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Challenging The "Distinct Population Segment" Definition Of Atlantic Salmon Under The Endangered Species Act

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CHALLENGING THE "DISTINCT POPULATION SEGMENT" DEFINITION OF ATLANTIC SALMON UNDER THE ENDANGERED SPECIES ACT

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I. INTRODUCTION

In October 1993, a citizen petition[1] was filed under the Endangered Species Act of 1973 (ESA or Act)[2] to list the anadromous Atlantic salmon as an endangered species throughout its historic range in the contiguous United States.[3] The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS)[4] responded in January 1994, by forming a joint biological review team to perform a detailed Status Review of the requested listing.[5] Following completion of the Status Review, the

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1. RESTORE: The North Woods, Biodiversity Legal Foundation, and Jeffrey W. Elliot, Petition for a Rule to List the Anadromous Atlantic Salmon (*Salmo salar*) under the Endangered Species Act, 16 U.S.C. Sec. 1531 *et seq.* (1973) as Amended (in the Office of Endangered Species, U.S. Fish and Wildlife Service, United States Department of the Interior, Sept. 1993) [hereinafter Petition].

2. 16 U.S.C. §§ 1531-1544 (1994).

3. The Petition asked to list *Salmo salar* as endangered throughout its known historic range in the coterminous United States, and to designate areas of critical habitat. Petition, *supra* note 1, at 1.

4. NMFS is designated to act for the National Oceanic and Atmospheric Administration under the Department of Commerce; FWS acts under the Department of the Interior. MICHAEL J. BEAN, THE EVOLUTION OF NATIONAL WILDLIFE LAW 65-66 (rev. ed. 1983). The Secretaries of Interior and Commerce each have jurisdiction because the species spends significant portions of its life in both marine and freshwater habitats.

5. U.S. FISH AND WILDLIFE SERV. & NAT'L MARINE FISHERIES SERV., U.S. DEP'T OF COMMERCE, STATUS REVIEW FOR ANADROMOUS ATLANTIC SALMON IN THE UNITED STATES 1 (Jan. 1995) [hereinafter STATUS REVIEW]. The status review formed the basis

two Services announced that the petitioned U.S.-wide listing was not warranted,[6] but acknowledged that listings for populations in certain New England rivers might be.[7] In September 1995, the Services proposed listing only a distinct population segment (DPS) of the Atlantic salmon, found only in certain Maine rivers, as threatened.[8] The NMFS and FWS issued a proposed rule (Rule) establishing joint regulations,[9] prohibitions, and protective measures.[10] On the day before the comment period closed,[11] Maine Governor Angus King delivered a letter to the Services objecting to the listing "in the strongest possible terms," and called on the Services to enter into a cooperative agreement with Maine to implement an alternative plan to listing developed in early 1996 by a task force appointed by Governor King.[12] Thus, at the time this Comment goes to

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for the proposed rule designating the Atlantic salmon as threatened in the seven downeast rivers of Maine. Notice of Petition Finding, 60 Fed. Reg. 14,410, 14,412 (1995).

6. 60 Fed. Reg. 14,410 (1995).

7. *Id.* at 14,421. Technically, it appears that the petition was not granted and that the Services proceeded with its investigation and subsequent rulemaking on its own motion.

8. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon *(Salmo salar)* in Seven Maine Rivers, 60 Fed. Reg. 50,530 (1995) (to be codified at 50 C.F.R. pts. 17, 227, 425) (proposed Sept. 29, 1995). *See* also *infra* note 43.

9. *Id.*

10. *Id.* at 50,534. While the proposed protections permit "incidental take" as allowed by the Endangered Species Act, they invoke a special rule permitting the State of Maine to further regulate the incidental take: "The intent of the special rule is to provide the State of Maine an opportunity to maintain the lead role in the management of activities that could impact Atlantic salmon . . . ." *Id.* at 50,535.

The protections are also in addition to other recovery efforts, like the FWS river-specific stocking program in effect since 1991. Letter from Paul Nickerson, Endangered Species Northeast Coordinator FWS, to author (Sept. 12, 1996) (on file with author)). Although stocking and other recovery efforts in many non-DPS and DPS rivers began in the mid to late 1800s, the degree of success these efforts have achieved is debated. STATUS REVIEW, *supra* note 5, at 4. For a detailed analysis of historic, ongoing, and proposed restoration efforts, *see* U.S. FISH AND WILDLIFE SERV., U.S. DEP'T OF INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT 1989-2021, ATLANTIC SALMON RESTORATION IN NEW ENGLAND (1989).

11. The congressional moratorium prohibiting the listing of additional species under the Act (in effect until April 1996) delayed the public hearing process until August 1996. The Services accepted comments on the proposed rule from August until October 11, 1996. Letter from Andrew Rosenberg, Northeast Regional Administrator, NMFS, to author (Aug. 30, 1996) (on file with author). *See also* Extension of Listing Priority Guidance for Fiscal Year 1997, 61 Fed. Reg. 48,962 (1996).

12. Letter from Angus King, Governor of State of Maine, to Paul Nickerson, Endangered Species Northeast Coordinator, FWS, and to Mary Colligan, Fisheries Biologist, NMFS 3 (Oct. 19, 1996) (referring to MAINE ATLANTIC SALMON TASK FORCE,

print it will not be known whether the Services will change their Rule or what impact Governor King's comments will have on concurrent jurisdiction and federal-state cooperation in protecting Atlantic salmon.

This Comment addresses several debated aspects of the proposed listing, proposes an alternative method of deciding listings more in keeping with the goals and purposes of the Endangered Species Act,[13] and describes several congressional attempts to limit the scope of the ESA. Specifically, Part II summarizes the threshold tests used in the listing process and describes how these tests were applied to the listing of the Atlantic salmon. Part III begins by criticizing the standard the Services used to determine which populations to list and the eventual limitation of ESA protection to seven "downeast" Maine rivers instead of the dozens of other rivers throughout the species' historic range. Part III continues by criticizing the Services' proposed rule for failing to consider threats to the ecosystem and the habitat of the Atlantic salmon, as well as ignoring other federal requirements and agreements. Part III concludes that in addition to scholarly criticism and debate, the legality of the proposed rule may be challenged as being arbitrary and capricious. Part IV describes an alternative standard that is more consistent with ESA goals and purposes. Part V discusses the significance of several misguided proposed amendments to the ESA that would prohibit federal agencies from even considering listings below the species level in the future. The Comment concludes that the Services' proposed rule is a prime example of the interplay between biology and law in a political context. Even if one believes that the Services used a logical method to define which populations to list, they did so to minimize political pressure calling for limited federal involvement and greater state control. Additionally, the Services' sensitivity to this atmosphere of reform[14] may be indicative of future

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DRAFT MAINE ATLANTIC SALMON CONSERVATION PLAN (1996)) (on file with Author).

13. This Comment does not propose a holistic plan to improve the efficiency or fairness of every aspect of the ESA; this soil has been tilled by other authors. *See, e.g.* John Charles Kunich, *The Fallacy of Deathbed Conservation Under the Endangered Species Act*, 24 ENVTL. L. 501, 578 (1994) (ESA is a "well intentioned but misguided and ineffective piece of legislation . . . designed to be the option of last resort. . . ." But it has become the option of first and only resort due to the lack of "teeth" in other conservation statutes.). *See generally* William W. Stelle et al., *Endangered Species Act at Twenty-one: Issues of Reauthorization*, 24 ENVTL. L. 321 (1994).

14. Leading ESA "reformers" believe that attempts to address perceived problems in the Act by regulation and agency policy are inadequate, and ultimately not legal. *See, e.g.*, Letter from Don Young, U.S. House of Representatives, to Bill Baker, U.S. House

approaches to administering the Act. This result would be unfortunate because the Services' proposed rule fails to extend ESA protection to populations which may be crucial to the survival of Atlantic salmon, and whose habitat is similarly important.

II. LISTING SPECIES UNDER THE ENDANGERED SPECIES ACT

A. The Listing Process

A species can be listed under the Act if it is endangered or threatened. "Endangered" means "in danger of extinction throughout all or a significant portion of its range,"[15] while "threatened" means "likely to become an endangered species within the foreseeable future."[16] "Species" includes "any subspecies of fish or wildlife or plants, and *any distinct population segment* [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature."[17]

Depending on the species, listing can be initiated by either the Secretary of the Interior or the Secretary of Commerce, or by "petition of an interested person."[18] For petitions, the Secretary[19] must determine within ninety days whether the petition presents substantial information warranting further action. If so, the Secretary must begin a status review

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of Representatives (Sept. 4, 1996) ("The Secretary of the Interior and the . . . Administration have attempted to 'paper over' the problems with the ESA and have promised to make the Act work better by improved administrative interpretations . . . . Unfortunately . . . many of those improved administrative interpretations may exceed the bounds of the law.") (on file with author).

15. 16 U.S.C. § 1532(6) (1994).

16. *Id.* § 1532(20).

17. *Id.* § 1532(16) (emphasis added). The distinct population segment language was added in the 1978 amendments to the ESA. The notion of a classification below the level of endangered status, as well as the idea of protecting endangered populations of otherwise healthy species was borrowed from the Marine Mammal Protection Act in the 1973 authorization of the ESA. JOSEPH J. KALO ET AL., COASTAL AND OCEAN LAW 443 (1994).

18. 16 U.S.C. § 1533(b)(3)(A),(B) (1994).

19. Under the ESA, "Secretary" generally refers to the Secretary of Commerce or to the Secretary of the Interior. Their responsibilities are divided in accordance with the habitat location of the species. With respect to provisions regarding the importation or exportation of terrestrial plants, "Secretary" means the Secretary of Agriculture. *Id.* § 1532(15).

of the species and decide within twelve months whether to propose to list the species or to deny the petition.[20]

At the time of listing, the Secretary must designate the species as threatened or endangered.[21] An evaluation of the listing proposal must be based on the best scientific and commercial information available.[22] The Secretary must also, to the maximum extent prudent and determinable, designate critical habitat.[23] In theory, the Secretary must affirmatively designate protections for a threatened species, and may provide regulations as restrictive as if the species were endangered "as he deems advisable to provide for the conservation of the species."[24] But in practice, the Secretary generally treats both designations the same.[25] In the few reported cases, courts have given the Secretary wide discretion in promulgating regulations for threatened species.[26]

Listing is highly significant because it invokes three major actions: (1) Section 1536 of the ESA restricts any agency from taking an action that

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20. *Id.* § 1533(b)(3)(B). If the Secretary does not approve the petitioned action, he must publish a written finding in the Federal Register. *Id.*

21. *Id.* § 1533(a)(1). The ESA requires the Secretary to determine whether the species is threatened or endangered due to one or more of five factors: (1) present or threatened habitat destruction, (2) human overutilization, (3) disease or predation, (4) inadequacy of existing regulatory mechanisms, or (5) other natural or manmade factors affecting its continued existence. *Id.*

22. *Id.* § 1533(b)(1)(A).

23. The Secretary may list the species without designating the critical habitat if the habitat is "not then determinable." *Id.* § 1533(b)(6)(C)(ii). *See* Nancy Kubasek, *The Endangered Species Act: Time for a New Approach*, 24 ENVTL. L. 329, 337 (1994) (citing a 1992 GAO study finding that of 651 species examined, 546 had no critical habitat designated or pending).

24. 16 U.S.C. § 1533(d) (1994).

