UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

IN RE POLAR BEAR ENDANGERED SPECIES ACT LISTING AND § 4(d) RULE LITIGATION	**Misc. Action No. 08-0764 (EGS)** **MDL Docket No. 1993**
This Document Relates To Listing Rule Cases: *State of Alaska v. Salazar, et al.*, No. 1:08-cv-1352; *Safari Club Int'l, et al. v. Salazar, et al.*, No. 1:08-cv-1550; *California Cattlemen's Ass'n, et al. v. Salazar, et al.*, No. 1:08-cv-1689; *Center for Biological Diversity, et al., v. Salazar, et al.*, No. 1:08-cv-2113; *Conservation Force, et al. v. Salazar, et al.*, No. 1:09-cv-245	

PLAINTIFFS' STATE OF ALASKA,
SAFARI CLUB INTERNATIONAL, ET AL., CONSERVATION FORCE, ET AL., AND CALIFORNIA CATTLEMEN'S ASSOCIATION, ET AL.,
JOINT MOTION FOR SUMMARY JUDGMENT ON LISTING RULE CLAIMS

Pursuant to LCvR 7(h) and the Court's August 21, 2009 Order (Doc. #115), Plaintiffs State of Alaska; Safari Club International and Safari Club International Foundation; Conservation Force, et al.; and California Cattlemen's Association, et al. move for summary judgment on their respective Listing Rule claims in No. 1:08-cv-1352, No. 1:08-cv-1550, No. 1:09-cv-245, and No. 1:08-cv-1689, in this consolidated multidistrict litigation proceeding.

This joint motion is supported by the Parties' contemporaneously filed Joint Memorandum of Points and Authorities Supporting Parties' Motion for Summary Judgment on Listing Rule claims, and the individual supplemental briefs and memoranda of points and authorities of each of these four parties, submitted pursuant to the Fourth Joint Status Report (Doc. #114 at 3) and the Court's August 21, 2009 Order.

Pursuant to LCvR 7(f), the Parties request oral argument on this motion, consistent with the oral argument proposal in the Fourth Joint Status Report (Doc. #114 at 4-5).

Consistent with the Court's August 21, 2009 Order, Alaska, Safari Club, Conservation Force, and California Cattlemen's Association will be submitting to the Court two copies of all filings associated with this joint summary motion in both CD-ROM and hard copy. Those submissions will be provided within approximately seven to ten days of the filing of this motion.

WHEREFORE, Plaintiffs Alaska, Safari Club, Conservation Force, and California Cattlemen's Association respectfully request that summary judgment be entered on their Listing Rule claims.

DATED this 20th day of October, 2009

Respectfully submitted,

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PLAINTIFFS' STATE OF ALASKA, SAFARI CLUB INTERNATIONAL, CONSERVATION FORCE, ET AL., AND CALIFORNIA CATTLEMEN'S ASSOCIATION, ET AL. JOINT MEMORANDUM OF POINTS AND AUTHORITIES SUPPORTING PARTIES' JOINT MOTION FOR SUMMARY JUDGMENT ON LISTING RULE CLAIMS

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Pursuant to the Court's August 21, 2009 Order, Plaintiffs Alaska; Safari Club International and Safari Club International Foundation; Conservation Force, et al.; and California Cattlemen's Association, et al. file this joint memorandum of points and authorities in support of both their joint and individual motions for summary judgment.

Introduction

In this consolidated action, Plaintiffs Alaska, Safari Club, Conservation Force, et al., and California Cattlemen's Association, et al. ("Joint Plaintiffs"), challenge the U.S. Fish and Wildlife Service's (the "Service") listing of the polar bear as a threatened species.[1] The Joint Plaintiffs ask that the Final Rule be set aside based on the Service's failure to comply with the Endangered Species Act's ("ESA") statutory standards and procedures and for violating the Administrative Procedure Act's ("APA") rulemaking standards and requirements.

For the first time under the ESA, the Service in the polar bear Final Rule listed a species based on uncertain predictions of future threats of habitat loss, rather than on actual observed population declines or sufficiently likely threats to the species. Moreover, this listing represents the first time the Service has listed a species that is at an all-time historical high in population numbers, currently enjoys a relatively stable distribution and population status throughout its range, and is listed solely because of forecasted future trends. The forecasts themselves are replete with uncertainty and divergent outcomes that do not adequately support the current threatened listing status for the polar bear. This approach violated both the ESA and Service's own guidance for responding to ESA listing petitions. That guidance provides first that species

[1] Determination of Threatened Status for the Polar Bear (Ursus maritimus) Throughout its Range, Final Rule, 73 Fed. Reg. 28212-28303 (May 15, 2008), ARL 117215- 307 ("Final Rule"). Citations to "ARL" refer to the Administrative Record for Listing Determination for the Polar Bear, which is the administrative record for Listing Rule Cases. (*See* Doc. #20 at 4 (Scheduling Order).)

listings "need to be rooted in the here-and-now of a species' current status and whatever trends can be confidently discerned," and second that species are generally not listed "on the basis of an uncertain future threat."

While the ESA allows a species to be listed as "threatened" where the species is likely to become "endangered" in the foreseeable future, the Service has failed to establish the statutorily requisite "likelihood" (in the range of 67-90% certain) of such a threat here. It chose a foreseeable future – 45 years – that is simply too long, is a rationalization of a biologically determined foreseeable future, and is not supported by appropriate inputs for its own polar bear generation length calculation. The Service also failed to "take into account" the conservation efforts of Canada or to explain why existing regulatory mechanisms do not adequately protect the species. Finally, the Service failed both to articulate a rational standard for its threatened listing and to adequately consider the relevant information and factors. It relied on modeling and reports infused with uncertainty and speculation, and failed to make a rational connection between the information found and the choice made with the threatened listing decision in the Final Rule.

Background

I. Statement of Facts

The current worldwide population of polar bears is estimated to be 20,000-25,000 (Final Rule, ARL117219), up from an estimated low of 8,000-10,000 in the 1960s (Alaska Comments, ARL062085 (citing Servheen USFWS bear expert) (1989).) The Service has not documented an overall decline in global polar bear population numbers from the current estimated population. To the contrary, as global temperatures have increased over the past half century, and the amount of Arctic Sea ice and ice-free days fluctuated in the years between 1979 and 2006, the polar bear population has also increased to the highest levels in recorded history.

Despite these high population numbers, on February 16, 2005, the Service received a petition to list the polar bear as threatened under the ESA. On January 9, 2007, the Service issued a Proposed Rule to list the polar bear as "threatened." (72 Fed. Reg. 1064, 1070-71 (Jan. 9, 2007), Proposed Listing Rule, ARL053526-62.) On May 15, 2008, the Service issued a Final Rule listing the polar bear as "threatened" throughout its entire range based on its conclusions that the polar bear's habitat would decline, as suggested by speculative climate model forecasts of melting sea ice, and that the species would be in danger of extinction within 45 years, the Service-defined period of the "foreseeable future" for this species. (ARL117215.)

For the first time in the history of the ESA, the Service listed a species based on predictive models of declining habitat conditions rather than on actual observed effects to the species such as declining population numbers. One of the population forecasting models relied on by the Service predicts only a 10-22% range-wide decline in the carrying capacity of sea ice habitats during the 45-year foreseeable future. (ARL117277.) The Service relied on another forecasting model that suggests, if certain climate change predictions also occur, that two-thirds of the present polar bear population may be lost by mid-century. But that model uses the subjective estimates of one individual using a "prototype" model that the Service warns is not to be considered final. (ARL117277-78.)

Of the 19 polar bear populations worldwide, only two are subject to the regulatory control of the United States and the ESA. The majority (14 populations) are found in Canada, where the polar bear is not listed as threatened or endangered under Canada's Species At Risk Act. Others are located in Greenland, Russia, and Norway. (ARL117216-22.) While two polar bear populations (one in the United States and one in Canada) are deemed by the Service to be "actually or potentially declining" (in number or in "vital rates" health) due to reduced sea ice

habitat, others have grown. (ARL117300-01; ARL117271-73; ARL117221.) Almost three-quarters of the 19 polar bear populations are stable, increasing, or indeterminate in number. (ARL117221.) The polar bear still retains almost the entirety of its original range, and that range has not changed to date. (ARL117217-219.)

Although the Service admits that Arctic climate models are highly uncertain (ARL117231-32), the Service considers the polar bear "threatened" because certain predictive computer models forecast a declining trend in sea ice. (ARL117229, ARL117279-81.) Additionally, the sea ice models relied on by the Service assume a one-to-one correlation between sea ice reduction and polar bear carrying capacity declines, contrary to the available information. The models do not account for temperature variability (such as the fact that global temperatures have not increased in the last decade), or polar bear adaptability, or changes in global influences. (ARL117276-78.) Also, the International Panel on Climate Change ("IPCC") and other models on which the Service relies do not predict the complete loss of sea ice or the complete extirpation of the polar bear species over the next 45 years (*i.e.*, within the foreseeable future). (ARL117276-78.)

