THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

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CENTER FOR
FOOD SAFETY

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Comments to FWS on the *Draft Environmental Assessment for Mosquito Control at Bandon Marsh National Wildlife Refuge*

April 9, 2014

Dear Ms. Nagel:

The Xerces Society for Invertebrate Conservation (Xerces) and the Center for Food Safety (CFS) hereby submit these comments regarding the U.S. Fish and Wildlife Service (FWS)'s draft *Environmental Assessment (EA) for Mosquito Control at Bandon Marsh National Wildlife Refuge*.

We are pleased that U.S. Fish and Wildlife Service (FWS) is attempting to implement an Integrated Marsh Management plan including mosquito monitoring, correcting restoration errors by expanding the tidal channel network, and excluding the use of adulticides. Still, we have significant concerns with the EA and with the preferred alternative in particular. While we recognize that the mosquitoes are a nuisance, the EA strongly overstates potential health threats, as there is no reasonable risk of mosquito-borne disease in the county at this time. If proper surveillance of egg hatch and larval populations is done, appropriately timed and targeted

applications of *Bacillus thuringiensis israelensis* (Bti) will reduce mosquito numbers without the need to resort to more toxic options such as methoprene and/or CocoBear.

Furthermore, the EA fails to provide an adequate evaluation of risk to the Refuge's ecosystem if Alternative A, the Preferred Alternative, is implemented. In part this is due to the high level of uncertainty caused by lack of detail around the trigger for, and duration of, pesticide use. Neither Alternative A nor B sufficiently describe the parameters of how, where, and when pesticides will be used. The uncertainty of risk coupled with the controversy around treating nuisance mosquitoes on the Refuge's land warrants a full Environmental Impact Statement (EIS).

However, we would not oppose FWS proceeding with Alternative *B: Mosquito Control Without Synthetic Larvicides*, if clear parameters on the use of the larvicide Bti are provided in the Final EA.

Expertise of Commenting Organizations

Xerces is an international nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. For over forty years, Xerces has been at the forefront of invertebrate protection worldwide, harnessing the knowledge of scientists and the enthusiasm of citizens to implement conservation programs.[1] Our work is extremely effective; we have protected thousands of acres of critical habitat for endangered invertebrates including butterflies, tiger beetles and aquatic insects; helped restore, enhance and protect more than 60,000 acres of pollinator habitat in agricultural landscapes; and reached tens of thousands of people through workshops, short courses and seminars.

CFS is a national nonprofit public interest and environmental advocacy organization working to protect human health and the environment by curbing the use of harmful food production technologies.[2] In furtherance of this mission, CFS uses legal actions, groundbreaking scientific and policy reports, books and other educational materials, and grassroots campaigns, on behalf of its 360,000 members. CFS is a recognized national leader on the issue of improper pesticide use in National Wildlife Refuges.[3]

I. INTRODUCTION

In the summer of 2012, Bandon Marsh National Wildlife Refuge experienced an increase in nuisance-biting mosquitoes in the Bandon area, primarily the summer salt marsh mosquito *Aedes dorsalis*. The increased mosquito populations were believed to result from the inadvertent creation of new breeding habitat during a salt marsh restoration project on the Refuge. Mosquito numbers remained high in 2013, and early in the summer FWS initiated a monitoring effort with Oregon State University.

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[1] *See generally* www.xerces.org.
[2] *See generally* www.centerforfoodsafety.org.
[3] *See http://www.centerforfoodsafety.org/press-releases/2934/center-for-food-safety-files-groundbreaking-legal-action-to-protect-national-wildlife-refuges.*

The increased mosquito production created significant public outcry. Public pressure included: contact from the offices of Governor Kitzhaber, Congressman DeFazio, and Senator Merkley; a resolution passed by the City of Bandon demanding immediate action be taken to reduce mosquito numbers; and the release of a Public Health Advisory by Coos County Public Health, based on, to our understanding, the fact that some people had bites that became infected after they were scratched.

In response, the FWS in consultation with Coos County Public Health proposed widespread spraying of two insecticides: methoprene, an insect growth regulator that kills the juvenile stages of aquatic insects; and Dibrom, a broad-spectrum organophosphate pesticide that kills flying adult mosquitoes. The proposal included the use of methoprene at the Refuge, and the use of Dibrom over a 10,000 acre area that included homes, gardens, state parks, and farmlands.

The use of pesticides was strongly opposed both for health and economic reasons, as well the fact that by fall, at least half of the pools that had produced mosquitoes were dry, and the number of adult mosquitoes had already decreased substantially. As a result, the proposal to spray adulticide was dropped, and ultimately 290 acres Ni-les'tun Unit of the marsh were treated with methoprene.