25. The threatened status option allows flexibility, because a distinct population segment can be listed as threatened in one location, but not in another where it may be more abundant. The bald eagle, for example is listed in the lower forty-eight states, but not in Alaska. Congressional support for this flexibility is apparent in the Senate Report on the 1973 amendments to the 1969 Act, which specifically rejected a proposal from the General Accounting Office to prevent the Services from listing populations such as the bald eagle at the subspecies level. Daniel J. Rohlf, *There's Something Fishy Going on Here: A Critique of the NMFS's Definition of Species Under the ESA*, 24 ENVTL. L. 617, 633 (1994) [hereinafter Rohlf]. *But see* S. REP. NO. 96-151, at 7 (1979) ("great potential for abuse" means Services' latitude in listing at sub-species level should be used "sparingly").

26. BEAN, *supra* note 4, at 345-46 (citing Cayman Turtle Farm Ltd. v. Andrus, 478 F. Supp. 125 (D.D.C. 1979), *aff'd without opinion*, (D.C. Cir. Dec. 12, 1980); Defenders of Wildlife v. Watt, No. 81-1048 (D.D.C. May 28, 1981); Fund for Animals v. Andrus, 11 Env't Rep. Cas. (BNA) 2189 (D. Minn. July 14 and Aug. 30, 1978)).

is likely "to jeopardize the continued existence of any endangered species or threatened species or result in the destruction . . . of habitat . . ." and requires all federal agencies to consult with the Secretary, and to use their authority to further the Act;[27] (2) Section 1538 prohibits "taking," or capturing, the listed species;[28] and (3) Section 1533 requires FWS and NMFS to develop recovery plans[29] for the conservation and survival of listed species "us[ing] all methods and procedures which are necessary to bring any endangered or threatened species to the point" where the species would not require listing.[30]

B. Defining DPS Using Evolutionarily Significant Units (ESU)

If the Secretary decides that a listing of the entire species or a subspecies is not warranted, she can decide to list a distinct population segment of the species or subspecies.[31] Listing of a DPS under the ESA is a two-step process: (1) a population or group of populations must be determined to comprise a DPS; and (2) several specific factors are considered to determine whether the species is actually threatened or endangered.[32] Populations that do not make the DPS hurdle are removed from listing consideration.

Since the DPS is not explicitly defined by the ESA, legislative history, or the courts,[33] the Services have attempted, through regulation and policy statements, to develop a threshold test which reconciles the Congressional imperative to "minimize losses of genetic variation" with its caveat that "it expects FWS . . . to list populations sparingly."[34] This attempt at reconciliation resulted in the "evolutionarily significant unit" (ESU)

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27. 16 U.S.C. § 1536(a)(2) (1994).

28. *Id.* § 1538(a). *See also* Notice of Policy Statement, 59 Fed. Reg. 34,272 (1994) (FWS and NMFS have established an interagency cooperative policy to establish a procedure at the time of listing to identify to the maximum extent practicable those activities that would or would not constitute a violation of § 9 of the ESA, and to increase public understanding and provide as much certainty as possible regarding potential prohibitions). *Id.*

29. 16 U.S.C. § 1533(f) (1994).

30. *Id.* § 1532(3).

31. *See infra* notes 15-17 and accompanying text.

32. *Id. See also* 16 U.S.C. § 1533(a)(1) (1994).

33. Karl Gleaves et al., *The Meaning of "Species" Under the Endangered Species Act*, 13 PUB. LAND L. REV. 25, 27-40 (1992) [hereinafter Gleaves]. *See also* Notice of Policy, 61 Fed. Reg. 4,722 (1996).

34. H.R. REP. NO. 93-412, at 5 (1973); S. REP. NO. 96-151, at 7 (1979).

concept which was developed solely to delineate distinct population segments of Pacific salmon.[35] However, rather than limiting the ESU to Pacific salmon, the Services have created a joint policy on using the ESU concept for vertebrates other than Pacific salmonids.[36] In other words, while the DPS policy applies to *all* vertebrates, ESU is only one means the Services may use to define a DPS. This difference is significant because the DPS is not defined in the Act as requiring evolutionary significance, while the ESU is based precisely on that notion.[37]

To qualify as an ESU, a population or group of populations must: (1) be substantially reproductively isolated from other populations and (2) represent an important component in the evolutionary legacy of the species.[38] To determine whether a population is reproductively isolated, the Services rely primarily on a genetic analysis of the statistical differences in gene samples from two populations. The requirement of evolutionary significance is satisfied if a population is determined to have distinct phenotypic,[39] life history, and habitat characteristics.[40]

The ESU doctrine aims to identify and protect local adaptations on the basis that their distinctness contributes to the overall diversity of the species. Hence, it conserves a genetic inheritance "to ensure that the dynamic process of evolution will not be unduly constrained in the future."[41] Although the bulk of this paper questions various aspects of

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35. The ESU was developed by NMFS specifically for the Pacific salmon, but the similar concept of an evolutionary unit (EU) was recognized previously. These criteria thus offer the ESA protections to populations that are separate enough to allow distinct adaptations to develop, and which have an "underlying genetic basis." *See also* NATIONAL RESEARCH COUNCIL, SCIENCE AND THE ENDANGERED SPECIES ACT 57, n.2 (1995) ("The EU does not stress reproductive isolation as a criterion, because [it] is often difficult to assess directly . . . .").

36. Notice of Policy, 61 Fed. Reg. at 4,722. This joint policy concludes that the ESU policy developed for the Pacific salmon by NMFS is a "detailed extension" of the DPS policy, and that NMFS will continue to apply it to Pacific salmonids. *Id.*

37. *Id.*

38. *Id.*

39. "Phenotypic" refers to anatomical and behavioral traits that result from both heredity and environment. *See* Dorothy W. Bisbee, *Note, Preparing for a Blue Revolution: Regulating the Environmental Release of Transgenic Fish*, 12 VA. ENVTL. L.J. 625, 634 (1993).

40. STATUS REVIEW, *supra* note 5, at 22-24.

41. Robin S. Waples, *Pacific Salmon, Oncorhynchus spp., and the Definition of "Species" Under the Endangered Species Act*, MARINE FISHERIES REV. 11, 13 (1991). "Specifically, the evolutionary legacy of a species is the genetic variability that is a product of past evolutionary events and which represents the reservoir upon which future

applying the ESU concept to the Atlantic salmon, this theoretical underpinning has laudable and logical ends: conserve locally-adapted populations to prevent a species' gene pools from losing diversity (and hence the ability to respond to environmental changes) and to avoid extinction.[42]

C. Applying the ESU Standard to the Atlantic Salmon Petition.

While the Services' Rule responds to some elements of the Petition, it avoids others,[43] most notably delineation, the first hurdle of meeting the DPS standard. Comparing the approaches of the Petition and the Services' proposed rule to rapidly diminishing U.S. populations of a species provides important insight into the tensions inherent in the DPS protection afforded by the ESA.

While RESTORE's petition called for listing the Atlantic salmon throughout the species' United States range,[44] the Services' ESU approach precluded a listing beyond the seven downeast Maine rivers.[45] The fundamental difference between the Petition and the proposed rule was the Services' decision that the only viable means to apply the ESA to the Atlantic salmon was to list it as a "distinct population segment"[46] in the downeast Maine rivers. The Services believed that a DPS was the only

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evolutionary potential depends." *Id.*

42. Larry J. Bradfish, *Recent Developments in Listing Decisions Under the Endangered Species Act and Their Impact on Salmonids in the Northwest*, 3 HASTINGS W.-N.W. J. ENVTL. L. & POL'Y 77, 80 n.48 (1995).

43. The action proposed in the RESTORE petition was found by the Services to be "not warranted." Thus under the ESA the proposed rule is not technically published in direct response to the petition, and in fact the inquiry could have stopped after the not warranted finding. Telephone Interview with Mary Colligan, Fisheries Biologist, NMFS (Nov. 22, 1995). The legal basis of the proposed rule was thus agency-generated under 16 U.S.C. § 1533(a) (1994).

44. The Services limited the listing to seven "downeast" Maine rivers: the Sheepscot, Ducktrap, Narraguagus, Pleasant, Machias, East Machias, and Dennys Rivers. The Services also classified four rivers—the Kennebec, Penobscot, St. Croix, and Tunk Stream—as rivers that were not being listed because the links between Atlantic salmon and the native populations of these rivers were not sufficiently understood. The Services announced that further study was warranted. Notice of Petition Finding, 60 Fed. Reg. 14,411 (1995). The Services declined, however, to list other historic salmon rivers which the Petition addressed by including all historic salmon rivers in the coterminous United States. Petition, *supra* note 1, at 1.

45. Telephone Interview with Mary Colligan, *supra* note 43.

46. STATUS REVIEW, *supra* note 5, at 26-27.

unit that appeared to merit a listing.[47] They believed that the entire species of Atlantic salmon could not feasibly be listed because of its relative abundance in Canada.[48] Additionally, Atlantic salmon could not qualify as a biological subspecies, because a subspecies must differ "taxonomically" from other populations of the species.[49]

The proposed rule to delineate and list a DPS of Atlantic salmon in the downeast rivers closely follows the ESU paradigm developed for the Pacific salmon. The rule specifically applies the ESU test, based on the Status Review conclusion that Atlantic salmon have similar traits.[50] Additionally, the stocks of Atlantic salmon in the downeast rivers showed "strong fidelity to natal streams," minimal re-colonization outside of their own watersheds,[51] and relative genetic distinctness, all of which substantiated them as an "evolutionarily significant unit."[52] Because adaptations to local ecosystems contribute to survival of a species throughout its range, and salmonids have a uniquely strong homing instinct to their rivers of origin, the Services concluded that the salmon in the selected

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47. *Id.*

48. Telephone Interview with Robin S. Waples, Conservation Biology Program Manager, NMFS (Nov. 29, 1995). *See also* Notice of Petition Finding, 58 Fed. Reg. 36,924 (1993) ("In cases where a petitioner only requests listing of a species throughout a portion of its range, [FWS] must first determine whether or not the population petitioned represents a 'distinct population segment' listable under the Act.").

49. "In the biological context, 'subspecies' refers to taxonomic subdivision of a species consisting of 'an aggregate of phenotypically similar populations of a species inhabiting a geographical subdivision of the range of the species and differing taxonomically from other populations of the species.' To be classified as a subspecies, the group of populations must differ taxonomically, that is by diagnostic morphological characteristics." Gleaves, *supra* note 33, at 27.

50. STATUS REVIEW, *supra* note 5, at 17. Although technically the ESU approach only applies to Pacific salmonids, the STATUS REVIEW is clear that similarities between the species made it appropriate for the Atlantic salmon analysis. *Id.* A recent policy announced by the Services governs DPS delineations for all vertebrates other than Pacific salmonids, stating that NMFS' ESU policy "is a detailed extension of this joint policy." *See* discussion *infra* Part IV(B).

51. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. 50,531 (1995) (to be codified at 50 C.F.R. pts. 17, 277, 425 (proposed Sept. 29, 1995).

52. STATUS REVIEW, *supra* note 5, at 17-18. It is also widely accepted that Atlantic salmon rivers have separate populations. Letter from Mary Colligan, Fisheries Biologist, NMFS, to author (Sept. 23, 1996) (on file with author).

rivers "represent an important component in the evolutionary heritage of the species."[53]

In large measure, the Services distinguished the rivers in which the Atlantic salmon was extirpated (exterminated or destroyed) and later reintroduced using non-indigenous stocks from those in which some wild salmon have persisted in their indigenous habitat. The DPS downeast rivers fit the latter category, while the populations in *most* of the other rivers were extirpated. Populations in Tunk Stream, the Kennebec, Penobscot, and St. Croix rivers were not proposed for listing but were proposed as candidate[54] rivers because of a lack of data on the persistence of native stocks and uncertainty about the degree of hatchery influence.[55] The detrimental effects of applying this approach to the Atlantic salmon will now be addressed.