According to the Service, changes in ringed seal distribution and abundance "will likely be the most important factor determining effects on polar bear populations." (ARL117265.) While the Service cites current estimates predicting decreasing seal populations, the Final Rule fails to document actual declines in ringed seal distribution and abundance. Instead, the seal, like the polar bear itself, enjoys sound population numbers: "The most recent population estimates of ringed seals, the preferred prey of most polar bear populations, range to about 4 million or more, making them one of the most abundant seal species in the world." *Id.*

Polar bears have survived previous global warming periods with higher temperatures than today and with a severe reduction in sea ice. (ARL117259-60.) Also, polar bears are already protected from direct harm through national and international laws and treaties. (ARL117285-92.)

According to the Secretary of the Interior, who made the final listing determination, the ESA listing will not "prevent sea ice from melting" (the primary basis for listing). (Press Release, May 14, 2008, ARL117188.) And the Service has not determined what constitutes a minimally viable or recoverable polar bear population, and therefore cannot determine when the polar bear population may become extinct or in danger of extinction.

II. Statutory Background

The Endangered Species Act, 16 U.S.C. §§ 1531 *et seq.*, delegates authority to determine whether to list a species as endangered or threatened to the Secretaries of Commerce and the Interior. The Secretary of the Interior has jurisdiction over the polar bear. *Id.* § 1532(15). An endangered species is "in danger of extinction throughout all or a significant portion of its range," while a threatened species is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *Id.* § 1532(6), (20).

In making an ESA listing determination, the Service must consider five statutory factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors affecting its continued existence. *Id.* § 1533(a)(1). The ESA is explicit that a Secretary may only list a species based on these criteria

> solely on the basis of the best scientific and commercial data available to him after conducting a review of the status of the species and **after** taking into account those efforts, if any, being

> made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under its jurisdiction, or on the high seas.

Id. § 1533(b)(1)(A) (emphasis added).

III. Standing and Citizen Suit Provision

To bring a citizen suit claim under ESA Section 11(g), a plaintiff need establish only Article III standing. This "irreducible constitutional minimum" of standing requires "that [a plaintiff] has suffered 'injury in fact,' that the injury is 'fairly traceable' to the actions of the defendant, and that the injury will likely be redressed by a favorable decision." *Bennett v. Spear*, 520 U.S. 154, 162 (1997).[2] Congress eliminated prudential standing requirements for such claims "by specifying that 'any person' may be a plaintiff." *Am. Soc'y for Prevention of Cruelty to Animals v. Ringling Bros. & Barnum & Bailey Circus*, 317 F.3d 334, 336 (D.C. Cir. 2003).[3] The ESA citizen suit provision requires a plaintiff to provide the defendant agency with 60 days notice of the claims before filing suit. 16 U.S.C. § 1540(g)(2).

For those claims brought under the APA, both Article III standing and prudential standards, including the "zone of interests" test, apply. *See Bennett*, 520 U.S. at 163. The

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[2] A plaintiff establishes associational standing by showing:

> (a) its members would otherwise have standing to sue in their own right;
>
> (b) the interests it seeks to protect are germane to the organization's purpose; and
>
> (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit.

Hunt v. Washington State Apple Adver. Comm'n, 432 U.S. 333, 343 (1977).

[3] These prudential standing principles include avoiding adjudicating claims based on "the legal rights or interests of third parties," refraining from adjudicating "generalized grievances," and requiring the plaintiff to be within "the zone of interests to be protected or regulated by the statute or constitutional guarantee in question." *Valley Forge Christian Coll. v. Am. United for Separation of Church & State, Inc.*, 454 U.S. 464, 473 (1982).

Supreme Court has explained that, for purposes of applying the zone of interest test for claims under the APA, the court must look to the purposes of the substantive provision of the statute under which the plaintiff is suing. *Id.* at 175. In its supplemental brief, each party to this joint brief will address its compliance with the ESA citizen suit provision, its standing, and any other jurisdictional matters.

Standard of Review

Summary judgment is an appropriate procedure to resolve a challenge to the Service's ESA decisionmaking when, as here, review is based on the administrative record, even though the court does not employ the standard of review in Fed. R. Civ. P. 56. *Fund for Animals v. Babbitt*, 903 F. Supp. 96, 105 (D.D.C. 1995) (cited in *Defenders of Wildlife v. Kempthorne*, 535 F. Supp. 2d 121, 125 (D.D.C. 2008)).

The applicable standard of review for the Service's listing decision is from the APA, 5 U.S.C. § 706(2)(A)&(D). *See Am. Wildlands v. Kempthorne*, 478 F. Supp. 2d 92, 96 (D.D.C. 2007) (citing *Las Vegas v. Lujan*, 891 F.2d 927, 932 (D.C. Cir. 1989)). The APA requires courts to hold unlawful and set aside federal agency actions that are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." *Id.*; *Greater Yellowstone Coal. v. Kempthorn**e***, 577 F. Supp. 2d 183, 188 (D.D.C. 2008). Under the APA, the court's review is limited to the administrative record. *Am. Wildlands*, 478 F. Supp. 2d at 96.

While the court may not substitute its judgment for the agency's, the APA standard of review "requires 'a thorough, probing, in-depth review' of challenged decisions." *Greater Yellowstone Coal.*, 577 F. Supp. 2d at 188 (quoting *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 415-16 (1971)). "When decisionmaking 'requires a high level of technical expertise,' courts should defer to 'the informed discretion of the responsible federal agencies'."

Am. Wildlands, 478 F. Supp. 2d at 96 (quoting *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 377 (1989)).

A court's deference to the agency under the APA is not unlimited, however. An agency decision is arbitrary and capricious and must be vacated where the agency (1) relied on factors which Congress has not intended it to consider, (2) entirely failed to consider an important aspect of the problem, (3) offered an explanation for its decision that runs counter to the evidence before the agency, or (4) is so implausible that it could not be ascribed to a difference in view or the product of agency expertise. *Greater Yellowstone Coal.*, 577 F. Supp. 2d at 188-89 (citing *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983)).

The "agency's reasons and policy choices" must "conform to 'certain minimal standards of rationality'." *Defenders of Wildlife v. Babbitt*, 958 F. Supp. 670, 679 (D.D.C. 1997) (quoting *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 521 (D.C. Cir.1983) (citation omitted)). To survive an "arbitrary and capricious" challenge, an agency must "examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made." *Fund for Animals v. Norton*, 512 F. Supp. 2d 49, 53 (D.D.C. 2007) (internal quotation and citations omitted); *Bldg. Indus. Ass'n of Superior Cal. v. Babbitt*, 979 F. Supp. 893, 898 (D.D.C. 1997) (same).

The ESA's best available science requirement prohibits an agency from disregarding scientifically superior evidence. *Sw. Ctr. for Biological Diversity v. Babbitt*, 215 F.3d 58, 60 (D.C. Cir. 2000) (citing *Las Vegas v. Lujan*, 891 F.2d at 933). The Service may not disregard "available scientific evidence that is in some way better than the evidence [it] relies on," although the agency need not conduct its own independent studies. *Am. Wildlands*, 478 F. Supp. 2d at 99 (citing *Sw. Ctr. for Biological Diversity*, 215 F.3d at 60). If the Service uses modeling

to support its listing determination, a court will reject a model as arbitrary and capricious if there is " 'no rational relationship between the model and the known behavior of [the items] to which it is applied.' " *Greater Yellowstone Coal.*, 577 F. Supp. 2d at 198 (quoting *Chemical Mfrs. Ass'n v. EPA*, 28 F.3d 1259, 1265 (D.C. Cir. 1994)).

Argument

I. The Service Failed To Apply The Proper Standards For Assessing The Certainty Of Future Threats And Their Effects On The Polar Bear

Before it can list a species as "threatened," the Service must affirmatively find the species is "**likely** to become an endangered species within the **foreseeable future** throughout all or a significant portion of its range." 16 U.S.C. § 1532(20) (emphasis added). Because "likely" and "foreseeable future" are not defined in the Act, the Service attempted to give those terms some meaning in the Final Rule. However, in doing so, the Service erred.

Although the Service determined that "likely" means a 67-90% probability, the Service failed to apply that standard. As for "foreseeable future," the Service chose 45 years as the foreseeable future in the Proposed Rule based on biological factors. In the Final Rule, the Service disavowed that basis, but simply tried to rationalize 45 years based on the alleged reliability of climate and sea-ice modeling. Forty-five years is demonstrably an excessive period for the foreseeable future based on the present record.

A. The Service Concluded That "Likely" Means 67-90% Probable, But Then Never Applied That Definition In Its Listing Determination

Although the Proposed Rule did not appear to give any meaning to the term "likely," the Final Rule explained that the Service relied on the probability value assigned to the term "likely" by the IPCC's Fourth Assessment Report ("AR4"). (ARL117241). To describe something that is "likely," the IPCC AR4 uses a range of 67-90% probability of happening. (Climate Change 2007: The Physical Science Basis, *Summary for Policymakers*, Intergovernmental Panel on

Climate Change, at 4 n.6, ARL151195 ("the following terms have been used to indicate the assessed likelihood, using expert judgment, as an outcome or a result: . . . *Very likely > 90%, Likely >66%* . . . ."); ARL101051 (power point on IPCC AR4 with same figures).) Thus, the Service's standard for "likely" is that there must be a 67-90% probability that the polar will be endangered within the foreseeable future. Consistent with these figures, the dictionary defines "likely" as something "having a high probability of occurring or being true; very probable." Merriam Webster OnLine, http://www.m-w.com/dictionary/likely.