At the time of spraying both larval and adult mosquito numbers were much lower due to normal seasonal changes, and thus the benefit of this late-season treatment is questionable. In addition, the stated draft policy for mosquito management at refuges across the nation is "we will allow populations of native mosquito species to function unimpeded unless they cause a human and/or wildlife health threat.''[4]

FWS completed a post-treatment National Environmental Policy Act (NEPA) compliance document in November 2013. The draft EA for further mosquito management was released on March 11, 2014.

II. STATUTORY BACKGROUND

National Environmental Policy Act

NEPA requires a federal agency such as FWS to prepare a detailed environmental review for all "major Federal actions significantly affecting the quality of the human environment."[5] NEPA "ensures that the agency . . . will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger [public] audience."[6]

[4] Federal Register. 2007. Department of the Interior, Fish and Wildlife Service, Draft Mosquito and Mosquito-borne Disease Management Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997. *Fed. Reg.* 72 (198):58321 – 58333.
[5] 42 U.S.C. § 4332(2)(C).
[6] *Robertson v. Methow Valley Citizens Council,* 490 U.S. 332, 349 (1989).

If the federal action may significantly affect the environment, FWS must prepare an EIS.[7] As a preliminary step, an agency may prepare an EA to decide whether the environmental impact of a proposed action is significant enough to warrant preparation of an EIS.[8] If an agency decides not to prepare an EIS, it must supply a "convincing statement of reasons" to explain why a project's impacts are insignificant.[9] "The statement of reasons is crucial to determining whether the agency took a "hard look" at the potential environmental impact of a project."[10] An EA must "provide sufficient evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact."[11] NEPA regulations require the analysis of direct and indirect, as well as cumulative, effects in NEPA documents, including EAs.[12] The assessment must be a "hard look" at the potential environmental impacts of its action.[13] FWS's decisions in the EA must be "complete, reasoned, and adequately explained."[14]

Whether there may be a significant effect on the environment requires consideration of two broad factors: context and intensity. "Context" means that "the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality . . . . Both short- and long-term effects are relevant."[15] In addition, a number of factors should be considered in evaluating intensity, including "[t]he degree to which the proposed action affects public health or safety," "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial," "[t]he degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks," "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts," "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts," and "[t]he degree to which the action may adversely affect an endangered or threatened species or its habitat."[16] An action may be "significant" if even one of these factors is met.[17]

A thorough consideration of cumulative impacts is required in the preparation of an EA.[18] Specifically, an EA must provide a quantified assessment of project's environmental impacts when combined with other projects.[19] Notably, courts and the Council on Environmental Quality (CEQ) emphasize that a detailed cumulative impacts analysis is especially important in an EA, because there is a much higher risk of cumulative impacts resulting from many smaller decisions

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[7] *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1150 (9th Cir. 1998) (citation omitted); *Steamboaters v. U.S. Fed. Energy Regulatory Comm.*, 759 F.2d 1382, 1392 (9th Cir. 1985).
[8] 40 C.F.R. § 1508.9.
[9] *Save the Yaak v. Block*, 840 F.2d 714, 717 (9th Cir. 1988).
[10] *Id.*
[11] *Id.*
[12] *See* 40 C.F.R. §§ 1508.8, 1508.9, 1508.13, 1508.18.
[13] *Blue Mountains Biodiversity v. Blackwood*, 161 F.3d 1208, 1211 (9th Cir. 1998); *Nat'l Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 731 (9th Cir. 2001) (quoting 40 C.F.R. § 1508.27).
[14] *Nw. Coalition for Alternatives to Pesticides v. U.S. Envtl. Ptor. Agency*, 544 F.3d 1043, 1052 n.7 (9th Cir. 2008).
[15] 40 C.F.R. § 1508.27(a).
[16] *Id.* § 1508.27(b)(2), (4), (5), (6), (7), (9). "Human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment." *Id.* § 1508.14.
[17] *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 361 F.3d 1108, 1125 (9th Cir.2004); *see also Nat'l Parks & Conservation Ass'n*, 241 F.3d at 731 (either degree of uncertainty or controversy "may be sufficient to require preparation of an EIS in appropriate circumstances").
[18] *See, e.g., Kern v. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002).
[19] *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 972 (9th Cir. 2006).

for which EAs are prepared.[20] The cumulative impact analysis must also include an assessment of potential aesthetic, historic, cultural, economic, social, and health impacts.[21]