III. THE INAPPROPRIATENESS OF APPLYING THE ESU APPROACH TO THE ATLANTIC SALMON LISTING

A. General Criticisms of the ESU Approach

The ESU doctrine as propounded by NMFS interprets halting and reversing the trend toward extinction as preserving genetic variations, and it does so by only listing populations if they pass the logical test of showing reproductive isolation and evolutionary significance. Despite its logic, the use of the ESU concept has been criticized by writers such as

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53. STATUS REVIEW, *supra* note 5, at 18. Since none of the New England rivers appears to be viable today without stocking by resource agencies, the proposed rule includes both naturally reproducing and *river-specific* hatchery populations for the seven rivers. Telephone Interview with Paul Nickerson, Endangered Species Northeast Coordinator, FWS (Dec. 6, 1995). *See also* Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,534.

54. The Proposed Rule states that the Atlantic salmon would be a candidate species under NMFS, and "C2" candidates under FWS. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,531. However, FWS has discontinued its C2 category, leaving the status of the four candidate rivers uncertain. The Rule states that the Services "plan to issue joint guidance on candidate species soon." *Id.*

55. *Id.* For suggested actions to counter the threats of hatchery influence to the genetic diversity of salmon, *see* Michael L. Goodman, *Preserving the Genetic Diversity of Salmonid Stocks: A Call for Federal Regulation of Hatchery Programs*, 20 ENVTL. L. 111, 160-265 (1990).

Professor Daniel Rohlf, as an attempt to overly limit the application of the Act within the Services.[56] For example, if the ESU concept had been used for early listings, it would have precluded listing the non-Alaskan United States grizzly bear populations, because that listing was based on geographical occurrence, rather than "evolutionary significance."[57] In fact, the ESU concept was developed after opponents of the listing of the woodland caribou, the bald eagle, and the gray wolf in the lower forty-eight states[58] complained the listings were not proper. These same opponents concurred with the ESU concept for the Pacific salmon, claiming that basing the listing on run timing and geographical occurrence would result in a listing that was arbitrary rather than scientifically sound.[59] Using the ESU requirements for reproductive isolation and "evolutionary significance" has in fact stopped listings that would previously have been likely.[60]

Perhaps more seriously, the ESU is driven by a strong bias toward genetics. Robin Waples, the scientist who wrote the seminal paper on the ESU,[61] states: "Population characteristics that are important in an evolutionary sense *must* have a genetic basis."[62] The statement is arguably a truism—analogous to saying that for a volume of air to be useful to a mammal, it must contain oxygen. In short, genetic basis may not be a sound basis, at least under the ESA, for overshadowing important non-

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56. *See* Rohlf, *supra* note 25, at 656 (citing 57 Fed. Reg. 28,474, at 28,476 (1992)).

57. *Id.* at 620. There is a potential inconsistency between the genetic policy for salmon and those for mammals. For example, the Florida panther numbers approximately fifty individuals. FWS has brought in panthers from Texas to expand the gene pool, and the offspring will be protected under ESA. The Eastern peregrine falcon no longer exists, but FWS interbred western, Arctic, and Canadian falcons into a hybrid with no genetic legacy from the Eastern peregrine falcon, but it is now listed as threatened under the ESA. The red wolf is another listed species whose genetic structure has been altered to the point that there is no longer a "true" red wolf. Telephone Interview with David Carle, RESTORE: The North Woods (Nov. 10, 1995). NMFS biologists contend that such introductions of genes from other populations in the mammalian context are consistent with the genetic policy for salmon. "In all cases the management action that is taken is what is seen as necessary and advisable to maintain the genetic viability of the remnant population." Letter from Mary Colligan, *supra* note 52.

58. Notice of 90-day Petition Finding, 61 Fed. Reg. 8,016, 8,017 (1996).

59. Telephone Interview with Robin S. Waples, *supra* note 48.

60. Rohlf, *supra* note 25, at 636-51. For example, the winter steelhead run in Oregon's Illinois River was not listed because it was not proven genetically distinct from nearby steelhead populations. *Id.* at 648.

61. Waples, *supra* note 41.

62. *Id.* at 12 (emphasis added).

genetic factors.[63] In fact, requiring genetic substantiation of localized adaptation may err on the side of extinction rather than protection.

B. Criticisms of Applying ESU to the Atlantic Salmon

1. The ESU Approach is Merely a Judgment Call

The Services are frank about the judgment call inherent in the DPS whether or not it is determined by the ESU analysis:

> Available scientific information provides little specific enlightenment in interpreting the phrase "distinct population segment." This term is not commonly used in scientific discourse, although "population" is an important term in a variety of contexts. For instance, a population may . . . refer to a loosely bounded, regionally distributed collection of organisms.[64]

Although the ESU has some degree of scientific basis, it is not the only logical classification possible, especially in an area in which scientists are in disagreement.[65] The Services have simply chosen one biological

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63. The proposed rule emphasizes the discreteness of the DPS and seems to downplay the admitted gene flow between populations in adjacent watersheds. It claims that this genetic exchange has not "been sufficient to have eliminated all historic differences" between them. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. 50,531 (1995) (to be codified at 50 C.F.R. pts. 17, 277, 425, (proposed Sept. 29, 1995). The rule embraces the ESU concept's penchant for protecting local ecosystem adaptations on the assumption that they "are important to the survival of populations and the survival of the species throughout its range." *Id.* However, an opposing view is that "reproductive interactions *among* populations" are significant in contributing to overall species health. Rohlf, *supra* note 25, at 634 (emphasis added) (noting that ESU policy promotes evolution of sub-species, or "speciation," at the expense of interconnectedness of populations necessary for viability of overall species). NMFS biologists have conceded the potential for a "genetic bottleneck" that may result when a stock in a specific river becomes too small and its integrity is compromised by inadequate genetic diversity. Telephone Interview with Robin S. Waples, *supra* note 48.

64. Notice of Policy, 61 Fed. Reg. 4,722 (1996).

65. Deriving principles of scientific certainty from the ESA is problematic, when the ESA itself uses terms that are not consistent with biological principles. For example, it has been noted that "the ability of an organism to interbreed is not always a safe criterion for species distinctiveness." NATIONAL RESEARCH COUNCIL, *supra* note 35, at 54. Yet ability to interbreed is required for a distinct population segment under the specific language of the ESA. 16 U.S.C. § 1532(16) (1994).

paradigm to interpret the general congressional provision for listing of populations at the sub-species level.[66]

As a scientific committee appointed by the Congress reported recently:

> The most difficult questions generally arise at taxonomic levels below the subspecies level. Because evolutionary units at such levels are not discrete but exist along a continuum, it is a *policy judgment as well as a science judgment* to determine the significance of an evolutionary unit . . . . [S]cience alone does not lead to a conclusion that any objectively definable degree of distinctiveness is more significant than another.[67]

There is a great danger of assuming that conclusions derived from applying the ESU are scientifically ascertainable and conclusive, when in fact, they are to a considerable extent policy decisions with a plausible, yet not definitive, scientific basis. The inherent policy judgment is evidenced by the fact that some of the Services' biologists believed that populations *throughout the historic range* were an ESU.[68] The biologists also debated at length whether to designate one DPS comprising each of the seven rivers versus seven separate ones, and some termed the ESU issue as "one of bookkeeping."[69]

2. *Criticisms of Using the ESU approach for the Atlantic Salmon Listing*

As mentioned earlier, the Services designate an ESU population by considering non-genetic factors and genetic analysis. In applying the non-genetic factors ("phenotypic," life history, and habitat characteristics) the Status Review finds conclusive differences between U.S. populations and those in Canada.[70] The most striking difference is that most salmon of U.S. origin spend two winters in the ocean before returning to streams to

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66. *See, e.g.*, Rohlf, *supra* note 25, at 617, 625.

67. NATIONAL RESEARCH COUNCIL, *supra* note 35, at 56 (emphasis added).

68. Memorandum from Marta Nammack, NMFS, to Mary Colligan, Fisheries Biologist, NMFS 1 (Dec. 1, 1994) (on file with author).

69. *Id.*

70. [Phenotypic] variation indicated that U.S. populations possessed *a large number of traits* that differed from the population of the St. John River in Canada. STATUS REVIEW, *supra* note 5, at 22 (emphasis added).

spawn, while Canadian counterparts return after one year at sea.[71] Yet the differences cited between populations within the U.S. are less convincing,[72] for the Services rely on studies over sixty years old,[73] as well as conclusions from historical, "unpublished data" where recent trends are "not available."[74] The Services' reliance on outdated studies that predate the ESA and perhaps untested data is at the very least, arguably suspect.

While it would be inaccurate to state that the Services rely solely on statistical differences in gene samples from two populations to define an ESU, genetic analysis is a critical part of the ESU reproductive isolation criterion. The genetic factor analysis is most striking in the Services' decision of which rivers to list or exclude. The Services chose not to list existing river runs of Atlantic salmon in the Kennebec, Penobscot, Tunk and St. Croix, based on a finding that their "link to native stocks and degree of persistence is not well understood."[75] However, given that the annual monitored return of salmon in *all* U.S. rivers only amounts to several thousand individuals,[76] the decision to not include these rivers based on questions about genetic distinctiveness may be criticized as neglecting the ecological significance of the stocks.

The genetic distinctiveness issue is especially disturbing because the Status Review concludes that the genetic make-up of the populations in the selected DPS rivers is *also* not well understood.[77] For example, the Dennys River—which was selected for the DPS—was stocked with salmon of Penobscot River origin prior to 1920, Canadian origin from 1957 to 1968, and Penobscot and Union River origin from 1975 to 1991.[78] Similar mixed-river salmon were introduced between 1918 and 1991 in

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71. STATUS REVIEW, *supra* note 5, at 12.

72. Variation in measurements between the seven U.S. rivers surveyed indicated that stock differences existed *for some traits*. *Id.* at 22 (emphasis added).

73. The study on size differences among adult salmon in U.S. rivers dates from 1874; the shape and girth of Atlantic salmon were reported in some rivers in 1935. *Id.* at 23. "More research is needed on the adaptive significance of these traits to make a more definitive statement regarding the importance of these differences." *Id.*

74. *Id.* at 23.

75. *Id.* at 2. The populations in these rivers have been designated candidate species to "allow for collection of additional information." *Id.* at 26.

76. *Id.* at 13.

77. *See id.* at 78, 88, 95, 99, 112-13.