The case law also supports such a reading of the term "likely." Commenting indirectly on the "likely" standard, one court determined that even a small amount of doubt can avoid the need for a "threatened" listing. The court upheld a Service decision not to list a species as threatened (*i.e.,* likely to become extinct in the foreseeable future) based on, among other things, the conclusion of one expert involved in the decision (and agreed to by others) that the scientific uncertainty surrounding the issue and other information "created a significant 'shadow of a doubt' in [the expert's] own mind regarding the proposed listing." *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, 402 F. Supp. 2d 1198, 1205-06 (D. Or. 2005). Other courts, interpreting other statutes, have defined "likely" to mean "highly probable" or "probable." *See Nippon Steel Corp. v. United States,* 26 C.I.T. 1416, 1420, 2002 WL 31873457, **3 (Ct. of Int'l Trade 2002) (citing Merriam-Webster definition of "highly probable" and Webster's definition of "probable"); *In re Leon G.*, 59 P. 3d 779, 786 (Ariz. 2002) (collecting cases on meaning of "likely").

In a determination of whether the polar bear is "threatened," the ESA prevents the Service from relying on predictions or conclusions about occurrences and impacts that are "possible" or could potentially happen as the Service did here. Such speculation does not satisfy

the statutory requirement, as interpreted by the Service here, that the Service must affirmatively determine with a high degree of probability (defined by the Service as 67-90%) that the species will become endangered in the "foreseeable future" time period that the Service ultimately designates for polar bears (discussed below). This standard also helps establish the level of certainty with which the Service must foresee the future. In other words, the foreseeable future is that future period in which the Service can predict with 67-90% reliability the future conditions.

B. The Service Failed To Establish An Appropriate Standard For Determining The Foreseeable Future And Then Chose An Unjustifiable Forty-Five Year Foreseeable Future

The Service failed to adopt a defensible standard for assessing the foreseeable future, developed a standard to justify an already chosen time period, and misapplied the facts to the designated standard. In the 2006 Status Review and in the Proposed Rule to list the polar bear, the Service chose 45 years as the foreseeable future. (2006 Status Review at 59-60, ARL047452-53; ARL053526-62).) The Service established this time period based on the foreseeable future it had applied for other species, the IUCN (World Conservation Union—International Union for Conservation of Nature and Natural Resources) standard when that body looked at the polar bear's status, and three biological life generations of polar bears. (*Id.*; *see also* ARL054600 (2007 power point explaining biological basis for 45 years).) In their formal comments, SCI and SCIF argued that the Service's original approach was inadequate because Congress did not define the "future" into which the Service must look as biologically based.

(ARL124927-28.) Instead, Congress used the term "foreseeable," which dictates the certainty with which the agency can "see" or predict the future.[4]

The Service appeared to agree. (Final Rule, ARL117243-44, 117258 ("biological considerations" were "not relied on as the basis for determining 'foreseeable future' in this rule)".) Instead of analyzing the issue afresh under this principle, however, the Service simply tried to justify the 45-year foreseeable future it had already chosen. (ARL117257.) The Service rationalized that the three-generation "foreseeable future" "**coincides** with the timeframe within which climate model projections are most reliable." (ARL117244 (emphasis added); ARL098170 (IUCN "criteria of 45 years compares well" with "climate predictions for the next 50 years").)

In addition, by focusing simply on whether 45 years was reliable in relation to longer periods, the Service failed to analyze whether some shorter period would more appropriately represent the foreseeable future. In a document that post-dated the preparation of the nine United States Geological Survey ("USGS") Reports (finalized in September 2007), the Service acknowledges that:

> If an effort were taken to examine a different period of time for use as the "foreseeable future" for polar bears (e.g., 10, 20, or 30 years), then a similar analysis would need to be prepared to both gauge the relative reliability of the sea ice model data modeled at those different time intervals and to compare the relative uncertainties and other limitations which attach to those new analyses . . . . Similarly, the use of a 10-, 20-, or 30-year period for polar bears would require both an independent science

[4] The ESA does not define the phrase "foreseeable future," but the ordinary meaning of the phrase establishes that it should be short enough that the agency can determine the future state of things with a relatively high degree of certainty. Dictionary definitions of foreseeable and foresee echo this meaning. To foresee is "to realize or understand (something) in advance or before it happens." "Foreseeable" means "able to be understood in advance." Cambridge Dictionary of American English, http://dictionary.cambridge.org/define.asp?key=foresee*1+0&dict=A.

> base (new modeling) **as well as** a science-based comparison of the new modeling versus the 45-year period . . . .

(ARL004018 (emphasis in original).) In fact, the Service rejected the idea of "shorter time frames" for the foreseeable future. (Aug. 13, 2007 version of Final Listing Rule, ARL079972.)

In its desire to justify its pre-chosen 45-year period, the Service simply looked at one factor—habitat, in terms of projections of sea-ice loss—and fashioned a justification for 45 years. In large part, the Service simply concluded that "[a]vailable science, including results of the IPCC AR4, indicates that climate change projections over the next 40-50 years **are more reliable** than projections over the next 80-90 years." (Final Rule, ARL117243 (emphasis added)*; see also id.* ARL117257 (uncertainty associated with emissions is "relatively smaller" for 45 year foreseeable future).) These record documents highlight two points: (1) the Service did not consider a shorter "foreseeable future" than 45 years; and (2) the Service was fixated on comparing the "relative" certainty of predictions at different future time periods.

The problem with this approach is that it simply states a fairly obvious conclusion—that projections for 40-50 years are more reliable than those going out 80-90 years. It is just as true that projections going out only 10, 20, or 30 years are more reliable than projections 40-50 years out, or that projections for 80-90 years out are more reliable than projections going out 150 years. This analysis was legally inadequate because the Service based it on relative certainty, not on an objective certainty rooted in the concept of "likely" and "foreseeable."

The Service's foreseeability analysis also fails because it did not assess how the available data relevant to the other listing factors affected the length of the foreseeable future. A more probing analysis by the Service also would have looked at what it could know with relatively high certainty generally and in regard to ***all five*** statutory listing factors, ***plus*** the state and foreign country conservation efforts. *See* 16 U.S.C. § 1533 (a)(1), (b)(1)(A). When it

established 45 years as the foreseeable future based on alleged reliability of climate and sea ice modeling and impacts on habitat, the Service ignored whether it could accurately project impacts related to overutilization, disease and predation, existing regulatory mechanisms, and other manmade factors. For example, the Service did not analyze the predictability of "existing regulatory mechanisms" during its chosen 45-year foreseeable future. (*See* Final Rule, ARL117297 (***existing*** regulatory mechanisms not expected to be effective in counteracting growth of greenhouse gas emissions).) The reason is simple. Forty-five years into the future is far too long a period to assess what the "existing" regulatory mechanisms are going to be at that time. In other words, because the Service cannot reasonably "foresee" or predict anything about existing regulatory mechanisms in 45 years, that period is too long. The same holds true for the other factors (including state and foreign conservation programs); the Service did not and cannot foresee their status so far into the future.

Even if it were legally sufficient and 45 years were appropriate, the Service's one-factor analysis fails because of the uncertainties involved in predicting out 45 years, including emission scenarios, climate change, impacts of any climate change on arctic sea ice, and any impacts of any sea ice reductions on polar bear populations throughout its range. (*See, e.g.*, Final Rule, ARL117231-32.) These uncertainties, acknowledged by the Service and scientific papers, belie the conclusion that projections out 45 years are a sufficiently reliable basis on which to premise the Final Rule, which relies largely on predictive modeling to forecast future threats to the species.

To the extent the Service relied on life-generation biological factors to initially establish and then later support its 45-year foreseeable future (by claiming that biological factors "coincide" with the alleged reliability of the models), the record does not support their choice of

45 years as three life generations. (*See* Final Rule, ARL117243, 117258.) The Service claims to use the "IUCN Red List process" to determine polar bear generation time, providing that "[a] generation span, as defined by IUCN, is calculated as the age of sexual maturity . . . plus 50 percent of the length of the lifetime reproductive period." (*Id.*, ARL117258 ; *see also* ARL140985 (IUCN Red List process).[5]) The Service then calculated the age of sexual maturity for the polar bear as five years, and the "lifetime reproductive period" as "20 years." (Final Rule, ARL117258.) But the Service's choice of a 20-year lifetime reproductive period is contrary to both the record and the "best available scientific data" cited by the Service.

The Service states in the Final Rule that for polar bears "[b]oth sexes can live 20 to 25 years," citing "Stirling and Derocher 2007." (*Id*.) This article is an editorial which provides no support for this statement. (*See* ARL082865-69.) The Service then states that actually "few polar bears in the wild live to be older than 20 years." (ARL117258, citing "Stirling 1988, p. 139; Stirling 1990, p. 225.") Based on this statement, and the Service's use of a 20-year lifetime reproductive period, the Service is assuming either that (1) polar bears reproduce from birth until death, at 20 years; or (2) polar bears, on average, live to 25 years, and reproduce from five years of age until death at 25 years. But neither assumption by the Service is realistic or supported by the record.

Based on the articles cited by the Service (Stirling 1988, p. 139; Stirling 1990, p. 225), "few [polar bears] live longer than 20 years" (*see* ARL132022), and "only a small proportion live past about fifteen to eighteen years" (*see* ARL140094.) Thus, according to the very science on which the Service relies, the average maximum age of polar bears is closer to 15 to 18 years.

