species' range is an area that is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

8. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Four Penguin Species as Threatened or Endangered Under the Endangered Species Act and Proposed Rule To List the Southern Rockhopper Penguin in the Campbell Plateau Portion of Its Range Thursday, December 18, 2008 73 FR 77264-01

... species' range is an area that is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The first step in determining whether a species is endangered in a SPR is to ...

... The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

9. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions Wednesday, December 10, 2008 73 FR 75176-01

... is a significant portion of the range. Based on our evaluation of this population's low level of contribution toward the resiliency, redundancy, and representation of the species as a whole, we conclude that the Florida population of the Florida indigo is not ...

10. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Northern

Mexican Gartersnake (*Thamnophis eques megalops*) as Threatened or Endangered with Critical Habitat
Tuesday, November 25, 2008 73 FR 71788-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... of the range is not significant, we do not determine whether the species is threatened or endangered there. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

11. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Bonneville
Cutthroat Trout as Threatened or Endangered Tuesday, September 9, 2008 73 FR 52235-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... and if so, whether that portion is important to the conservation of the species because it contributes meaningfully to the resiliency, representation, or redundancy of the species. The range of a species can theoretically be divided into portions in an infinite number ...

... The concepts of "resiliency," "redundancy," and "representation" are indicators of the conservation value of portions of the range. Resiliency of a species allows the species ...

12. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Final Rule Removing the Virginia Northern Flying
Squirrel (*Glaucomys sabrinus fuscus*) From the Federal List of Endangered and Threatened Wildlife
Tuesday, August 26, 2008 73 FR 50226-01

... The biological principles under which we evaluate the rangewide population status of the WVNFS relative to its long-term conservation are representation, redundancy, and resiliency (Groves 2003, pp. 30-32). At the time of listing, the WVNFS was thought to be an extremely rare ...

... of the species and if it is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

13. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Sierra Nevada Bighorn Sheep (*Ovis canadensis sierrae*) and Taxonomic Revision Tuesday, August 5, 2008 73 FR 45534-01

... long-term survival of the Sierra Nevada bighorn sheep at the local and subspecies levels, as well as provide for sufficient resiliency, representation, and redundancy of the subspecies. (2) There is uncertainty regarding whether viable Sierra Nevada bighorn sheep herds can become established ...

14. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To Delist *Astragalus magdalenae* var. *peirsonii* (Peirson's milk-vetch) Thursday, July 17, 2008 73 FR 41007-02

... range is significant if it is part of the current range of the species and it contributes substantially to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

15. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Final Rule To Amend the Listing for the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) To Specify Over What Portion of Its Range the Subspecies Is Threatened Thursday, July 10, 2008 73 FR 39790-01

... range is significant if it is part of the current range of the species and it contributes substantially to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... ranking (high, medium, and low) of the level of the portion's contribution to the listable entity's (species, subspecies or DPSs) representation, resiliency, or redundancy. Because the questions may not be independent of each other or equivalent in value, it is inappropriate to ...

... total "score." Rather, the questions are tools to identify those factors that are important in considering a portion's contribution to resiliency, redundancy, and representation, and whether it is significant. The Service then reviews the results and the justifications to decide whether the ...

16. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Proposed Removal of the Concho Water Snake (*Nerodia paucimaculata*) From the Federal List of Endangered and Threatened Wildlife; Removal of Federally Designated Critical Habitat Tuesday, July 8, 2008 73 FR 38956-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... or endangered in a portion of its range, the Service need not determine if that portion is significant. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

17. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Proposed Removal of *Erigeron maguirei* From the Federal List of Endangered and Threatened Plants; Availability of Post-Delisting Monitoring Plan Friday, May 16, 2008 73 FR 28410-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... or endangered in a portion of its range, the Service need not determine if that portion is significant. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

18. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Polar Bear (*Ursus maritimus*) Throughout Its Range Thursday, May 15, 2008 73 FR 28212-01

... range is significant if it is part of the current range of the species and it contributes substantially to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... will specify that portion of the range as threatened or endangered pursuant to section 4(c)(1) of the Act. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

19. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the North American Wolverine as Endangered or Threatened Tuesday, March 11, 2008 73 FR 12929-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... of the range is not significant, we do not determine whether the species is threatened or endangered there. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

... States, we assessed whether this portion is important to the conservation of the subspecies because it contributes meaningfully to the representation, resiliency, or redundancy of the species. For resiliency, we evaluated whether the contiguous U.S. wolverine population occupies relatively large or particularly ...

20. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx (*Lynx canadensis*) Thursday, February 28, 2008 73 FR 10860-01

... determined that occupied areas are sufficient for the conservation of the species because these areas adequately address the concepts of representation, resiliency, and redundancy necessary for conservation of a species (Shaffer and Stein 2000). Resiliency of a species allows the species to ...

21. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Final Rule Designating the Northern Rocky Mountain

Population of Gray Wolf as a Distinct Population Segment and Removing This Distinct Population Segment From the Federal List of Endangered and Threatened Wildlife Wednesday, February 27, 2008
73 FR 10514-01

... of the species historic range, both in and beyond the NRM DPS. Others indicated that the conservation biology concepts of resiliency, redundancy, and representation need to be addressed over a much broader area. Some believed that our interpretation of recovery led us ...

... Resiliency, redundancy, and representation (described in detail in the Conclusion of the 5-Factor Analysis section below) are important factors in the long-term ...

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

22. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding and Proposed Rule To Remove the Brown Pelican (*Pelecanus occidentalis*) From the Federal List of Endangered and Threatened Wildlife Wednesday, February 20, 2008 73 FR 9408-01

... range is significant if it is part of the current range of the species and it contributes substantially to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... or endangered in a portion of its range, the Service need not determine if that portion is significant. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

... other areas in the Caribbean is limited, and therefore cannot conclude that brown pelicans in Puerto Rico contribute meaningfully to resiliency, redundancy, or representation of the species. In the absence of identified threats or evidence that brown pelicans in Puerto Rico represent ...

23. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Gunnison's Prairie Dog as Threatened or Endangered Tuesday, February 5, 2008 73 FR 6660-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

... Given the best scientific and commercial information available, we found that individual population areas did not meaningfully contribute to the representation, resiliency, or redundancy of the species. The scale at which we define the range of a particular species, that is, at ...

24. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Siskiyou Mountains Salamander (*Plethodon stormi*) and Scott Bar Salamander (*Plethodon asupak*) as Threatened or Endangered Thursday, January 24, 2008 73 FR 4380-01

... DPSs) is significant if it is part of the current range of the species and it contributes substantially to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... will specify that portion of the range as threatened or endangered pursuant to section 4(c)(1) of the Act. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a species ...

25. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Arenaria ursina* (Bear Valley Sandwort), *Castilleja cinerea* (Ash-gray Indian Paintbrush), and *Eriogonum kennedyi* var. *austromontanum* (Southern Mountain Wild-Buckwheat) Wednesday, December 26, 2007 72 FR 73092-01

... from the Proposed Rule" and the "Unit Descriptions" sections below). Including these two pebble plains in this designation increases the representation, resiliency, and redundancy of this morphologically distinct form of the species and the unique portion of the range of environmental variability ...

26. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Response to Court on Significant Portion of the Range, and Evaluation of Distinct Population Segments, for the Queen Charlotte Goshawk (*Accipiter gentilis laingi*) Thursday, November 8, 2007 72 FR 63123-01

... subspecies') range is an area that is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. Adequate representation insures conserving the breadth of the genetic makeup of the species needed to ...

27. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Proposed Rule To Amend the Listing for the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) %g To Specify Over What Portion of Its Range the Subspecies Is Threatened Wednesday, November 7, 2007 72 FR 62992-01

... current range of the subspecies and is important to the conservation of the subspecies because it contributes meaningfully to the representation, resiliency, or redundancy of the subspecies. The contribution must be at a level such that its loss would result in a ...

... subspecies. endangered in a portion of its range, the Service need not determine if that portion is significant. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a subspecies ...

... commercial information available, we do not believe such subdivisions would result in units that would each meaningfully contribute to the representation, resiliency, or redundancy of the subspecies at a level such that its loss would result in a decrease in the ability ...

28. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Guajón (*Eleutherodactylus cooki*) Tuesday, October 23, 2007 72 FR 60068-01

... protected from disturbance. We have determined that this site is essential to the conservation of the species because of the representation, redundancy, and resiliency provided by the species at this site in relation to the species as a whole. Further, it contains ...

29. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Hine's Emerald

Dragonfly Wednesday, September 5, 2007 72 FR 51102-01

... the Hine's emerald dragonfly. Management and protection of all the areas is necessary to achieve the conservation biology principles of representation, resiliency, and redundancy (Shaffer and Stein 2000) as represented in the recovery criteria established in the recovery plan for the species. ...

30. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List the Yellowstone National Park Bison Herd as Endangered Wednesday, August 15, 2007 72 FR 45717-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... species. endangered in a portion of its range, the Service need not determine if that portion is significant. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a ...

31. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Sierra Nevada Bighorn Sheep (*Ovis canadensis californiana*) and Proposed Taxonomic Revision Wednesday, July 25, 2007 72 FR 40956-01

... long-term survival of the Sierra Nevada bighorn sheep at the local and subspecies levels as well as provide for sufficient resiliency, representation and redundancy; (2) There is uncertainty whether viable Sierra Nevada bighorn sheep herds can become established in the proposed Twin ...

32. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife Monday, July 9, 2007 72 FR 37346-01

... current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a ...

... or endangered in a portion of its range, the Service need not determine if that portion is significant. The terms "resiliency," "redundancy," and "representation" are intended to be indicators of the conservation value of portions of the range. Resiliency of a To ...

... whether the bald eagle is threatened in any significant portion of its range, we first considered how the concepts of resiliency, representation, and redundancy apply to the conservation of this particular species. The recovery of the bald eagle in the lower 48 ...

33. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Guajón
(*Eleutherodactylus cooki*) Tuesday, June 19, 2007 72 FR 33715-01

... humidity); and (3) they are currently occupied. Unit 16 is essential to the conservation of the species because of the representation, redundancy, and resiliency it adds to the critical habitat designation. Below, we present brief descriptions of the five units, the PCEs ...

34. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Final Rule Designating the Western Great Lakes
Populations of Gray Wolves as a Distinct Population Segment; Removing the Western Great Lakes
Distinct Population Segment of the Gray Wolf From the List of Endangered and Threatened Wildlife
Thursday, February 8, 2007 72 FR 6052-01

... the portion of the DPS that provides an adequate wild prey base, suitably low levels of human-caused mortality, and sufficient representation, resiliency, and redundancy to buffer the impacts of disease and parasite-induced mortality. These biological needs, and the threats to gray wolves ...

35. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17
Endangered and Threatened Wildlife and Plants; Proposed Rule to Remove the Virginia Northern Flying
Squirrel (*Glaucomys sabrinus fuscus* %) From the Federal List of Endangered and Threatened Wildlife
Tuesday, December 19, 2006 71 FR 75924-01

... The biological principles under which we evaluate the rangewide population status of the WVNFS relative to its long-term conservation are representation, redundancy, and resiliency. At the time of listing, the WVNFS was thought to be an extremely rare and declining taxon that ...

36. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Hine's Emerald Dragonfly Wednesday, July 26, 2006 71 FR 42442-01

... the Hine's emerald dragonfly. Management and protection of all the areas is necessary to achieve the conservation biology principles of representation, resiliency, and redundancy (Shaffer and Stein 2000) as represented in the recovery criteria established in the recovery plan for the ...

37. PROPOSED RULES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Removing the Eastern Distinct Population Segment of the Gray Wolf From the List of Endangered and Threatened Wildlife Wednesday, July 21, 2004 69 FR 43664-01

... tribes who wish to develop wolf recovery plans beyond those that have already been undertaken. H. Principles of Conservation Biology Representation, resiliency, and redundancy are three principles of conservation biology that are generally recognized as being necessary to conserve the biodiversity of ...

... The principles of representation, resiliency, and redundancy are fully incorporated into the recovery criteria developed by the Eastern Team. Maintenance of the Minnesota wolf population ...

38. RULES and REGULATIONS DEPARTMENT OF THE INTERIOR Fish and Wildlife Service 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Final Rule To Reclassify and Remove the Gray Wolf From the List of Endangered and Threatened Wildlife in Portions of the Conterminous United States; Establishment of Two Special Regulations for Threatened Gray Wolves Tuesday, April 1, 2003 68 FR 15804-01

... needs the protections of the Act, because the species is no longer threatened or endangered. Important Principles of Conservation Biology Representation, resiliency, and redundancy are three principles of conservation biology that are generally recognized as being necessary to conserve the biodiversity of ...

... and found them to be adequate and sufficient to ensure long-term population viability (Peterson in litt. 1997). The principles of representation, resiliency, and redundancy are fully incorporated into the recovery criteria developed by the Eastern Timber Wolf Recovery Team. The need to ...

... Northern Rocky Mountain Wolf Recovery Plan (Service 1987) have been subsequently revised following peer review (Bangs 2002) to provide sufficient representation, resiliency, and redundancy to ensure the species is no longer endangered in the Western DPS when those criteria are met. Large ...