78. *Id.* at 107-08.

the Narraguagus, also a river included in the proposed DPS.[79] Despite "[i]ncomplete data documenting genetic characteristics of salmon in the river," the Status Review nonetheless recommends the Narraguagus for inclusion in the DPS.[80]

By contrast, in the St. Croix, a river *not* selected for the DPS, the historical stocking has displayed a similar pattern,[81] but is disqualified from DPS consideration, on the basis that "[s]almon other than those of basin origin have been released in the river and their contribution to the persistence of stocks is not well understood."[82] Furthermore, immediately after stating that "assessment of the evolutionary significance of these U.S. stocks [is] difficult," the Status Review makes the quite absolute statement that only the seven rivers "represent the last wild remnant of U.S. Atlantic salmon [and] collectively these rivers meet the criteria of evolutionary significance."[83]

One could argue that inclusion of other rivers, especially those designated as candidate rivers, would have been a conservative and appropriate alternative to piece-meal focus dictated by the proposed DPS. If the U.S. populations in the seven rivers are genetically distinct from Canadian populations, what are the odds that those in the candidate rivers are *indistinct* and thus excludable? This criticism is supported in numerous memoranda obtained from FWS and NMFS through a Freedom of Information Act request.[84] The memos show that the Biological Review Team was apparently divided on whether the candidate rivers should be included for protection in the DPS. The memos cite "a basic philosophical difference" between the two agencies, with FWS generally opposed to listing the rivers where the composition of the stocks was not as well understood, and NMFS in favor of listing them in order to give the species the benefit of the doubt.[85]

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79. *Id.* at 92.
80. *Id.* at 95.
81. *Id.* at 112.
82. *Id.*
83. *Id.* at 24.
84. Telephone Interview with David Carle, *supra* note 57.
85. Memorandum from Marta Nammack to Mary Colligan, *supra* note 68, at 1. The memorandum cites the Umpqua River cutthroat trout as a model for listing a species despite uncertain knowledge, with the later option of withdrawing the proposal. *Id.* The memorandum further states: "[O]ur preferred option . . . was to propose a listing for an ESU, which in addition to the 7 DPSs currently proposed for listing, would also include the populations in smaller rivers within the range of these populations." *Id. See also*

The possibility of looking more closely at the interrelationship between the seven rivers and other rivers was adopted by some of the Services' biologists, who would have defined the ESU to include not only the seven rivers chosen, but also "populations in smaller rivers within the range of these populations."[86] Even Waples' seminal work cautions that "[s]ome introduced populations should not be excluded from ESA consideration . . . includ[ing] populations occupying habitat that is ecologically similar and geographically proximate to the source population."[87]

The non-scientist, lawyer, or legislator may well wonder whether inconclusive nuances between DPS rivers and the candidate rivers are reasonable under the ESA, when returning spawner numbers appear to be perilously low in all of these rivers. The Status Review reports that the U.S. populations have dropped from pre-colonial numbers of about one half million to 2,602 documented returning individuals in 1993.[88] Even in the DPS rivers with the "wild remnant" populations, recent minimal spawner returns range from zero in several of the rivers to a high of seventy-four in the Narraguagus.[89] According to the Services, no salmon rivers are self-sustaining, and if hatchery programs were to stop in any of the rivers, the populations would disappear.[90]

Although the Status Review concededly *does* document somewhat higher percentages of "natural" and "wild" salmon in the DPS rivers than in the others,[91] given the disputed level of precision in gauging the degree of exogenous influx, the exclusion of the candidate rivers is troublesome. In fact, the Status Review finds that "[s]tudies examining the genetic differences among U.S. Atlantic salmon stocks have yielded inconclusive results."[92] Some differences between U.S. Atlantic salmon populations

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Memorandum for Files from Mary Colligan, Fish Biologist, NMFS 1 (Nov. 30, 1994) (on file with author) (recommending one ESU for all of Maine, covering "all naturally spawning populations"); Biological Review Team meeting summary, at 3 (Dec. 6, 1994) (portraying the NMFS position that "[i]t does not need to be proven beyond a reasonable doubt that a listable entity exists or deserves protection prior to adding a species to the ESA . . . . *The burden of proof is placed on proving that a species does not exist.*" (emphasis added)).

86. Memorandum from Marta Nammack to Mary Colligan, *supra* note 68, at 1.

87. Waples, *supra* note 41, at 19.

88. STATUS REVIEW, *supra* note 5, at 13.

89. *Id.* at 33.

90. Telephone Interview with Paul Nickerson, *supra* note 53.

91. STATUS REVIEW, *supra* note 5, at 32-33, tbls. 5.1, 5.2.

92. *Id.* at 19 (citations omitted).

have been found in some studies, while "[o]ther researchers have not been able to demonstrate differences between these stocks."[93] Gene flow between populations is documented at various levels.[94]

The uncertainty about the populations in the Kennebec, Penobscot, Tunk and St. Croix—the four non-DPS rivers which have been proposed as candidate species rivers—relates to genetic and life history composition, not to danger of becoming extinct. The problem with using the genetic and life history criteria is that although the genetic inquiry in the ESU analysis is sensible for distinguishing between a nearly-depleted but important population from other less-threatened populations of the same species, *it has less of a basis for parceling out threatened status among similarly-threatened populations.* In other words, where both populations are threatened, not listing a particular river should not depend on genetic analysis alone.

In the simplest terms, the Status Review documents significant differences between U.S. and Canadian populations, under both the ESU criteria for reproductive isolation and evolutionary significance.[95] Differences among the U.S. rivers is summarized less convincingly as "modest but statistically significant" among *some* of the rivers.[96] "[G]enetic differentiation of these populations *may* still occur."[97]

If the test of evolutionary significance in general is as much of a judgment call as the Status Review suggests, perhaps there are better ways of defining distinct population segments under the ESA in the interest of conserving what remains of the Atlantic salmon in the United States. Alternatively, the ESU analysis could remain an *option* where it establishes protection that otherwise wouldn't exist, but should not be used to limit the delineation of a DPS.

3. The ESU Approach is Inconsistent With Congressional Intent

In addition to general concerns, because the ESU approach may unduly limit the geographic scope of the ESA, the ESU may be criticized as being inconsistent with congressional intent.

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93. *Id.* (citations omitted).

94. *Id.* Estimated gene flows in studies ranging from 2.9 to 7.1 "effective migrants per generation" led the Services to the conclusion that genetic differentiation between U.S. rivers may occur. *Id.*

95. *Id.*

96. *Id.* at 20.

97. *Id.* at 19.

There appears to be sound legislative history supporting the fact that Congress recognized authority under the ESA to list a domestic population even if its principal range is abroad, as well as an intent to protect domestic populations even when the species is not threatened in other countries.[98] As already discussed, the Services' line drawing may be more fine than Congress intended. The Services suggest that the only way salmon living in a river where the species was previously extirpated or where the influence of existing runs have a questionable genetic history can merit ESA protection, is if they evolve over decades or centuries to a genetic equivalent of the extirpated stock. The question asked by Rohlf and others is whether tying genes to watersheds in this manner may exceed the purposes of the ESA as well as the capabilities of science.[99]

It is not clear whether the DPS provision in the ESA was intended to exclude populations in this manner. During 1979 ESA amendments, Congress revisited the issue of listings below the species level:

> [L]isting of populations may be necessary when the preponderance of evidence indicates that a species faces a widespread threat, but conclusive data is available with regard to only certain populations. Nonetheless, the committee is aware of the great potential for abuse of this authority and expects the FWS to use the ability to list populations sparingly and only when the biological evidence indicates that such action is warranted.[100]

Rohlf argues that Congress' purpose in providing for listings at the population level was to allow action when there was evidence that "identifiable populations" were endangered but the threat to the entire species was not yet ascertained definitively.[101] This seems to be a reasonable reading, and comports with the approach Congress approved

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98. *See* Rohlf, *supra* note 25, at 628-29 (citing H.R. REP. NO. 93-412, at 10 (1973); S. REP. NO. 96-151, at 7 (1979)).

99. *Id.*

100. S. REP. NO. 96-151, at 7 (1979).

101. Rohlf, *supra* note 25, at 630. The caveat that the DPS be used sparingly was apparently in response to a General Accounting Office recommendation to Senate Committee hearings on the 1979 ESA amendments that FWS methodology for listing populations like the bald eagle could lead to the "listing of squirrels in a specific city park, even though there is an abundance of squirrels in other parks in the same city, or elsewhere in the country." *Id.* (citing S. REP. NO. 96-151, at 7 (1979)).

in the case of the bald eagle, which is listed in the lower forty-eight states, but not in Canada and Alaska.[102]

The draconian results of the ESU line drawing may be best illustrated in the case of two salmon swimming side-by-side in the Gulf of Maine toward West Greenland, one of which hatched in the Machias, a DPS river, and the other in the Penobscot, a candidate river excluded from the DPS. Both have some non-river specific hatchery genetic history.[103] A person who entraps and intentionally kills the Machias fish would face the full sanctions of the ESA, while she who does the same to the Penobscot fish does not.

The line drawing distinction seems to use potential genetic differences to avoid addressing the overall survival of the species, which may depend on protecting both of these fish.[104] In fact, the ESA provides that the Secretary may:

> [T]reat any species as an endangered species or threatened species even though it is not listed pursuant to this section if he finds that—(A) such species so closely resembles in appearance . . . a species which as been listed pursuant to such section that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species . . . .[105]

According to Rohlf, "Congress clearly approved of listings based on geopolitical boundaries when the geographically-defined population inhabits a significant portion of the entire species' or subspecies' range, as in the case of bald eagles."[106] This reasoning would afford threatened status for both fish, as Rohlf would defend because, "only *one* of the aims of the ESA was genetic integrity."[107]

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102. S. REP. NO. 96-151, at 6-7 (1979).

103. STATUS REVIEW, *supra* note 5, at 84, 100.

104. 16 U.S.C. § 1533(e) (1994).

105. *Id.* Such a "similarity of appearance" listing might be advisable if the DPS is enacted as currently proposed, but it will not, of course, provide non-DPS salmon the comprehensive protection of either a recovery plan under the Act or the restrictions on agency action.

106. Rohlf, *supra* note 25, at 633.

107. Telephone Interview with Daniel J. Rohlf, Senior Advocacy Fellow and Adjunct Professor, Northwestern School of Law, Lewis and Clark College (Dec. 4, 1995).

The notion that some biologists consider the ESU boundary lines as arbitrary contrasts with the seemingly reasonable theoretical basis of the ESU. Although the Status Review asserts that the theoretical basis of the ESU is that "locally adapted, river specific stocks of Atlantic salmon existed in the U.S. and that this structure was important to the overall fitness and productivity of the species,"[108] the theory is not applied in practice. In other words, the laudable goal of recognizing localized adaptation as a primary indicia of an ESU is not always realized, especially when there is little agreement even among top biologists on how to define the basic unit.

C. Criticisms of the Proposed Rule

1. The Rule's ESU Standard Fails to Consider Threats to the Ecosystem and Habitat of the Atlantic Salmon

By virtue of using the ESU concept, the proposed rule can be criticized for having a myopic focus on genetic distinctness. It may also be doubted for failing to support the explicit congressional purpose of protecting species' ecosystems, and not merely the species themselves: "The purposes of this chapter are to provide a *means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.*"[109] Despite this expressed intent, the proposed rule does not designate critical habitat, stating that the Services have "not been able to address either the prudency [sic] or determinability of critical habitat designation."[110]

Insisting on a population's separateness as a listing criterion may be at the expense of the Act's goal of using species protection as a means of ecosystem protection.[111] By limiting the DPS to the downeast rivers, the

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108. STATUS REVIEW, *supra* note 5, at 18.

109. 16 U.S.C. § 1531(b) (1994) (emphasis added). *See also* H.R. REP. NO. 95-1625, at 16 (1978) ("The ultimate goal of the Endangered Species Act is the conservation of the ecosystem on which all species, whether endangered or not, depend for survival."); Rohlf, *supra* note 25, at 627.

110. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. 50,531 (1995) (to be codified at 50 C.F.R. pts. 17, 277, 425, (proposed Sept. 29, 1995).