[5] The USGS criticized the Service's use of one IUCN criteria definition to calculate generation length, asserting that "this particular definition is never justified and there are others that are (continued)

Since polar bears reach sexual maturity at 5 years, *see* ARL117258, the actual lifetime reproductive period for the polar bear is around 10-13 years (i.e., the period when polar bears can reproduce until death, at 15 to 18 years (on average)). This 10 to 13-year period is much less than the Service's 20-year lifetime reproductive period.

Taking the midpoint of this 10 to 13-year reproductive period, i.e., 11.5 years, and applying the Service's methodology for determining a generation span (the age of sexual maturity [5 years for polar bears]) plus 50 percent of the length of the lifetime reproductive period [11.5 years on average for polar bears], the actual length of one generation for the polar bear is closer to 11 years. Thus, three generations are 33 years, not 45 years. As a result, the Service's establishment of a 45-year "foreseeable future" does not "coincide" with a three-generation timeframe for the polar bear that should be closer to 33 years (a time period, as discussed above, the Service failed to analyze). For this reason also, the Service's selection of a 45-year as the "foreseeable future" is arbitrary and capricious and not supported by the record.

II. The Nature And Extent Of Future Climate Change, Impacts On Sea Ice, And Impacts On The Polar Bear Are Too Uncertain To Support A Threatened Listing

The Service repeatedly admonishes that forecasted population levels and estimated future time periods are not to be taken at face value, ostensibly because they are inherently uncertain. Instead, the Final Rule states that the trend is "worrisome" and that the listing is warranted because diminished sea ice habitat will "negatively affect" polar bear populations, perhaps resulting in a steady decline in abundance. (Final Rule, ARL117279-117281.) But given that the current data do not show any overall decline in the polar bear population, let alone a steady decline in abundance, this "worry" does not justify the current listing. *See Cook Inlet Beluga*

(footnote, con'td)
better accepted in the literature." USGS Comments on Draft Final Rule, ARL080028.

Whale v. Daley, 156 F. Supp. 2d 16, 22 (D.D.C. 2001) ("But neither is listing required simply because the agency is unable to rule out factors that could contribute to a population decline.").

To guard against the haphazard implementation of the ESA, the Service developed its "Petition Management Guidance"[6] to provide consistent data and information standards for the Service's listing decisions. (*See* 61 Fed. Reg. 36075 (July 9, 1996) (notice of availability).) This guidance provides that the Service's findings "need to be rooted in the here-and-now of a species' current status and whatever trends can be confidently discerned." (Petition Management Guidance at 9.) This guidance further provides: "we would not as a general matter list a species that now appears to be secure on the basis of an uncertain future threat." (*Id*.) Thus, the Service's guidance directs that a species should not be listed if future threats to the species are uncertain and trends in the species' status cannot be confidently discerned. (*Id*.)

The listing of the polar bear was not warranted at this time because, in contravention of the Service's own listing policy, the record relied on by the Service demonstrates tremendous uncertainty about the nature and extent of any future global climate change, and the impact of any climate change on the Arctic ecosystems and on the polar bear. The complexity of the issue and the inherent uncertainty involved in predicting the future of complex systems with unknown future parameters creates a great deal of scientific uncertainty underlying the final listing decision. While the ESA tolerates some uncertainty, particularly regarding "threatened" determinations, that tolerance is not boundless. The statutory "likely" requirement and the restriction to look only in the "foreseeable future" constrain the Service. The uncertainty present

[6] Available at http://www.nmfs.noaa.gov/pr/pdfs/laws/petition_management.pdf (last visited Oct. 19, 2009).

here should have prevented the Service from making a "threatened" determination under the ESA.

For example, one of the nine USGS Reports issued in September 2007 discusses in detail the uncertainty inherent in the types of projections contained in the other reports, including the uncertainty of the climate and sea ice models. (DeWeaver, "Uncertainty in Climate Model Projections of Arctic Sea Ice Decline: An Evaluation Relevant to Polar Bears" (2007) ("Uncertainty Report"), ARL128797-844.) This report confirms there is significant uncertainty surrounding this crucial underlying scientific information:

> While most aspects of climate simulations have some degree of uncertainty, uncertainty in projections of Arctic climate change is relatively high . . . . To some extent, the high level of uncertainty is a simple consequence of the smaller spatial scale of the Arctic, since climate simulations are reckoned to be more reliable at continental and larger scales . . . . The uncertainty is also a consequence of the complex processes that control the ice, and the difficulty of representing these processes in climate models. The same processes which make Arctic sea ice highly sensitive to climate change, the ice-albedo feedback in particular, also make sea ice simulations sensitive to any uncertainties in model physics (e.g., the representation of Arctic clouds).

(ARL128805.)

In particular, two of the USGS reports rely on these climate model projections for speculating about the status of the polar bear and its habitat at certain time periods in the future. ("Forecasting the Range-wide Status of Polar Bears at Selected Times in the 21st Century," Amstrup et al., at 8, 10, 23-24 (2007) ("Forecasting Report"), ARL082446-549; "Predicting the Future Distribution of Polar Bear Habitat in the Polar Basin from Resource Functions Applied to 21st Century General Circulation Model Projections of Sea Ice," Durner et al., at 1, 5-6 (2007), ARL129001-61.) The modeling in the Forecasting Report not only relies on speculative sea-ice conditions at the 45, 75, and 100 year time points, but itself attempts to make predictions about

the future of polar bears based on mathematical modeling that cannot replicate natural variable conditions in such a complex and incompletely understood system, and relies on excessive "interpretation of data" and the expert judgment of only one polar bear expert. (ARL082467.)

From the beginning, the Service acknowledged the uncertainty surrounding the decision it had to make. The Range-Wide Status Review of the Polar Bear (USFWS December 2006) acknowledged that there is a "large degree of uncertainty" about the actual increase in global temperatures and the "future of the Arctic sea ice." (ARL047460.) The Final Rule continues to acknowledge this uncertainty. (*See, e.g.*, ARL117232 ("while most aspects of climate stimulations have some degree of uncertainty, projections of Arctic climate change have relatively higher uncertainty.").)

Another of the documents on which the Service chiefly relies also readily acknowledges this scientific uncertainty and unpredictability:

> Scenarios help in the assessment of future developments in complex systems that are either **inherently unpredictable**, or that **have high scientific uncertainties**. In all stages of the scenario-building process, uncertainties of different nature are encountered. A large **uncertainty surrounds future emissions** and the possible evolution of their underlying driving forces, as reflected in a wide range of future emissions paths in the literature. The uncertainty is further compounded in going from emissions paths to climate change, from climate change to possible impacts and finally from these driving forces to formulating adaptation and mitigation measures and policies. The uncertainties range from inadequate scientific understanding of the problems, data gaps and general lack of data to inherent uncertainties of future events in general. Hence the use of alternative scenarios to describe the range of **possible future emissions**.

(IPCC's Special Report on Emissions Scenarios Section 1.2, Box 1-1: Uncertainties and Scenario Analysis (emphasis added), http://grida.no/climate/ipcc/emission/025.htm; the IPCC reports are discussed at ARL117232-38.) As quoted in the Final Rule, the IPCC AR4 report generates "probabilistic estimates of future climate change." (ARL117231, quoting IPCC 2007,

p. 761.) These reports also echo the Uncertainty Report's concern over the greater uncertainty regarding the potential impacts of global climate change at the arctic "sub-region" level. (*See* ARL117232.)

The ACIA Synthesis Report states:

> In a region as large and diverse as the Arctic, there are significant sub-regional variations in climate. . . . In assessing future impacts in the sub-regions, projected changes in climate were primarily derived from global scale climate models. As regional scale climate models improve and become more widely available, future assessments may be capable of more precisely detailing the local and regional patterns of change. For this assessment, the patterns of climate change and their impacts should be viewed at a fairly broad regional scale, as they become less certain and less specific at smaller scales.

(ARL149901.) And finally, these underlying uncertainties further compound the unreliability of the BM (Bayesian) study (discussed *infra* in Section V.C.).

As the documents discussed above and others demonstrate, the science of predicting climate change on a global, much less a sub-regional, scale, and for projections reaching out 45 years, is full of uncertainty and speculation. While the Service acknowledges the tremendous uncertainty, it must explain how it nonetheless can make a "likely" to be in danger of extinction determination in the face of this uncertainty. It failed to do so. Based on the Service's own assessment, the existing level of uncertainty does not allow the Service to affirmatively determine that a currently healthy species is "likely" (i.e., 67-90% certain) to become extinct in the "foreseeable future," here arbitrarily determined to be the next 45 years. The Service's policy is that "[p]etition findings need to be rooted in the here-and-now of a species' current status and whatever trends can be **confidently** discerned." (Petition Management Guidance at 9 (emphasis added).) There is simply far too much speculation by the Service in the Final Rule determination, and "[t]he Service may not base its listings on speculation or surmise." *Bldg.*

Indus. Ass'n of Superior Cal. v. Norton, 247 F.3d 1241, 1246-47 (D.C. Cir. 2001); *see also Bennett v. Spear*, 520 U.S. at 176.