Council on Environmental Quality

NEPA established the CEQ and charged it with the duty of overseeing the implementation of this statute.[22] The regulations subsequently promulgated by CEQ[23] implement the directives and purpose of NEPA, and "[t]he provisions of [NEPA] and [CEQ] regulations must be read together as a whole in order to comply with the spirit and letter of the law."[24] CEQ's regulations are applicable to and binding on all federal agencies.[25] Among other requirements, CEQ's regulations mandate that federal agencies address all "reasonably foreseeable" environmental impacts of their proposed programs, projects, and regulations.[26] Direct effects are those that are caused by the action and occur at the same time and place.[27] Indirect effects are those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.[28] A cumulative impact constitutes the impact on the environment that results from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[29]

CEQ's regulations clearly lay out the purpose environmental review under NEPA. "The primary purpose of an environmental impact statement is to serve as action-forcing devices to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government."[30] An EIS shall provide "full and fair discussion of significant environmental impacts and shall inform decision makers of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[31] Agencies are to focus on "significant environmental issues and alternatives."[32]

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[20] *See, e.g.*, *Native Ecosystems Council v. Dombeck*, 304 F.3d 886 (9th Cir. 2002); *Kern*, 284 F.3d. at 1076, 1078 (emphasis in original) (quoting CEQ, Considering Cumulative Effects Under the National Environmental Policy Act at 4, January 1997) ("Given that so many more EAs are prepared than EISs, adequate consideration of cumulative effects requires that EAs address them fully. Without such individually minor, but cumulatively significant effects, "it would be easy to underestimate the cumulative impacts" of the action . . . and 'of other reasonably foreseeable future actions, on the [environment].'").

[21] 40 C.F.R. § 1508.8; *see e.g.*, *id.* § 1508.14 (when "economic or social and natural or physical environmental are interrelated," then the NEPA analysis must discuss "all of these effects on the human environment); *Wyoming v. U.S. Dept. of Agric.*, 661 F.3d 1209, 1251 (10th Cir. 2011) (explaining that a cumulative impacts analysis must consider all of the effects listed at 40 C.F.R. section 1508.8).

[22] *See* 42 U.S.C. §§ 4321, 4344.

[23] 40 C.F.R. §§ 1500–08.

[24] *Id.* § 1500.3.

[25] *Id.* §§ 1500.3, 1507.1; *see, e.g.*, *Hodges v. Abraham*, 300 F.3d 432, 438 (4th Cir. 2002).

[26] *See* 40 C.F.R. §§ 1502.4, 1508.8, 1508.18, 1508.25.

[27] *Id.* § 1508.8(a).

[28] *Id.* § 1508.8(b).

[29] *Id.* § 1508.7.

[30] *Id.* § 1502.1.

[31] *Id.*

[32] *Id.*

Endangered Species Act

As recognized by the Supreme Court, the Endangered Species Act (ESA) is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[33] Federal agencies are obliged "to afford first priority to the declared national policy of saving endangered species."[34]

Section 7(a)(2) of the ESA requires every federal agency to consult the appropriate federal fish and wildlife agency, i.e. FWS, in the case of land and freshwater species and the National Marine Fisheries Service (NMFS), to "insure" that the agency's actions are not likely "to jeopardize the continued existence" of any listed species or "result in the destruction or adverse modification" of critical habitat.[35] To facilitate compliance with section 7(a)(2)'s prohibitions on jeopardy and adverse modification, the ESA requires each federal agency that plans to undertake an action to request information from FWS "whether any species which is listed or proposed to be listed [as an endangered species or a threatened species] may be present in the area of such proposed action."[36] If FWS advises the agency that listed species or species proposed to be listed may be present, the agency must then prepare a biological assessment for the purpose of identifying any such species that are likely to be affected by the proposed agency action.[37]

If an agency determines that its proposed action may affect any listed species and/or their critical habitat, the agency generally must engage in formal consultation with FWS.[38] At the end of the formal consultation, FWS must provide the agency with a "biological opinion" detailing how the proposed action will affect the threatened or endangered species and/or critical habitats.[39]

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements the obligations of the U.S. under several international treaties and conventions for the protection of migratory birds.[40] It mandates that proposed projects must avoid the take of migratory birds entirely and must minimize the loss, destruction, and degradation of migratory bird habitat.[41] The vast majority of U.S. native birds are protected under the MBTA, even those that do not participate in international migrations.[42] Under the MBTA, "[n]o person may take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such bird except as may be permitted under the terms of a valid permit."[43]