111. *See, e.g.*, Allan Dowd, *The US Government decides that Atlantic salmon are just too endangered to be declared an endangered species* (visited Feb. 17, 1997) <http://www.envirolink.org/arrs/salmon.html>.

proposed rule avoids addressing the many habitat threats to the species in the other rivers throughout the historic range. For example, the Penobscot River supports greater populations of returning adult salmon than all of the DPS rivers combined,[112] and its stocks are in "severe decline."[113] The threats to the Penobscot run notably include habitat degradation and inadequate fish passage facilities, yet the proposed rule contains a single sentence expressing a concern for non-DPS habitat like the Penobscot, stating: "[a]reas outside the present range should also be identified."[114]

Whether or not one agrees with the correctness of the proposed rule's definition of the DPS, its limited geographic and political range has the effect of diffusing many potential issues that a wider definition would engender. In fact, consideration of numerous potential threats to the Atlantic salmon and its habitat would seem to be precluded by the localized range of the DPS. Examples of precluded potential threats include toxic levels of heavy metals in the Penobscot and other rivers,[115] deoxygenation from bacterial breakdown of organic material from industrial effluent,[116] and the flow and temperature changes that result from diversions and dams.[117]

A broad interpretation of the ESA factor for determining whether a species is threatened or endangered, namely "present or threatened destruction, modification, or curtailment of its habitat or range,"[118] is apparent in the RESTORE petition which documents damage to the rivers throughout the Atlantic salmon's historic range and describes how the degradation of the Penobscot River has an impact on the Atlantic

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112. STATUS REVIEW, *supra* note 5, at 33 (1993 statistics). It should be noted that the returns to the Penobscot are largely attributable to massive stocking; for example, nearly ten million smolt were released in the Penobscot between 1968 and 1992. *Id.* at 86. The Status Review documents the low percentage of returns from U.S. stocking in the Northeast: "the 1988 fry release, the largest on record, produced one of the lowest return rates ever recorded (.06 adults/1000 fry)." *Id.* at 13.

113. *Id.* at 89.

114. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,537. The ESA "is just one tool we have to offer species," and other statutes and agency programs besides the ESA provide protection for the Atlantic salmon, including the Fish and Wildlife Coordination Act, Clean Water Act, River and Harbors Act, and Federal Power Act. Letter from Mary Colligan, *supra* note 52, at 4.

115. For examples of toxic threats, *see* Petition, *supra* note 1, at 18-19.

116. *Id.* at 21.

117. *Id.* at 26-27.

118. 16 U.S.C. § 1533(a)(1)(A) (1994).

salmon.[119] The degradation of the Penobscot includes the effects of dams and river diversions, toxic pollution, acidification, aquaculture enterprises, river siltation, and changes in water temperature and flow.[120] The petition also cites a Department of the Interior report describing the Penobscot as "the highest priority salmon fishery in the state" and host to "the most productive and intensely fished salmon pools in the eastern U.S."[121]

The effect of limiting the geographic range of the listing is demonstrated by how the proposed rule treats the adverse impact of dams. To begin with, the rule recognizes dams as being the cause of the historic decline of the Atlantic salmon: "Dams adversely impact Atlantic salmon by impeding both their upstream and downstream migration, increasing predation, altering the chemistry and flow pattern of rivers, increasing water temperature, and reducing available flow downstream."[122] However, the rule's recognition of the impact of dams is negated by the fact that "there are no dams on rivers in the DPS that have the potential to adversely impact the species."[123] Having removed all but the downeast rivers from consideration through the definition of the DPS, the impacts of dams on the New England rivers where they actually pose threats to the species—such as the Penobscot, Kennebec, Merrimack, and Connecticut rivers—need not be addressed. Furthermore, no mention is made in the proposed rule of threats from toxics or industrial effluent presumably because, again, the rivers are located in one of Maine's least-populated regions.[124]

Although the rule can be criticized for its limited range, the Services have solicited input on "[a]reas outside the present range . . . if such areas are essential for the conservation of the species."[125] This is one area in

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119. Petition, *supra* note 1, at 13.

120. *Id.* at 13-14.

121. *Id.* at 17 (citing MAINE DEP'T OF CONSERVATION & U.S. DEP'T OF INTERIOR, MAINE RIVERS STUDY FINAL REPORT (1982)).

122. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. 50,530, 50,531 (1995) (to be codified at 50 C.F.R. pts. 17, 277, 425, (proposed Sept. 29, 1995).

123. *Id.*

124. The proposed rule does mention the potential danger of direct and indirect mortality from spraying of fungicides, insecticides, and herbicides in blueberry cultivation, but maintains that "numerous measures are being implemented to reduce the potential for contamination of waterways from blueberry cultivation." *Id.* at 50,532.

125. *Id.* at 50,537.

which the rule comports with the statutory definition of "critical habitat,"[126] and at least in theory could provide a means for the designation of habitat outside the DPS area, such as on one of the candidate rivers. On balance, however, the limited range of the DPS is likely to translate to a limited range of habitat protection which certainly contrasts with the sweeping scope of the Petition's recommendation for critical habitat for "all watersheds historically inhabited by Atlantic salmon."[127] This contrast is yet another manifestation of the significance of the DPS definition.

2. The Rule Limits the Categories of "Threat" to the Atlantic Salmon

The Services found that the low abundance of returning salmon showed that "the DPS is likely to become endangered within the foreseeable future throughout all or a significant portion of its range."[128] This conclusion was equally stressed in the Petition, and does not seem to be at issue. The larger question, and one where there is little agreement between petitioner and agency, is what threats to consider.

As mentioned in Part II of this Comment, at the time of listing, the Secretary must determine whether the species is threatened or endangered due to one or more of the following five factors: (1) present or threatened habitat destruction, (2) human overutilization, (3) disease or predation, (4) inadequacy of existing regulatory mechanisms, or (5) other natural or manmade factors affecting its continued existence.[129]

The proposed rule finds three main factors that threaten the Atlantic salmon's survival: poaching, low natural survival of fish during their first winter at sea, and potential impacts from escaping hatchery fish on the genetic integrity and disease vulnerability of the DPS.[130] The Services concluded that certain other factors were *not* significant impacts, including current forest and agricultural practices, natural diseases, and commercial

126. 16 U.S.C. § 1532(5)(A)(ii) (1994).

127. Petition, *supra* note 1, at 49 (calling such designation "determinable and prudent").

128. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,531.

129. 16 U.S.C. § 1533(a)(1) (1994). Additionally, an evaluation of the listing proposal must be based on the best scientific and commercial information available. 16 U.S.C. § 1533(b)(1)(A) (1994).

130. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,533.

fishing.[131] Commercial peat mining within DPS watersheds was found to have the potential to adversely affect salmon habitat, but the recommendation was for further study.[132]

These findings are likely to be debated. The Rule's focus on only three threats is belied by the statement in the Status Review that: "[w]hen returns of wild fish to the Maine rivers are as low as they have been in recent years, *any* source of mortality may pose a risk to the distinct population segment."[133] Indeed, the Status Review mentions numerous current and potential threats to the Atlantic salmon which the proposed rule does not highlight. It is unclear whether this is a result of a fair prioritization of threats or a balancing of political considerations.[134] No matter how competent and ethical the agencies intend to be, it is difficult to believe that the decision was not based, in part, on politics.

Just as the difference between the Petition's request for a broad geographic listing of the Atlantic salmon and the Rule's limited scope was based on the Services' definition of a DPS, the dichotomy in determining the threat to the Atlantic salmon is a result of the definition of species. Because the threats to the DPS rivers are only a microcosm of the threats to salmon throughout the historic U.S. range, the Rule's focus on ocean mortality, riparian poaching, and aquacultural practices should be scrutinized. First, the analysis on poaching apparently consists of one sentence: "There are numerous, although unsubstantiated, reports of poaching activities on Maine rivers."[135] Since according to the proposed rule, "[t]he Status Review provides detailed information and references used as a basis for this proposed rule,"[136] the Rule's conclusion relative to poaching seems unsubstantiated.[137] At the same time, serious potential

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131. *Id.* at 50,532.

132. *Id.*

133. STATUS REVIEW, *supra* note 5, at 51 (emphasis added).

134. *See, e.g.*, Andrew K. Weegar, *Did Politics Sink the Salmon Listing?* MAINE TIMES, Mar. 30, 1995, at 14.

135. STATUS REVIEW, *supra* note 5, at 51.

136. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,530.

137. Although the numbers vary greatly from year to year, impacts on salmon populations by recreational anglers have been significant and likely detrimental. The Fishery Management Plan for U.S. Atlantic Salmon found that "recreational fishermen constitute the most significant source of exploitation to New England Atlantic salmon populations in homewaters." Lower catch limits and bans on certain rivers are aiding restoration, but inadvertent mortality by trout anglers and catch-and-release salmon anglers as well as reported poaching work against restoration, especially in rivers where adult

habitat threats such as peat mining are detailed in the Status Review[138] yet do not seem to rank among the top concerns of the proposed rule.

Second, while ocean mortality is documented in the Status Review as being a threat to U.S. salmon populations, its significance has been debated. The Status Review cites recent literature that "provides an alternate hypothesis to conventional thinking that the most significant natural mortality occurs in the river, estuary, and close to the river mouth."[139] The "conventional thinking" is shared by some conservationists who see ocean mortality being used as a means of avoiding numerous ecological threats in the riparian environment.[140]

There are numerous other inconsistencies. The Status Review cites data showing lower spawner return rates in the Penobscot, Merrimack, and Connecticut rivers than in the St. John River in Canada. It is unclear why these non-DPS rivers are used when no data is cited for the DPS rivers. Further, the studies finding that lower marine survival in U.S. salmon is due to longer migration routes than their Canadian cohorts are baffling, at least to a non-scientist, because they don't seem to explain the colonial U.S. Atlantic salmon population of half a million, whose migration was presumably comparable to today's.[141] The Status Review concludes that "[m]ortality could arise from stress, starvation, predation, disease, and perhaps, other unknown mechanisms . . . . In summary . . . major seasonal events influence post-smolt survival. . . ."[142]

The proposed rule identifies ocean mortality as a critical threat, and makes a brief mention that "[a]dditional research is ongoing to identify the processes involved."[143] The 1987 New England Fishery Management Plan prohibits the possession of Atlantic salmon in the 200-mile U.S.

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returns number from zero to well under 100. STATUS REVIEW, *supra* note 5, at 33, 50-51.

138. *Id.* at 38. *See also* Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,532.

139. STATUS REVIEW, *supra* note 5, at 71 (citing studies that document significant mortality of U.S. salmon while in their shared environment with Canadian and European counterparts between the Labrador Sea and east of Greenland).

140. Telephone Interview with David Carle, *supra* note 52.

141. One explanation for the significance of the comparison is that it shows that current marine survival is lower for U.S. salmon than for Canadian salmon, and that this difference can be partially explained by migration distance. Letter from Mary Colligan, *supra* note 52.

142. STATUS REVIEW, *supra* note 5, at 72-73.

143. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,533.

Exclusive Economic Zone (EEZ).[144] Exploitation of salmon in their marine environment is primarily by foreign fisheries outside the EEZ, in West Greenland and Atlantic Canada.[145] The former is a mixed-stock fishery, with stocks recorded from the United States, Canada, Iceland, and nine European countries.[146] The exploitation of Maine origin fish in the West Greenland and Canada fisheries has been extremely significant: studies show that annual exploitation rates of Maine origin Atlantic salmon have ranged from 27% to 97%.[147]

Agreements under the North Atlantic Salmon Conservation Organization (NASCO) in the West Greenland fishery,[148] combined with purchases of West Greenland's quota by private conservation interests, were predicted to increase returns to United States and Canadian rivers from 90,000 to 185,000 in 1995.[149] The West Greenland fishery has been reduced from a 2,689 metric ton (mt) fishery in 1971 to a 12 mt subsistence fishery currently.[150] The proposed rule states that NASCO agreements will protect "the number of spawners needed to sustain North American stocks."[151] There was also some optimism based on the first

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144. STATUS REVIEW, *supra* note 5, at 49.

145. *Id.* at 41, 49. Although there is no "directed" commercial fishery for Atlantic salmon in U.S. waters, the 1987 Fishery Management Plan prohibits possession of Atlantic salmon in the Exclusive Economic Zone in recognition of the fact that by-catch during commercial fishing for other species can cause significant mortality. *Id.* at 49. The proposed rule responds with an aggressive enforcement of the "taking prohibition" under the ESA. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. at 50,534.