III. The Service Has Not Shown That Existing Regulatory Mechanisms Are Inadequate To Protect A Viable Population Of The Polar Bear

One of the factors that the Service must consider in determining a species' status as threatened or endangered is the "inadequacy of existing regulatory mechanisms." 16 U.S.C. § 1533(a)(1)(D). In the Final Rule, the Service concluded that "existing regulatory mechanisms at the national and international level **are adequate** to address actual and potential threats to polar bears from direct take, disturbance by humans, and incidental or harassment take." (Final Rule, ARL117292 (emphasis added).) This conclusion should have compelled a finding that the listing of the polar bear is not warranted based on this statutory factor D. However, the Service decided it must list the polar bear as "threatened" on the basis that existing regulatory mechanisms do not adequately address "the primary threat to polar bears," which the Service described as the loss of sea ice due to global warming. (*Id*.) The Service has missed the mark.

Rather than focus on whether existing regulatory mechanisms can reduce or eliminate the "primary threat" to polar bears, the Service should have determined whether these mechanisms can protect the polar bear given the threat. Existing regulatory mechanisms are not inadequate for failing to address global warming if they are adequate to protect polar bears notwithstanding global warming.[7]

[7] The National Marine Fisheries Service appears to agree with this assessment. That agency recently found reductions in sea ice habitat to be a threat to one distinct population segment (but not others) of the spotted seal. However, the agency concluded that "there is little evidence" that the lack of regulatory mechanisms addressing reductions in sea ice habitat or ocean acidification "currently poses a significant threat to any of the spotted seal" populations. The lack of regulatory mechanisms was not expected to result in population level effects in the foreseeable future, contrary to the conclusion of the Service in this case. *See* Endangered and Threatened (continued)

The Service has not produced any evidence that existing regulatory mechanisms cannot cope with changing habitat conditions in the foreseeable future. To the contrary, the Service reports that while some populations have been negatively affected by melting sea ice, other populations have increased in numbers in recent years. (Final Rule, ARL117221; ARL117300-01.) And no decline in overall population numbers has been shown to coincide with shifting Arctic sea ice occurrence.

According to the Service, no regulatory scheme can alter the trend in melting sea ice in the foreseeable future, including the ESA itself. In the Final Rule, the Service reported that because of the lag time between CO_2 emissions and climate impacts, climate change is already predetermined "out to 2050 and beyond." (ARL117292; ARL117248.) Moreover, when the Secretary of the Interior announced the listing of the polar bear he also declared the ESA will not "prevent sea ice from melting." (Press Release, ARL117188.)

The Service has failed to demonstrate that existing regulatory mechanisms are inadequate to protect a viable population of polar bears even in the face of projected reductions in sea ice. Nor could it where the Service has never defined a viable polar bear population. *See infra* at Section V.B. Unless the Service knows when a population is no longer viable, it cannot determine if existing regulatory mechanisms are inadequate to protect that population.

It is not enough for the agency to claim that existing regulatory mechanisms are inadequate to stop or curtail a threat (like loss of sea ice habitat) when empirical evidence shows that these regulatory mechanisms (i.e., treaties, conservation plans, and other federal, state and

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(footnote, con'td)
Wildlife and Plants; Proposed Threatened and Not Warranted Status for Distinct Population Segments of the Spotted Seal, 74 Fed. Reg. 53683, 53689-90 (Oct. 20, 2009).

foreign laws) have, and likely will, protect the polar bear population from a risk of extinction within the foreseeable future in the face of that threat.

IV. The Service Failed to Adequately Take Into Account Foreign Nations Programs As Required by ESA Section 4

ESA Section 4 sets forth the circumstances under which the Service shall determine whether to list a species as "threatened" or "endangered." Section 4(b), entitled "Basis for determinations," requires that the Service conduct its listing determinations using the best available commercial and scientific data and only "after taking into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species." 16 U.S.C. § 1533(b)(1)(A). The implementing regulations for the listing process, found at 50 C.F.R. § 424.11 and entitled "Factors for listing, delisting, or reclassifying species," expressly include "taking into account" as a criterion for listing a species as "threatened" or "endangered." 50 C.F.R. § 424.11(f). During the comment period for the polar bear listing process, Conservation Force and Safari Club submitted comments informing the Service of the scope of its duty to take into account foreign conservation programs before listing. (ARL152653; ARL124917-22.) Environment Canada, Nunavut, and the Northwest Territories also submitted material detailing the importance of trophy hunting to Canadian management strategies.[8] Despite these comments, the Service failed to separately take into account foreign nations' programs, especially Canada's management program, or explain why it failed to do so, in the Final Rule.

This Court reviews the reasonableness of the Secretary's interpretation of the ESA against Congress's expressed intent. Congress's intent that the Secretary "take into account"

[8] *See* Environment Canada at ARL111126-28; Nunavut at ARL061373-81; Northwest Territories at ARL059917-19.

foreign programs before listing a foreign species is made clear both by the plain language of the statute and by the Secretary's decision to include the "taking into account" requirement in the listing process under 50 C.F.R. § 424.11. Even if this statutory provision were ambiguous, this Court would not be required to defer to any interpretation that the Service may produce in this lawsuit. The D.C. Circuit has explained that deference "is not due when the [agency] has apparently failed to apply an important term of its governing statute." *Int'l Longshoremen's Ass'n, AFL-CIO v. Nat'l Mediation Bd.*, 870 F.2d 733, 736 (D.C. Cir. 1989).

The Service, unlike the Department of Commerce, which shares responsibility for interpreting this section, has never defined the phrase "taking into account" so that it may be applied in a consistent, objective manner. When, in 2003, the Service issued its "Policy for Evaluation of Conservation Efforts when Making Listing Decisions," it chose to apply that policy only to "formalized conservation efforts that have not yet been implemented or have been implemented, but have not yet demonstrated if they are effective at the time of a listing decision." (*Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)*, 68 Fed. Reg. 15100, 15113 (Mar. 28, 2003).) The Service has produced no interpretations, guidelines, or standards to define the scope of "taking into account" for longstanding, functional conservation programs and agreements. The "taking into account" requirement is completely separate from the factor D listing factor of "inadequacy of existing regulatory mechanisms," which the Service at least attempted to address in the polar bear listing. That factor is one of the five statutory factors listed at 50 C.F.R. § 424.11(c).

The requirement of "taking into account" foreign nations' programs *before* listing a species is separately specified at 50 C.F.R. § 424.11(f). The Service should have construed this requirement as encompassing more than a mere duty to examine the efficacy of a foreign

nation's regulatory program based on the different language Congress used in each section ("existing regulatory mechanisms" under factor D versus "efforts . . . to protect such species whether by predator control, protection of habitat and food supply, or other conservation practices" under the "taking into account" consideration of Section 4(b)(1)(A)).

Despite its independent duty of "taking into account" foreign nations' conservation programs, the Service has undertaken this accounting in only a handful of listing rules, all produced jointly with the Department of Commerce. The Department of Commerce, subject to precisely the same laws as the Department of the Interior, developed a policy that explains its duty to take foreign programs into account in each proposed rule. Not only does Commerce explain its duty, it also clarifies how it implements that duty into its decisionmaking on each final rule.[9] For example, when the Secretary of Commerce listed a distinct population segment of Maine Atlantic Salmon, the NMFS explained that in adhering to the listing process "we first assess a species' level of extinction risk and identify factors that have led to its decline," and that, "we then assess existing efforts being made to protect the species to determine if these conservation efforts improve the status of the species such that it does not meet the ESA's definition of a threatened or endangered species." 74 Fed. Reg. at 29377. The Service's failure to routinely explain the "taking into account" consideration in its listings further demonstrates the Service's failure to fulfill its duty under Section 4 in the Final Rule.

[9] *See, e.g., Notice of Finding on a Petition To List the Largetooth Sawfish (Pristis perotteti) as an Endangered or Threatened Species Under the Endangered Species Act,* 74 Fed. Reg. 37671-74 (July 29, 2009); *Determination of Endangered Status for the Gulf of Maine Distinct Population Segment of Atlantic Salmon*, 74 Fed. Reg. 29344-87 (June 19, 2009); *Proposed Endangered, Threatened, and Not Warranted Status for Distinct Population Segments of Rockfish in Puget Sound*, 74 Fed. Reg. 18516-42 (Apr. 23, 2009).

The Service has ignored its responsibility to take into account Canada's conservation efforts toward the polar bear. The Congressional Research Service, two of the Service's peer reviewers, the governments of Canada, Nunavut and the Northwest Territories, the IUCN polar bear specialist group and many others clearly notified the Service that a listing would harm efforts to conserve the polar bear.[10] In the Final Rule, the Service nevertheless listed the polar bear as "threatened" throughout its entire range over the vigorous protests of Canada and its territories, which are home to over two thirds of the world's polar bear, and whose management program depends heavily on the financial contributions of U.S. trophy hunters.

In response to an objection by one of its own peer reviewers that its decision might imperil the Canadian bear, the Service admitted that "without this program there would be a loss of funds derived from import fees; loss of economic incentives that promote habitat protection and maintain sustainable harvest levels in Canada; and loss of research opportunities in Canada and Russia, which are funded through sport-hunting revenue." (Final Rule, ARL117246.)