146. STATUS REVIEW, *supra* note 5, at 42.

147. *Id.* at 45-47. *See also* Petition, *supra* note 1, at 28; Andrew Weegar, *Salmon Runs Threatened Again by Greenland Fishing*, MAINE TIMES, July 10, 1996 at 7; Bruce Kyle, *Politics Prevails Over Science in Salmon Harvest,* BANGOR DAILY NEWS, June 22, 1996 (Greenland can unilaterally set its harvest at level scientist predicts could devastate North American populations).

148. In 1993, NASCO's West Greenland Commission unanimously accepted the West Greenland Fishery Regulation Measure, resulting in the setting of quotas based on the best available scientific advice, with the goal of reaching target spawning escapements for North American stocks. STATUS REVIEW, *supra* note 5, at 48. However, the agreement broke down in 1996, in the fourth year of its five year term, and the parties must start negotiations from the beginning. Letter from Mary Colligan, *supra* note 52.

149. STATUS REVIEW, *supra* note 5, at 48.

150. *Id.* at 42, 48.

151. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. 50,530, at 50,532 (1995) (to be codified at 50 C.F.R. pts. 17, 227, 425) (proposed Sept. 29, 1995).

increase in six or seven years of ocean habitat predicted by computer modeling.[152] However, returns to Maine rivers do not seem to be responding to these increases to date.[153] The fact that marine exploitation by formerly active fisheries has recently been greatly reduced leads some conservationists to question why returns to U.S. rivers have not responded commensurably if there are no serious habitat deficiencies and dam related problems.

3. *The Legality of the Proposed Rule is not Guaranteed*

In addition to merely criticizing the proposed rule and its ESU approach, it would be possible, although not easy, to convince a court that the ESU concept is invalid because it is inconsistent with congressional intent. The Status Review only addressed in detail the downeast rivers, even though the Services initially found that the petition presented substantial information to list all rivers.[154] However, the proposed rule is not legally susceptible on the basis that the threat to Atlantic salmon was not adequately considered outside of the downeast rivers, because the ESA only requires an analysis of threats to the *species*, and the Services defined the species as the DPS. Thus, any legal challenge would have to be that the ESU method itself is an inadequate application of the ESA's definition of species as "a *distinct population segment* of any species of vertebrate fish or wildlife that interbreed at maturity."[155]

Certainly the Services could argue that they have broad authority to define a DPS because Congress "has not directly addressed or resolved this precise question," and the legislative history of the ESA "provides no specific guidance."[156] This presents an uphill battle for opponents, in part because courts generally defer to the administrative agency policy as long as it has a rational basis and appears to be consistent with the broad values and goals enunciated by Congress.[157] Since the Services are construing

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152. Telephone Interview with John Albright, Executive Director, Atlantic Salmon Federation (Oct. 9, 1996).

153. Dec. 6, 1995. Further, it is unknown how long the American interests will be able to afford to buy out the salmon fishery. Telephone Interviews with David Carle, *supra* note 57, and Paul Nickerson, *supra* note 53.

154. Notice of Petition Finding and Request for Information, 59 Fed. Reg. 3,067 (1994).

155. 16 U.S.C. § 1532(16) (1994) (emphasis added).

156. Gleaves, *supra* note 33, at 37, 38.

157. *See* Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc. 467 U.S. 837 (1984). When the court reviews whether an agency regulation or action follows the

a statute Congress has authorized them to administer, a court's inquiry would be whether the action is based on a permissible construction of the statute.[158]

However, if plaintiff successfully argues that the Act and its legislative history are inconclusive, the court may look to case law for guidance.[159]

A general basis for a challenge would be that the Services did not act consistently with the U.S. Supreme Court's declaration in *Tennessee Valley Authority v. Hill*[160] that "[t]he plain intent of Congress in enacting [the ESA] was to halt and reverse the trend toward species extinction, whatever the cost."[161] Other than the *Tennessee Valley Authority* holding, there is scant case law dealing with the DPS. In terms of challenging the limited geographic scope of the Atlantic salmon listing, the case of *Roosevelt Campobello International Park Commission v. U.S. Environmental Protection Agency*[162] demonstrates that Congress at least intended for the Secretary to consider and list a population in one area even if it

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enabling legislation or is compatible with congressional intent, the court follows a two-step process. First, the court will determine if Congress has directly addressed the issue by looking to the act itself; that is, by conducting a plain reading of the language. If there are ambiguities, the court will refer back to broad goals and the legislative history. Second, where Congress is silent or provides ambiguous language, the court decides whether the administrative agency's interpretation is a permissible reading of the statute. Since administrative agencies are frequently left to fill in the gaps left by congressional enactments, courts generally defer to agency decisions unless they are arbitrary, capricious, or contrary to the statute. Thus, rather than substituting their own policy preferences, courts defer to the expertise of administrative agencies and uphold reasonable statutory interpretations. *Id.* at 842-45.

158. The Administrative Procedure Act, 5 U.S.C. § 706 (1994), would control judicial review of the Services' determination of a DPS. Gleaves, *supra* note 33, at 46 ("Under section 706, the reviewing court must satisfy itself that agency decisions are not 'arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law'").

It has been noted that the Services' 1996 DPS guidelines "are couched in terms of 'policy' rather than as regulations," and as such are interpretive, not rule making. They have thus not undergone formal review under the Administrative Procedure Act required for all federal agency rule making. *See* Bradfish, *supra* note 42, at 80 n.43 (citing 5 U.S.C. § 553 (1994)).

159. *See, e.g.*, United States v. Aceto Agric. Chem. Co. 872 F.2d 1373, 1382 (8th Cir. 1989), where the court indicated that the common law was the proper source of guidance when a federal act and its legislative history provided inconclusive direction.

160. 437 U.S. 153 (1978).

161. *Id.* at 184.

162. Roosevelt Campobello Int'l Park Comm'n v. EPA, 684 F.2d 1041 (1st Cir. 1982) (citing H.R. REP. NO. 93-412, at 10 (1973); S. REP. NO. 96-151, at 7 (1979)).

was not threatened in other regions. The *Roosevelt* plaintiffs had challenged an oil refinery permit partially on grounds that it would affect a population of bald eagles. Dismissing the defendant's argument that the bald eagle could be found in other regions, the First Circuit tersely stated: "[T]he legislative history appears to authorize the Secretary to deem a species endangered in the United States, or a portion thereof, even if it is abundant elsewhere."[163] This case could be used to argue expanding the Atlantic salmon listing to rivers outside the seven downeast rivers.

Courts will, on occasion, interpret the DPS and scrutinize agency decisions. In *Fund for Animals v. Florida Game & Freshwater Fish*,[164] a federal district court held that the white-tailed deer did not qualify for ESA protection despite its similarities to the endangered Key Deer, because the two did not interbreed when mature.[165] A case that indicates the chilly judicial reception an action to argue for a broader definition of the DPS might encounter is *Louisiana v. Verity*.[166] In deference to the agency's listing, the Fifth Circuit stated:

> Although we believe appellants' challenge is not totally without merit, we are mindful that under the arbitrary-and-capricious standard, our deference to the agency is greatest when reviewing technical matters within its area of expertise, particularly its choice of scientific data and statistical methodology. In reviewing such technical choices, "we must look at the decision not as the chemist, biologist or statistician . . ., but as a reviewing court exercising our narrowly defined duty of holding agencies to certain minimal standards of rationality."[167]

Having said that the plaintiff carries a heavy burden, it is nonetheless, possible to expand a listing. In *Northern Spotted Owl v. Hodel*,[168] the decision of FWS not to list the spotted owl under the ESA was found to be "arbitrary and capricious and contrary to law."[169] The court reasoned

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163. *Id.* at 1050 n.5.

164. Fund for Animals v. Florida Game & Freshwater Fish, 550 F. Supp. 1206 (S.D. Fla. 1982).

165. *Id.* at 1209. The court found that actual interbreeding was required, "not the possiblity that the white-tailed deer might someday biblically *know* the Key Deer." *Id.*

166. Louisiana v. Verity, 853 F.2d 322 (5th Cir. 1988).

167. *Id.* at 329 (citations omitted).

168. Northern Spotted Owl v. Hodel, 716 F. Supp. 479 (W.D. Wash. 1988).

169. *Id.* at 483.

"the agency [spurned] unrebutted expert opinions without itself offering a credible alternative explanation."[170] This level of agency failure would seem to be a far reach for a challenge to the proposed rule for the Atlantic salmon. However, even if opponents cannot mount a successful challenge to the ESU for this listing, noting the numerous inconsistencies that lie in the ESU analysis, they may at least cause the Services to question the rationality of using the ESU on a regular basis.

IV. A MORE APPROPRIATE STANDARD

A. An Inadequate Defense of the ESU

Robin Waples clearly articulates how the ESU approach is consistent with the ESA and with good science.[171] First, the purpose of the ESA is to prevent the irreversible: extinction. If a population is not contributing to the genetic diversity of the species, protecting it is not preventing extinction. Hence, if there is no genetic basis to the definition of a population segment, it cannot be supported scientifically by the ESA.[172]

Waples and others emphasize that under the ESU analysis, genetic proof is not technically a requirement for definition of an ESU.[173] Life history and other behavior or morphological traits, for instance, could substantiate a population's evolutionary significance. Ultimately, however, he believes genetic differences will be implicated.[174]

Furthermore, in response to criticisms about making DPS decisions without information on *every* aspect of a species, Waples and others argue that gathering all information would be imprudent.[175] Waples argues that the ESU is not designed to list an entire species throughout its American historic range when the species is only in danger of extinction in the United States. The ESU point of reference is not the degree of threat of

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170. *Id.*

171. Telephone Interview with Robin S. Waples, *supra* note 48.

172. *Id.*

173. Letter from Mary Colligan, *supra* note 52, at 3 ("Genetics is one part of the puzzle and not the only piece of evidence used to delineate population segments.").

174. Telephone Interview with Robin S. Waples, *supra* note 48.

175. *See, e.g.*, Letter from Mary Colligan, *supra* note 52, at 5 ("The ESA does require the Services to make determinations utilizing the best scientific and commercial data available. It does not, however, allow the Services to postpone or avoid a decision indefinitely in search of complete or absolute information which may never, realistically, be attainable.").

the species in the United States, but rather the degree of threat to the species as a whole.[176] Since the Atlantic salmon has not been characterized as imperiled in Atlantic Canada, listing as a DPS is available only if an evolutionarily significant portion of the species is threatened or endangered. He stated that FWS has held a somewhat contrary position in the past, listing depleted populations in the lower forty-eight when they add no significant "genetic legacy" to the species as a whole and cannot be distinguished genetically from abundant populations elsewhere.[177]

The NMFS scientists understandably desire a policy that is faithful to the ESA, uses sound scientific methods, and is practical to implement. NMFS's top biologists firmly believe that real genetic differences are critical to conserve a species, and that protecting genetic integrity is required for species survival and by the letter, spirit, and legislative history of the ESA.[178] Protecting the gene pools and the river-specific adaptations is the first and foremost purpose of the ESU, and it provides a commensurate methodology. If a population does not meet the species test, NMFS does not want to list it.

B. An Alternative Standard more Consistent with the ESA's Goals and Purposes

Excluding the candidate rivers from the DPS[179] shows how significant the ESU is to listing, and raises the question of whether the ESU is in the best interest of conserving the species. The Services' stated objection to expanding the DPS to the candidate rivers is that "their link to native populations warrant[s] further study."[180] This is consistent with the ESU hesitance to use the ESA "to create artificial units without a biological

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176. In reference to the Florida panther—species whose survival is now dependent upon exogenous populations from which it is genetically indistinct—FWS officials have questioned "whether [they] are protecting the Florida panther or protecting the panther in Florida." NATIONAL RESEARCH COUNCIL, *supra* note 35, at 64.

177. Telephone Interview with Robin S. Waples, *supra* note 48.

178. *Id.*; Telephone Interview with Mary Colligan, *supra* note 43. *See also* Waples, *supra* note 41, at 12-13.

179. The "exclusion" may be temporary, in that ongoing research on the candidate river populations may lead to their eventual conclusion in the DPS. Telephone Interview with John Albright, *supra* note 154.

180. Proposed Threatened Status for a Distinct Population Segment of Anadromous Atlantic Salmon (*Salmo salar*) in Seven Maine Rivers, 60 Fed. Reg. 50,530 (1995) (to be codified at 50 C.F.R. pts. 17, 277, 425, (proposed Sept. 29, 1995).

basis."[181] Genetic resources and their evolutionary legacy are the *sine qua non* of ESU. Waples's work cites the congressional finding in the ESA, that species "are of esthetic, ecological, recreational, and scientific value to the nation and its people,"[182] but urges that "focussing on these attributes without regard to the underlying genetic basis for diversity is not a sound strategy for long-term species survival."[183] Further, since societal values change rapidly, the focus must be on the genetic resource.

Yet others suggest that the certainty the Services place in the reproductive isolation/evolutionary significance test presumes abilities that are not there.[184] They see agencies using genetics to turn shades of gray into a clear policy choice, when biological and policy foundations are questionable.[185] Rohlf characterizes the NMFS's position as essentially saying that "lawyers have no right to meddle in science."[186] Yet in calling it "science," he believes NMFS is hiding its role as policy maker. He concludes that if we fail to protect what is there, there will be nothing to protect, and that cannot have been the intent of Congress.[187]

The biological basis of the proposed DPS for the Atlantic salmon is to some degree speculative. What is "artificial" and what is "biological" may be in the eye of the beholder, especially when the Status Review leaves no doubt that the abundance of the species in even the most promising U.S. rivers "indicates that these populations are in peril" and that "the low levels of abundance are disturbing given the recent trend of declining relative abundance."[188] In short, the type of biological basis that the ESU requires may result in failure to preserve the species because it so limits the scope of protection.

A competing notion is that the threatened status could be extended to other Maine and/or New England rivers on a biological basis that is not "artificial." There are other possibly appropriate criteria for defining distinct population segments consistent with the dictates of the ESA.

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181. Policy on Applying the Definition of Species Under the Endangered Species Act to Pacific Salmon, 56 Fed. Reg. 58,612, 58,617 (1991).

182. 16 U.S.C. § 1531(a)(3) (1994); Waples, *supra* note 41, at 13.

183. *See* Waples, *supra* note 41, at 13.

184. Telephone Interview with Daniel J. Rohlf, *supra* note 107.

185. *Id.*

186. *Id.*

187. *Id.*

188. STATUS REVIEW, *supra* note 5, at 31. In fact, only the Narraguagus River has had a ratio of returning salmon to available habitat exceeding ten percent in the past seven years. *Id.*

These criteria would likely produce a different result in the Atlantic salmon listing process, but would still be based on good science. At an elementary level, some biologists and conservationists simply argue that when a stocked fish returns to its river and lays eggs, the hatchlings are by definition wild, and thus there is no basis for distinguishing them from populations in rivers that were never extirpated.[189] One analyst characterizes the ESU as a "more technically complex but equally discretionary scheme."[190] As mentioned earlier, some of the Services' biologists have called the issue of how to delineate the Atlantic salmon DPS in the proposed rule as "one of bookkeeping."[191]

Although past FWS policy is by no means binding, it does suggest an alternative analysis. In a past notice, the FWS observed that "[d]istinct population segments listed as endangered or threatened species typically consist of: (1) Populations that are reproductively isolated from other members of the species, or (2) the entire coterminous United States population of a species."[192] The FWS recently explained the historical use of these concepts in a petition regarding listing of two populations of fisher (Martes pennanti): "Service policy has allowed for the flexibility to delimit international boundary populations if that listing is in the best interest of the species."[193] This statement summarizes the agency's past practices, quoting language from a joint FWS-NMFS policy: "The Service has listed populations that are delimited by international boundaries within which significant differences in control of exploitation, management of habitat, conservation status or regulatory mechanisms exist."[194]

The differences in result between this alternative analysis and the ESU appear readily predictable. The former interprets "distinct population segment" in a manner that would allow for an expanded DPS for the Atlantic salmon. For example, based on the degradation of habitat in New England and the well-documented differences between Canadian and U.S. populations,[195] the DPS could appropriately be extended into a

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189. Weegar, *supra* note 134 (quoting John Albright, Executive Director, Atlantic Salmon Federation).

190. Rohlf, *supra* note 25, at 644.

191. Memorandum from Marta Nammack to Mary Colligan, *supra* note 68.

192. Notice of Petition Finding, 58 Fed. Reg. 36,924 (1993).

193. Notice of 90-dy Petition Finding, 61 Fed. Reg. 8,016, 8017 (1996). The statement was made in a notice dated March 1, 1996.

194. *Id.* (citing 59 Fed. Reg. 65,884 (1994)).

195. As discussed earlier, the STATUS REVIEW documents differences between Canadian and United States populations of Atlantic salmon generally to a reasonable

greater portion of the species' historic range, and could at minimum include all naturally spawning salmon.

The Services' 1996 Notice of Policy on the DPS[196] falls somewhere between the inclusive FWS policies just described, and the narrower ESU approach that NMFS applied for the Atlantic salmon. The Services' joint DPS policy views the requisite elements for distinct population status in a slightly different manner by considering the following factors:

1. Discreteness of the population segment in relation to the remainder of the species to which it belongs;[197]
2. The significance of the population segment to the species to which it belongs;[198] and
3. The population segment's conservation status in relation to the Act's standards for listing; "Is the population segment, when treated as if it were a species, endangered or threatened?"[199]

This recent policy states that the ESU approach developed for the Pacific salmon by NMFS is a "detailed extension" of this joint policy, which NMFS will continue to apply to Pacific salmonids.[200] Yet, it appears that if the joint policy were applied to the Atlantic salmon, it would result in a broader definition of the DPS that includes populations in other than the downeast rivers defined under the ESU.

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certainty, in contrast to the less certain differences between populations in United States rivers. *See supra* notes 95-97 and accompanying text.

196. Notice of Policy, 61 Fed. Reg. 4,722 (1996).

197. Discreteness exists when a population segment is "markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological or behavioral factors." Genetic or morphological measures may be relevant. 61 Fed. Reg. 4722, 4725 (1996).

198. This biological and ecological significance considers such factors as:

1. Persistence of the discrete population segment in an ecological setting unusual for the taxon,
2. Evidence that a loss of the discrete population segment would result in a significant gap in the range of a taxon,
3. Evidence that the discrete population segment represents the only surviving natural occurrence a taxon that may be more abundant elsewhere as an introduced population outside its range, or
4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

199. Notice of Policy, 61 Fed. Reg. at 4,725.

200. *Id.* at 4,722.

There are several reasons why this is so. First, the "discreteness" criterion would be satisfied by the strong evidence that U.S. populations of Atlantic salmon bear numerous genotypical and phenotypical differences from Canadian populations. Second, the "significance to the species" criterion would be supported by the perilously low numbers of U.S. individuals of the species, such that loss of any individual stock is significant to the species' viability. Third, and critically, the final criterion would be satisfied by the Status Review's findings that in every river studied "The combination of low relative abundance and the low numbers relative to spawning requirements indicates that these populations are in peril."[201]

The proposed rule does include certain hatchery fish, but only if they are *river specific*.[202] By this rationale, even a self-sustaining run of Atlantic salmon in a given river could not be included in the ESU if its population had once been extirpated. Nor would individuals from one of the DPS rivers be protected if they strayed into an adjacent non-DPS river. The introduction of non-river specific stocks would preclude listing under the ESA. The only exception consistent with the ESU doctrine would be if non-river-specific fish established themselves and were empirically found to have evolved genetically to adapt to the specific river.[203]

Given a choice of protecting a run composed entirely of hatchery fish as opposed to a run of genetically pure wild salmon, the ESA's purpose of protecting genetic heritage would concededly favor the wild population. However, when a run has been extirpated or greatly diminished and non-river-specific fish have been introduced, it seems dubious that Congress did not intend the ESA to apply to *any* of them. This argument is consistent with the definition of "conserve" in the ESA: "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant

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201. STATUS REVIEW, *supra* note 5, at 31.

202. STATUS REVIEW, *supra* note 5, at 74-75, (citing J.J. Hard et al., PACIFIC SALMON AND ARTIFICIAL PROPAGATION UNDER THE ENDANGERED SPECIES ACT, U.S. Dep't of Commererce, NOAA Tech. Memo NMFS-NWFSC-2 (1992). *See also* Petition, *supra* note 1, at 48-49 ("[A] key component is the importance of conserving genetic resources that represent the evolutionary legacy of the biological species . . . . These genetic resources may reside in hatchery fish as well as in naturally reproducing fish. Therefore, hatchery fish may be considered to be part of an ESU defined on the basis of a natural population.") (citing Hard, *supra*).

203. Telephone Interview with Daniel J. Rohlf, *supra* note 107.

to this chapter are no longer necessary."[204] To conclude otherwise may mean that there will be nothing left to protect. It would be ironic and illogical to embrace the theory that the ESA cannot extend to protection of a successful, artificial re-establishment of the species in a river where it was eradicated by human activity. Beyond irony, there may be a credible argument that such a policy is arbitrary and capricious.

This broader concept of the DPS would be consistent with the RESTORE Petition, which calls for a listing throughout the historic range, despite the fact that the populations in many of the rivers were extirpated for at least two generations,[205] and their restoration is being accomplished with salmon from other rivers. The Petition rightfully points out that the ESA accepts methods of conserving listed species that specifically include "propagation, live trapping, and transplantation."[206] Noting that artificial propagation has been used in recovery plans for other species, and that hatchery fish themselves have a potentially valuable genetic legacy, the Petition argues that "a history of hatchery influence should not preclude protection of a natural salmon population under the ESA."[207]

While political considerations may prevent it, a prudent course of action faithful to the ESA and to the preservation of the Atlantic salmon would be to discontinue the ESU. The policies that have been used for such species as the grizzly and the bald eagle should be applied, and the Services should have the ready means to list the entire coterminous U.S. population of species even if it is abundant in Canada. Even the current policy for non-salmonids—the Services' 1996 Notice of Policy on the DPS, 61 Fed. Reg. 4722—allows the Services to adhere adequately to the congressional intent to use the distinct population segment listing "sparingly" without making a threshold so high that the entire United States portion of a species is likely to vanish.

The current non-salmonid policy has elements in common with the ESU, by considering, without requiring, population discreteness and reproductive isolation in defining a DPS. But by further factoring in evidence that a loss of the DPS would result in a significant gap in the range of the taxon, it permits federal protection of such important resources as all U.S. populations of Atlantic salmon, rather than merely

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204. 16 U.S.C. § 1532(3) (1994).
205. STATUS REVIEW, *supra* note 5, at 25.
206. 16 U.S.C. § 1532(3) (1994). *See also* Petition, *supra* note 1, at 48-49.
207. Petition, *supra* note 1, at 48.

those that satisfy ESU requirements based on debatable interpretations of evolutionary significance.

It would understate the case to say that the loss of existing U.S. populations of Atlantic salmon would result in a significant gap in the taxon. Based on the Services' 1996 Notice of Policy on the DPS, U.S. populations of a species would thus merit ESA protection without the need for fine distinctions about which rivers do and do not possess the prerequisite genetic legacy worthy of protection under the ESU. The equally important corollary to this is that the broad habitat restoration which is necessary to recover the Atlantic salmon would only be possible if distinct population segments encompass a meaningful geographic area. Congressional notice that the ESA has protected the entire coterminous United States population of several species without recourse to fine nuances of genetic study suggests that the Services should abandon the ESU in favor of their more inclusive past policies.