The Service's refusal to "take into account" Canada's management programs is evident in its statement that it could not consider the effects of listing on Canada's program because "the effect of the listing, in this case an end to the import provision under Section 104(c)(5) of the MMPA, is not one of the listing factors." (Final Rule, ARL117246.) The Service overlooked the fact that "taking into account" foreign nation programs is explicitly required by its own regulation at 50 C.F.R. § 424.11(f). An agency is required under the APA to "examine the relevant data and articulate a satisfactory explanation for its action." *FCC v. Fox Television*

[10] In the words of Eugene Buck, who compiled the report on the polar bear for the Congressional Research Service, "Canadian scientists and the Nunavut government strongly oppose the listing of polar bears under the Endangered Species Act, and the Service should not proceed in light of the negative impacts expected to result in their conservation programs." (ARL062120.)

Stations, Inc., 129 S. Ct. 1800, 1804 (2009). The Service's failure to perform its duty of "taking into account" the Canadian nation programs was arbitrary and capricious and a failure to consider the relevant factors and information in the Final Rule.

V. The Service's Use Of And Reliance On The USGS Population Forecasting Modeling Was Arbitrary And Capricious

The Service relied upon two modeling approaches to estimate the future status of polar bears. (ARL117276-79.) First, the Service used a deterministic Carrying Capacity Model ("CM") (*see Amstrup. et al.*, ARL082446-549) that applied "current polar bear densities to future . . . sea ice projections to estimate potential future numbers of polar bears." (Final Rule, ARL117276.) Second, the Service used a Bayesian Network Model ("BM") (*see* ARL082446-549) that included the same measures as the CM, but incorporated other polar bear population stressors, to estimate potential future numbers of polar bears. (Final Rule, ARL117276.)

When an agency uses a model in its decisionmaking process, it must "explain the assumptions and methodology used in preparing the model and, if the methodology is challenged, must provide a complete analytic defense." *United States Air Tour Ass'n v. F.A.A.*, 298 F.3d 997, 1008 (D.C. Cir. 2002) (quoting *Small Refiner Lead Phase Down Task Force*, 705 F.2d at 535). Furthermore, an agency's use of a model is arbitrary if it has no rational relationship to the reality it purports to represent. *Greater Yellowstone Coal.*, 577 F. Supp. 2d at 198 (reviewing National Park Service's use of modeling in preparing an environmental impact statement under the National Environmental Policy Act).

A. The Service Does Not Adequately Explain Or Support The Assumptions And Methodology Used In The Carrying Capacity Model

In the CM model, the Service assumed that current estimated polar bear densities will remain constant through time. (Final Rule, ARL117276.) "These density estimates were defined as 'carrying capacities' and applied to projected future sea ice availability scenarios using the

assumption that current 'carrying capacity' will apply to available habitat in the future." *Id.* Thus, the CM actually is not based on "carrying capacity" in the traditional sense, which is defined as "[t]he maximum number of individuals that a given environment can support without detrimental effects." (*See* The American Heritage Dictionary of the English Language, Fourth Ed., 2009, http://dictionary.reference.com/browse/carrying+capacity.) As Steven Amstrup, the developer of the CM, acknowledges, "you could avoid the term Carrying Capacity in this discussion by just stating that future numbers of polar bears in each ecoregion were projected forward in linear relationship to their current estimated densities." (ARL089955.) The CM merely provides a "density and habitat index" allowing a "straightforward comparison between the numbers of bears that are present now and the number of bears which **might** be present in the future." (ARL117276 (emphasis added).)

The Service does not explain or support its assumption that current estimated polar bear densities will remain constant through time, i.e., that every unit change in sea ice habitat will result in a corresponding unit change in polar bear population numbers, as opposed to changed polar bear densities (increased utilization of remaining habitat) or other outcomes. Indeed, the USGS report presenting the CM admitted that "the assumption that polar bear density would not change over time is almost certainly not valid." (ARL082463.) The Service struggled with this fundamental, yet invalid, assumption that a loss of polar bear habitat will lead to a corresponding linear loss of polar bear population.

For example, responding to the comment "[t]he assumption that polar bears are at carrying capacity is wrong," a Service draft of responses to comments on the USGS reports stated: "I doubt we have the data to say with absolute certainty that this statement is right or wrong." (ARL086435). James Mosher, the Deputy Assistant Secretary for Fish, Wildlife, and

Parks at the Department of the Interior, reviewed a draft of the Final Rule and expressed similar concerns. He stated that it "seems a gross correlation to relate ice acreage/extent to 'carrying capacity' - I'd defer to the USGS folks for their comfort level with this." (ARL090624-27.) Those "USGS folks" themselves expressed the limited utility of the CM model: "the carrying capacity model is not a demographic model, nor is it an estimation of actual, expected population sizes of polar bears. It is a calculation only of possible carrying capacity and changes thereof . . . ." (USGS Forecasting Report, ARL082463.) Gary Edwards, Acting Regional Director of the Service's Alaska Region, noted on a review draft of the Final Rule that "I'm having trouble with this [description of the Carrying Capacity Model] because it seems to be saying that so goes this carrying capacity so goes this number of bears. But doesn't carrying capacity represent the number of animals that the land can support and not the actual # of animals present?" (ARL085223.)

In response to the comment on the CM that "the assumption that polar bears are at carrying capacity is wrong [and that] [c]onsequently the results from the carrying capacity model are inaccurate" (ARL105025), the Service responded in conclusory fashion that "although the application of the term carrying capacity differs from the classical definition, it is well described and its use was appropriate for the analysis conducted," and "[t]he carrying capacity model accurately portrays trends in polar bear population based on their relationship (density) to sea ice." (ARL105025-26.) However, in a draft response to the State of Alaska's comments on the Service's use of the CM model, the Service cautioned that because of the assumptions on which the CM is based, "the carrying capacity model is not the preferred model and should not be used for outward forecasts." (ARL001589.) Inexplicably, this caution was deleted from the final Service response to Alaska. (*See* ARL011392-408.) As these record concerns from all levels of

the Service and the Department of the Interior show, together with the suppressed response to Alaska, the Service failed to address, or even fully disclose, the fundamental issue of whether polar bear density will remain the same over time, or whether current polar bear habitat is at capacity.

The Service cannot assume without adequate record support that the polar bear will be "threatened" by a loss of a certain percentage of habitat. This was the point made by the Ninth Circuit when reviewing the Service's listing decision for the flat-tailed horned lizard:

> It simply does not make sense to assume that the loss of a predetermined percentage of habitat or range would necessarily qualify a species for listing. A species with an exceptionally large historical range may continue to enjoy healthy population levels despite the loss of a substantial amount of suitable habitat. Similarly, a species with an exceptionally small historical range may quickly become endangered after the loss of even a very small percentage of suitable habitat.

Defenders of Wildlife v. Norton, 258 F.3d 1136, 1143 (9th Cir. 2001).

So too here, the polar bear has a historically large range and may continue to enjoy healthy population levels despite the loss of substantial habitat. The Service did not adequately address this consideration, and thus failed to consider relevant factors and information, and failed to ensure that the CM outputs were rationally related to the reality the model sought to represent.

B. The Service Does Not Adequately Explain Or Support Why The CM Outcomes Support A "Threatened" Determination

In the Final Rule, the Service provides that "[a]lthough the pattern of projected carrying capacity varied greatly among regions, the summary finding was for a range-wide decline in polar bear carrying capacity of between 10 and 22 percent by year 45," the period of the "foreseeable future" applied by the Service. (ARL117277.)

The Service fails to explain the significance of these projections or otherwise link them with the Service's finding that the polar bear is "threatened." For instance, the Service fails to

explain why a 10-22% reduction in "carrying capacity" by year 45 compels a finding that the species would be "in danger of extinction" at that point. The polar bear has recovered from populations of around 8,000-10,000 in 1965-70 to around 20,000-25,000 at present. (ARL117219.) This represents a 200-300% positive change in population, suggesting that much more than a 10-22% loss in "carrying capacity" or even population would be necessary to approach the "in danger of extinction" threshold for the polar bear.

As the Alaska Science Center (part of the USGS polar bear team) provided in its comments on the Service's draft final rule: "[w]hat we found to be missing is a clear linkage between the forecasted decline and the finding." (ARL080025.) Because the Service fails to make a "rational connection between the facts found and the choice made," or otherwise explain and support its conclusions based on the outcomes of the CM, its conclusions are arbitrary and capricious. *See Fund for Animals v. Norton*, 512 F. Supp. 2d at 53; *United States Air Tour Ass'n*, 298 F.3d at 1008; *Cook Inlet Beluga Whale*, 156 F. Supp. 2d at 20-21.

As this Court provided in *Cook Inlet Beluga Whale*, listing may be triggered "if the current population will continue to decline . . . **to levels warranting listing**." 156 F. Supp. 2d at 20 (emphasis added) (citing *Defenders of Wildlife v. Babbitt*, 958 F. Supp. 670, 682-85 (D.D.C. 1997) (requiring listing where lynx population not only had declined from its historic numbers, but was continuing to decline)). In *Cook Inlet Beluga Whale*, the Court recognized that under the ESA an agency is "not required by law to list any species with a historically small or a declining population." 156 F. Supp. 2d at 20. Thus, even though the Cook Inlet Beluga whale population had declined, and the NMFS was "unable to rule out factors that could contribute to a population decline," the court held that it was not arbitrary and capricious for NMFS to conclude that the whale population could sustain itself. *Id.* at 22; *see also Defenders of Wildlife v. Norton*, 258

F.3d at 1143. Similarly here, a 10-22% "carrying capacity" loss does not qualify the polar bear for listing.