V. POSTSCRIPT: HOW PROPOSED CONGRESSIONAL AMENDMENT TO THE ESA WOULD ALTER THE DPS EQUATION

The proposed listing of the Atlantic salmon highlights the tension between the use of "best scientific information" and the realpolitik of the day. While Interior Secretary Bruce Babbitt was quoted as saying, "[w]hether or not a species should be listed is a purely scientific decision,"[208] Maine Senator William Cohen[209] wrote a letter to Babbitt that suggests the pressures against a listing from which the Services would not likely be immune: "While I am aware that economic and social factors are not taken into consideration under the Endangered Species Act . . . the disposition of this petition will greatly affect my views regarding changes to the Endangered Species Act."[210]

If the proposed rule had been developed without political influence, the Services would deserve great credit.[211] As suggested above, the debate over the use of the ESU methodology to determine a distinct

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208. Weegar, *supra* note 134.

209. When the comments were made, Senator Cohen was still an active Senator. As of January 1997, he is a former senator, having chosen not to run for reelection in 1996.

210. Weegar, *supra* note 134.

211. The Atlantic salmon listing process may have been particularly immune from political influence. Telephone Interview with Mary Colligan, Fisheries Biologist, NMFS (Nov. 29, 1995).

population segment underscores the interrelationship of politics and biology, and the potential for agencies to use scientific methods for purposes of expediency. Accusations reported in the media that the Services used "the worst political information available" instead of "the best biological information available" are unsubstantiated.[212] At the same time, sensitivity within Congress toward the ESA is evident. Out of concern for the viability of the salmon restoration efforts, top biologists from NMFS and FWS briefed congressional subcommittees on the Atlantic salmon listing process and methods used.[213] These contacts suggest that it is inconceivable that the administrative and legislative arms of government function in a vacuum in regard to ESA issues.

As ominous as the ESU standard is to the Atlantic salmon listing, future debate over alternatives would have been precluded by several congressional bills that would have prohibited listings under the ESA below the species level.[214] A bill introduced in the 1995 session, sponsored by Reps. Don Young (R-Alaska) and Richard Pombo (R-Calif.),[215] contained dozens of provisions that, according to Secretary of the Interior Bruce Babbitt, "would gut the ESA."[216] The Young-Pombo bill also contained a number of provisions that related to the DPS issue. For

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212. *Id.*

213. *Id.*

214. Telephone Interview with Daniel J. Rohlf, *supra* note 107.

215. Endangered Species Conservation and Management Act of 1995, H.R. 2275, 104th Cong. (1995). In the 104th Congress, the Young-Pombo bill made it as far as being reported by the House Resources Committee. The other two of the three principal ESA bills introduced during the 104th Congress never made it out of committee. *See, e.g.*, Endangered Species Act Reform Act of 1995, S. 768, 104th Cong. (1995); Endangered Species Conservation Act of 1995, S. 1364, 104th Cong. (1995).

216. Telephone Interview with Paul Nickerson, *supra* note 53. H.R. 2275 proposes to amend the purposes of the ESA to read as follows:

> (1) To provide a feasible and practical means to conserve endangered species and threatened species consistent with protection of the rights of private property owners and ensuring economic stability.
>
> (2) To provide a program for the conservation and management of such endangered species and threatened species taking into account the economic and social consequences of such program.
>
> (3) To take such steps as may be practicable to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.

Endangered Species Conservation and Management Act of 1995, H.R. 2275, 104th Cong. § 3(b) (1995). It requires the Secretary to appoint a planning team after listing which shall assess "biological, economic, and intergovernmental factors with respect to the listed species. . . ." *Id.* § 501.

example, Section 902 of the Young-Pombo bill directed the Secretary to identify any species that is currently listed as a DPS, and to de-list "any segment not determined to be in the national interest" by Congressional action.[217] Legal experts who have scrutinized details of the bill's provisions believe that listing at below the biological species level would be "impossible."[218]

Further, under the bill, it would literally "take an act of Congress" to protect a dwindling population in the lower forty-eight states, if the animal is common in Alaska.[219] NMFS' role in administering the ESA would be eliminated—an especially puzzling notion, given that the ESU is largely a creation of NMFS scientists. The bill imposes on the federal government the burden of proving that a specimen belongs to a listed species.[220] This task would fall to FWS in the absence of NMFS, an arguably dubious delegation in the case of anadromous species, which spend much of their lives in marine environments far removed from the purview and monitoring capabilities of FWS.

Staff at FWS diplomatically characterized the revisions as "making our job significantly more difficult."[221] The consensus, however, is that moderate Republicans are not likely to support bills that call for radical changes to the ESA.[222] This is probably due to public opinion polls showing strong opposition even among Republican voters to reduced protection for endangered species.[223]

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217. Endangered Species Conservation and Management Act of 1995, H.R. 2275, 104th Cong. (1995).

218. Telephone Interview with Daniel J. Rohlf, *supra* note 107.

219. Those population segments which the Secretary recommends for continued listing in the national interest shall be submitted to the Congress for approval. Any population segment which is not determined to be in the national interest shall be delisted within 180 days after that determination.

Endangered Species Conservation and Management Act of 1995, H.R. 2275, 104th Cong. § 902 (1995).

220. *Id.* § 201(b)(9).

221. Telephone Interview with Paul Nickerson, *supra* note 53.

222. *Id.* (suggesting that these amendments "are not going anywhere"). Indeed, the House Resources Committee filed the report on the Young-Pombo measure in early September of 1996, discharging the committee from further consideration of the bill. Letter from Don Young, U.S. House of Representatives, to Bill Baker, U.S. House of Representatives 1 (Sept. 4, 1996) (on file with author).

223. Richard Lacayo, *This Land is Whose Land?* (visited Feb. 17, 1992) <http://pathfinder.com/time/magazine/domestic/1995/951023/cover2.html>.

The most prominent democratic proposal, H.R. 2374, sponsored by Rep. Gilchrest (D-Md.), seems equally unlikely of passage, and indeed never made it out of committee.[224] H.R. 2374 appears to less of a total revision of the ESA, yet it adds a consistency provision similar to those required under other federal acts. Notably the bill requires the federal government's recovery plan for a listed species to be consistent with an approved "voluntary conservation agreement" between the federal government and a state "[t]o the maximum extent practicable and consistent with the goals of the [ESA]."[225]

This seemingly subtle shift toward a greater state role in the ESA may be extremely significant. The adamant opposition to a listing of the Atlantic salmon by the current Governor on the grounds that the State of Maine has a plan in place to recover the species suggests the paradigm preferred by those calling for greater states' rights. If the Services avoid an otherwise necessary listing under the ESA based on a promised recovery program by the State of Maine, a significant precedent may be set, potentially damaging the ability of the federal government to protect species when confronted by strong local political forces. For those who have used the ESA to prevent the loss of species, these changes appear to be nothing less than a gradual administrative evisceration of the ESA.[226]

VI. CONCLUSION

The interplay of science, law, and politics is especially interesting in light of proposed challenges to the Endangered Species Act reform efforts in the Congress,[227] and predicted economic impacts from proposed salmonid listings in the Pacific Northwest.[228] Significant amendments to

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224. H.R. 2374, 104th Cong., § 7 (1995).

225. *Id.*

226. Telephone Interview with Jasper Carlton, Biodiversity Legal Foundation (Nov. 12, 1996).

227. For contrasting current attempts to rewrite the Act, *see* H.R. 2275, 104th Cong. (1995) (requiring, inter alia, compensation if Act affects land value and peer review open to industry consultants); H.R. 2374, 104th Cong. (1995) (keeping provisions of Act basically intact).

228. Bradfish, *supra* note 42, at 77. Bradfish predicts major economic impacts on the economy of northwest, yet the ability of the salmon to survive depends upon listing of the species. "[W]idespread listings would almost certainly provoke Congress to make major changes in the ESA in order to protect private property rights and local economies." *Id.*

the Act appear imminent, and this paper has noted changes in the policies implementing the Act that cannot be separated from the political context by observers with any degree of skepticism.

Most notably, a critical component of the Services' methodology—the tendency to rely on genetic distinctions more than other important factors—is actively debated. Alternatives previously considered by the Services and by other natural resources authorities provide more sensible means of effectuating congressional intent of defining species below the taxonomical level in order to prevent extinction. Had the Services applied such alternatives, protective measures of the ESA could have been applied to a large enough area of the species' historic range to have a meaningful effect on recovery.

These alternatives may have been eschewed in order to blunt the political fallout of listing the species throughout a greater part of its historic range. In this sense the Services have adopted a policy for salmon that narrowly interprets the ESA, yet one that may have enough fidelity to scientific method and the statute to withstand successful legal challenge.

Tragically, the definition of "species" under the ESA is potentially all-important to species recovery, especially because the degradation of the ecosystems in the species' existing and historic range is likely to be fundamental to recovery, and the ability of agencies to comply with the ESA's directive to "bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary."[229]

While there are other flaws in the ESA, con-gressional efforts to reform the ESA by removing or greatly restricting the ability of the Services to list populations below the species and subspecies level are misguided. Had the ESA not provided this flexibility in the past, such important listings as populations of the grizzly bear and the bald eagle in the lower forty-eight states would not have been possible, on the basis of their relative abundance in Canada and Alaska. However, the political environment poses its own threat to both the administration and reauthorization of the ESA: other efforts to blunt reactions to protection efforts, such as by providing a greater role of state involvement, are pragmatic and understandable moves.

The anticipated political fallout of the definition of distinct population segments should not determine the standard, yet unfortunately this is the

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229. 16 U.S.C. § 1532(3) (1994).

likely explanation for the use of the ESU. While the ESA has many flaws, the current political environment seems to have produced scientific policy purposefully geared to minimize local reaction to federal efforts to prevent extinction. As this Comment has stressed, application of the ESU will inevitably limit protection to mere vestiges of a species' genetic legacy at the expense of other viable populations purportedly "tainted" by some greater degree of hatchery fish heritage.

In these circumstances, the Atlantic salmon is proving to be a sad demonstration of the ESA's vulnerability to economic and political pressures. Furthermore, the common critique that the ESA epitomizes "deathbed conservation" appears to be particularly apt. For even if the DPS designation were biologically and legally optimal, the decline of the species in the U.S. may not be remediable by the ESA. The greatest historical cause for the decline of the salmon—obstruction of habitat by dams—is irreversible given the proliferation and relative permanence of dams for hydropower and river control. Further, if the Services are correct that ocean mortality is the largest current harm to the species and that it is caused by cyclical natural phenomena in the marine environment,[230] that too is beyond the reach of either Congress or agency. While the listing of the DPS along with concurrent efforts to recover salmon in the non-DPS rivers may eventually restore the species to a self-sustaining state, only a massive effort throughout the historic range would seem to be able to meaningfully reverse the decline of the species. That action is all but impossible politically under the ESA or any other legislation.

Returning to realistic actions, this Comment provides basis for an extension of the DPS to include, at a minimum, the Kennebec, Penobscot, and St. Croix rivers. Using alternatives to the ESU analysis, the populations in these rivers are a meaningful part of a distinct population segment that includes those rivers in which the Atlantic salmon has not been extirpated. While their location in more populous areas may heighten conflict with human users of the resource, such action may well be the least that we can do "to halt and reverse the trend toward species extinction, no matter what the cost."[231]

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230. Telephone Interview with Paul Nickerson, *supra* note 53.

231. Tennessee Valley Auth. v. Hill, 437 U.S. at 184.