Although the Service projects polar bear "carrying capacities" at various times in the future, it provides no baseline against which to compare these projections, such as the minimum viable population or the minimum amount of habitat to support a viable population. Without defining at what point the polar bear is likely to become in danger of extinction, or otherwise explaining and supporting its determination based on the outcomes of the CM, the Service's determination is not "rationally connected" to the outcomes of the CM, and is thus arbitrary and capricious. *See Fund for Animals v. Norton*, 512 F. Supp. 2d at 53.

C. The Service Does Not Adequately Support Its Reliance On The Outcomes From The Prototype BM

The second model utilized by the Service to estimate the future status of polar bears, the BM, fares no better. This model utilized the same data as the CM, but incorporated numerous other stressors on polar bear populations that were not incorporated in the CM. (*See* ARL117276.) As the Service recognizes in the Final Rule, the BM is just a "first generation prototype" that requires considerable additional refinement. (ARL117278; *see also* ARL117300 (same).)

> [B]ecause a BM combines expert judgment and interpretation with quantitative and qualitative empirical information, inputs from multiple experts are usually incorporated into the structure and parameterization of a 'final' BM. Because the BM . . . incorporates the input of a single polar bear expert, the model should be viewed as an 'alpha' level prototype [citations omitted] that would benefit from additional development and refinement.

(ARL117278; *see also id.* (BM "necessitat[es] inputs from multiple experts . . . before it can be considered final."); ARL117300 (same).) Also, the Service states that the following categories of uncertainty are "inherent to the carrying capacity and BM modeling:"

> (1) uncertainty in our understandings of the biological, ecological, and climatological systems;
>
> (2) uncertainty in the representation of those understandings in models and statistical descriptions; and
>
> (3) uncertainty in model predictions.

(ARL117278; *see also* ARL117300.) In other words, the Service admits the inherent uncertainty with the (1) underlying data; (2) the assumptions and methodology; and (3) the results of the BM.

As a result of these "caveats," the Service in the Final Rule itself discounts use of the BM as a tool for projecting future polar bear populations. (*See* ARL117278 ("However, because of the preliminary nature of the BM and levels of uncertainty associated with the initial Bayesian Modeling efforts, we do not find that the projected outcomes derived from the BM to be as reliable as [other data] . . . ."); ARL117300 (similar).) The Service also discussed internally the many ways to make the BM a more reliable model. For example, Peer Reviewer #4 of the USGS Reports (the record does not identify the reviewer by name) stated: "[h]ow the model 'behaved' is largely influenced by a single polar bear expert, Steven Amstrup. It would be an interesting exercise to 'model' the variability in outcomes based on input from different polar bear experts." (ARL082145.) Moreover, in editing responses to comments concerning the BM, Rosa Meehan, Service Division Chief for Marine Mammals Management, deleted a reference to "additional steps necessary to advance the [Bayesian Network] model." (ARL095792; ARL095796-97.) That deleted reference included these key items necessary for a record-supported consideration of the relevant factors to support an appropriate use by the Service of the BM results in the Final Rule:

> Further peer review of the alpha model by other subject-matter experts;

> Reconciliation of the reviews provided by other subject matter experts with the parameterization performed by the initial expert, and updating the model to a beta level that incorporates the inputs of other experts;
>
> Testing of the beta level model for accuracy with existing data (e.g. determining if it matches historic or current known conditions); and
>
> Updating the model to the next 'gamma' level with existing data or even to a delta level through incorporation of additional validation data from new field work or new analyses if available.

(ARL095796-97.)

The Service does not address these shortcomings in the Final Rule. Instead, the Service glosses over these limitations and relies in part on the BM to make its listing determination in the Final Rule. (*See* ARL117252 ("The overall direction and magnitude of threats to polar bears lead us to conclude that the species is threatened throughout its range . . . ."); *id.* ("On the basis of the best available scientific information derived from this preliminary model . . . we conclude that the species is not currently in danger of extinction throughout all or a significant portion of its range, but is very likely to become so within the foreseeable future."); *id.* at ARL117300 ("However, despite these limitations, we also recognize that the BM results are a useful contribution to the overall weight of evidence and likelihood regarding changing sea ice, population stressors, and effects.").) Yet it uses the BM model to support its finding of likely endangerment in 45 years. (ARL117278-79; ARL117300.) This represents a disconnect "between the facts found and the choice made." *See Fund for Animals*, 512 F. Supp. 2d at 53.

Likewise, the Service provides:

> [b]ecause the BM includes numerous qualitative inputs (including expert assessment) and requires additional development . . . we are more confident in the general direction and magnitude of the projected outcomes rather than the actual numerical probabilities associated with each outcome and we are also more confident in

> the outcomes within the 45-year foreseeable future than in outcomes over longer timeframes.

(ARL117278.) However, the Service fails to explain why it is more confident in the general direction and magnitude of the projected outcomes when the specific output of the BM is numerical probabilities. (*See* ARL117278.) The Service admits that it has less confidence in those underlying probabilities, as they are preliminary and uncertain. (*See id;* ARL117300.) The Service fails to explain how the "general direction and magnitude" of the BM results become more reliable than the actual projected outcomes.

The Service attempted to address this point by saying that because the general direction and magnitude of projected outcomes from the BM are "consistent with conclusions reached in the earlier assessments," that the conclusions in these documents thus "represent a consensus." (ARL117278-79.) However, the Service provides no support for the conclusion that simply because the BM reached the same general projections as "the earlier assessments," that this outcome supports use of and reliance on the BM. The Service could just as easily show that the same uncertainties and limitations are inherent in all the models, and that the Service is compounding those uncertainties and limitations by relying on the "consensus" of such approaches. After acknowledging all the limitations of the BM, the Service cannot resurrect it by using it for a purpose for which it was not intended, and by citing the consistency of its non-final, non-supported "general direction and magnitude" projections with other assessments. The Service gives no scientific or other basis as to how a rational connection exists between the facts found and the choice made.

Overall, the Service provides no objective basis as to why these non-final results should be used to support the Service's listing decision. Just as the court was troubled in *Carlton v. Babbitt*, 26 F.Supp.2d 102, 110 (D.D.C. 1998), by the Service taking inconsistent positions on

the viability of small population sets, so too here the Court should be troubled by the Service taking inconsistent positions on the use of the BM results. Thus, the Service also fails to establish that the BM has a rational relationship to the reality it purports to represent as is required to avoid the use of arbitrary modeling. *See Greater Yellowstone Coal.*, 577 F. Supp. 2d at 198; *see also Columbia Falls Aluminum Co. v. EPA*, 139 F.3d 914, 923 (D.C. Cir. 1998).

VI. The Service Failed To Consider The Best Scientific Data Available And Explain The Assumptions And Methodology Used To Determine That The Southern Beaufort Sea Population Is In A Declining Trend

In the Final Rule, the Service relied on three USGS reports to forecast a declining trend in the polar bear population in the Southern Beaufort Sea ("SBS"). This forecast was then used to presume a declining trend for other populations "which represent over one-third of the world's polar bears" (ARL117273), because those areas experienced similar sea-ice declines in recent years (*id.*). The Service made these projections even though it acknowledged that there was no present statistically-significant decline in the SBS polar bear population. To reach this conclusion, the Service relied on limited data sets from the available sea-ice cover and polar bear population and condition data in the SBS, and also downplayed the consequence of findings adverse to its conclusion, which findings suggested that there were not significant declining trends for the SBS population. This approach violated the Service's obligation to use the best available data, consider the relevant factors, and make a rational connection between the facts found and choice made in its listing determination.

To attempt to support its premise of a declining trend in the SBS population, the Service first sought to make a link between precursors to change noted in the Western Hudson Bay ("WHB") population prior to an observed population decline in that area. (*See, e.g.*, ARL011399.) The Service attributed the decline of the WHB population to increased natural mortality associated with earlier sea ice break-up and continued harvest of polar bears.

(ARL117271; *see also* ARL117242.) The Service identified evidence of declining body condition for polar bears in the WHB population to suggest that similar declining body conditions in other polar bear populations would be a precursor to decline. (*Id*.)

In studying the SBS polar bear population, the Service found some evidence of declining body conditions. (ARL117272-73.) This limited data on declining body conditions was compared to a small subset of recent data on sea ice conditions in the SBS. (*Id*.) Although not indicative of the full data set, the subset of recent data on sea ice conditions showed a trending decrease in sea ice. (*Id*.) By comparing declining body conditions to the trending decrease in sea ice, the Service correlated a curve of a decline in body conditions in relation to a decrease in sea ice over time. (*Id*.) Thus, the Service concluded that declining body conditions associated with decreasing sea ice would result in a declining population trend for SBS polar bears. (*Id*.)

For its conclusion that "declines in vital rates associated with longer ice-free periods have ramifications for the trend of the SBS population (i.e., result in a declining population trend)," the Service relied on only five years of data (ARL117273), although much more data was available. (*See* ARL117272 (discussing data on "[s]urvival rates, weights, and skull sizes" dating back to 1967).) Five years of data is not the "extensive time series of data," ARL117270, that the Service acknowledges is necessary for quantification of potential demographic effects of sea ice changes. Even the Service recognizes, "[t]he short duration of the study (5 years) introduced uncertainty associated with the logistic relationship between the sea ice covariate and survival." (ARL117273.) In simpler terms, the Service admits that the relationship it finds between population growth rate and the number of ice-free days for the SBS is highly uncertain. Yet, the Service does nothing to correct for this uncertainty, despite available data, and despite

indications that the relationship it posits is contrary to the reality of the phenomena it purports to be studying.

The Service's failure to use the best available data and failure to adequately address uncertainty is best illustrated by figures from two USGS reports relied on by the Service, Hunter et al. (2007) (ARL082291-341) and Regehr et al. (2007) (ARL131467-516.) As relied on by the Service, Figure 6 from Hunter, presented below, focuses on only five years of data (from 2001-2005) to develop a population growth rate curve as a function of the number of ice-free days for the Southern Beaufort Sea area. (*See* ARL082325.)

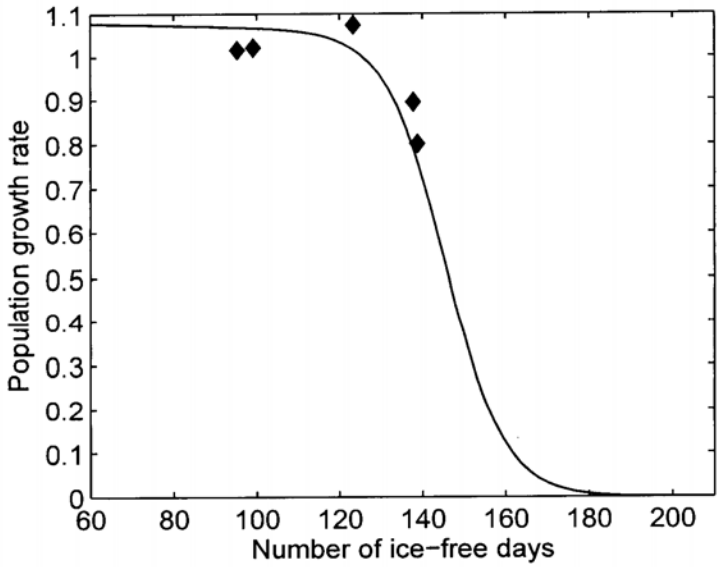

Figure 6: Solid line: population growth rate λ as a function of the ice covariate estimated from the full model set. Diamonds: population growth rate estimated for 2001–2005 from the non-covariate model set.

(ARL082325.)

By using only five years of data, the Service developed a logistic relationship predicting that the SBS population would decline as a result of an increasing number of ice-free days. Taking "the average observed frequency of bad sea ice years (0.21)" from those five years of

data, the Service predicts "a gradual population decline of about one percent per year" in the future. (ARL117300.) The Service's use of this limited data overstates the trend of increasing number of ice-free days which forms the basis for its logistic relationship. More extensive data (from 1979-2006) shown in Figure 3 below from Regehr et al., indicates that, in fact, there is not a significant increasing trend in the number of ice-free days in the SBS area.

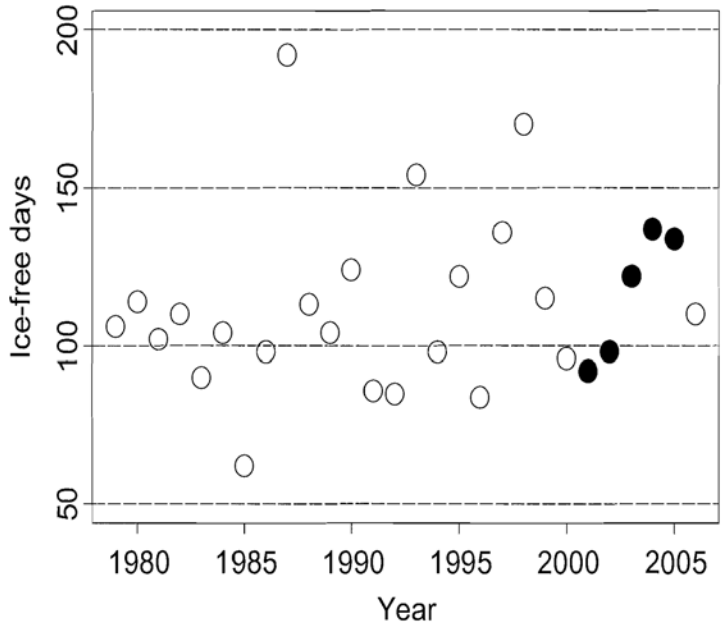

Figure 3. Number of ice-free days per year (i.e., the covariate *ice*) over the waters of the continental shelf within the southern Beaufort Sea polar bear management unit from 1979 to 2006.

ARL131497. The data points indicated by "black dots" indicate the data points utilized by the Hunter report to develop the claimed relationship between population growth rate and the number of ice-free days for the SBS. (*Id.*)

Also, Figure 4 of Rode et al. (2007) (ARL131706) shows a non-significant trend in the percentage of days with greater than 50% ice concentration over the continental shelf of the SBS. The Service acknowledged in its individual responses to the State of Alaska's comments, after

publication of the Final Rule, that "the increasing trend in the number of ice-free days was not statistically significant from 1979-2006." ARL011400 (emphasis added).

Considering all of the available sea ice data from 1979-2006, there is not a statistically significant trend in the number of sea ice-free days per year. Thus, there similarly should not be a significant link between predicted population growth rate and changes in the number of ice-free days over time. (ARL011400; *see also* ARL117273 ("the Rode et al. (2007, p.10) sea ice metric did not exhibit a significantly negative trend over time").) Further, the Service confirmed for the SBS polar bear population that "not all sex/age classes showed declines over time or relationships to sea ice. The relationships or absences of a relationship did not vary in direction or rate." (ARL011403.) Thus, the available data in these studies actually do not indicate a significant trend in the number of sea ice-free days, or related population decline in the SBS population. Instead, the available data indicate that the SBS population over the past 20 years has been stable.

As the Service itself was forced to admit, "the Southern Beaufort Sea population remains fairly large, that reproduction and recruitment is still occurring in the population, and that changes in the sea ice have not yet been associated with changes in the size of the population." (ARL117301.) Given these Service admissions and the actual findings of the science cited by the Service, it was arbitrary and capricious for the Service to rely on these USGS reports as evidence of a decline in either the SBS polar bear population or the number of ice-free days per year in this area.

The data utilized by the Service on potential demographic effects of sea ice change on polar bear reproductive and survival rates (vital rates) do not show the trend predicted by the Service. (ARL117270.) The Service indicates that, in general, declines in physical condition are

predicted to initially affect female reproductive rates and juvenile survival and then under more severe conditions adult female survival rates. (*Id*.) Yet the Service states, "cub production increased over time" for the SBS polar bear population (ARL117273), and there has not been a statistically significant decline in juvenile or adult female survival rates (*see* ARL117272). Although the Service presents evidence that certain physical conditions of male and female polar bears may be decreasing over time, these conditions have not been shown to be affecting "female reproductive rates and juvenile survival and then under more severe conditions adult female survival rates," as predicted. (ARL117270.)

The evidence presented by the Service is either not significant or is contradicted by other evidence presented by the Service. For example, based on studies by Regehr et al. (2006), the Service found that from 1990-2006 body weights for adult males decreased, and skull measurements were reduced. (ARL117272; *see also* ARL117242.) But based on studies by Rode et al., the Service concludes that from 1982-2006 "[c]ondition of adult males 11 years and older and of adult females **did not** decline," and further, "[a]dult body mass was **not** related to sea ice cover and **did not** show a trend with time." (ARL117272-73 (emphasis added).) Also, Regehr et al. (2007) indicated a relationship between the number of ice-free days in the SBS area and breeding probability of females without cubs from 2001-2006, but were unable to show a significant relationship between the number of ice-free days and survival rates of subadult males and females and adult males for that same time period. (ARL01140-01; ARL117272-73.)

Overall, the Service concludes that population stress factors on SBS polar bears will be negatively impacted by retreating sea ice. (ARL117273.) But in reaching this conclusion, the Service fails to ensure that the conclusions it makes comport with the reality of the observed data and observational studies. The Service relies on a limited subset of data to suggest a trend in

increasing number of ice-free days, even though no trend is apparent from the larger set of data. It also ignores or downplays contradictory data on polar bear condition to reach its conclusion. The Service must explain and support how the population trend models it used rationally relate to the current observations indicating that there is no trending decline in sea ice and no trending decline in polar bear vital rates. *Cook Inlet Beluga Whale*, 156 F. Supp. 2d at 19 ("[T]he Court must consider whether the agency . . . adequately explained its decision, based its decision on facts in the record, and considered the relevant factors.") (citation omitted). Because the Service has failed to use the best available data, and failed to adequately explain and support its use of the population trend models, its determination that the SBS polar bear population is in decline is arbitrary and capricious. Thus, the Service's determination regarding other polar bear populations based on this SBS population analysis is similarly arbitrary and capricious.

Conclusion and Relief Requested

The Service's decision in issuing the Final Rule, as described above, was arbitrary and capricious, constituted an abuse of discretion, and was otherwise not in accordance with law. When an agency violates statutory rulemaking requirements, the Court may "hold unlawful and set aside agency action." *See* 5 U.S.C. § 706. Thus, the Final Rule should be vacated while it is remanded to the Service for further consideration under the appropriate legal standards and procedures.

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Respectfully submitted,

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