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[33] *Tenn. Valley Authority v. Hill*, 437 U.S. 153, 180 (1978).
[34] *Id.*
[35] 16 U.S.C. § 1536(a)(2); *see also* 50 C.F.R. § 402.01(b).
[36] 16 U.S.C. § 1536(c)(1); *see also* 50 C.F.R. § 402.12(c).
[37] *Id.*
[38] 50 C.F.R. § 402.14.
[39] 16 U.S.C. § 1536(b); 50 C.F.R. § 402.14.
[40] 16 U.S.C. § 701.
[41] *Id.* § 701–12.
[42] *See* 50 C.F.R. § 10.13.
[43] *Id.* § 21.11.

Administrative Procedure Act

The Administrative Procedures Act (APA) sets forth standards that govern judicial review of decisions made by federal agencies.[44] The APA provides that "[a] person suffering legal wrong because of agency action, or adversely affected or aggrieved within the meaning of a relevant statute, is entitled to judicial review thereof."[45] Under the APA, an agency decision is unlawful if it is arbitrary or capricious or fails to follow procedures required by law.[46] Agencies must "articulate a rational connection between the facts found and the choice made."[47] An agency's decision is unlawful if it, *inter alia*, "entirely fail[s] to consider an important aspect of the problem," "fail[s] to offer any explanation" about an important aspect of the problem, or "offer[s] an explanation for its decision that runs counter to the evidence before the agency."[48]

National Wildlife Refuge System Improvement Act of 1997

The National Wildlife Refuge System Improvement Act of 1997 requires FWS to prepare a "comprehensive conservation plan" for each unit within 15 years and to update each plan every 15 years or sooner if conditions change significantly.[49] Once approved, the unit plan becomes a source of management requirements that bind the agency.[50] FWS would, barring an emergency, have to modify a plan before it could approve an action that conflicts with the plan.[51]

The Comprehensive Conservation Plan for the Refuge (Bandon CCP) includes an explicit directive specifying the narrow circumstances under which pesticide use will be allowed – limiting them to human health threats. However, in discussing threats to human health, the Bandon CCP exclusively refers to such threats in terms of mosquito-borne disease.[52]

Golden and Bald Eagle Protection Act

The Bald and Golden Eagle Act, enacted in 1940, protects eagles from human activities that interfere with their ability to hunt, roost, nest, or reproduce, and includes a prohibition against disturbance. One of the eight categories of activities specified as likely to cause disturbance is "helicopters and fixed-wing aircraft" (Category G), which would include those used for aerial pesticide applications. FWS published additional bald eagle management guidelines in 2007.[53] Under these Guidelines, the Act may be used to impose limitations on areas where pesticide applications may or may not be administered.

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[44] 5 U.S.C. § 706.
[45] *Id.* § 702.
[46] *Id. § 706(2)(A), (D).*
[47] *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mutual Auto. Ins. Co., 463 U.S. 29, 43, 59 (1983).*
[48] *Id. at 43, 56.*
[49] 16 USCA § 668dd § 7(e)(1)(A)(iv), § 7 (e)(1)(E).
[50] *Id.* § 7(e)(1)(E).
[51] *Id.* § 8(a).
[52] *Id. at 2-6 & 2-7 (referring to "disease surveillance, and treatments," "mosquito-borne disease outbreaks," and "mosquito-borne diseases").*
[53] *FWS. 2007. National Bald Eagle Management Guidelines. 25 pp. Washington D.C. U.S. Fish and Wildlife Service.*

III. COMMENTS

A. Risk of Mosquito-borne Disease is Overstated in the Draft EA, Leading to Inappropriate Decisions on Needed Risk Reduction Measures

Mosquito-borne diseases should always be monitored and infective vector populations treated accordingly, but treatment must be performed in the context of real risk.

The EA overstates issues around malaria. Malaria, which is mentioned as a disease risk in the EA (EA, pp. 49-50), was officially eradicated from the US in the 1950s. While travelers abroad may acquire malaria, there is no known endogenous source of the malaria parasite in this country, and none of the mosquito species noted as being present at the Refuge are in the genus *Anopheles*, which is the only genus that can vector malaria.

The EA also overstates the concern for West Nile virus in the Bandon area. The EA states on page 11: "In 2012, the one and only Coos County case of human West Nile virus infection was detected in the Bandon area." However, on page 49, the EA clarifies that the location where the person contracted the disease is "unclear." In 2013, there were no cases of West Nile virus in Coos County; indeed, in the entire state of Oregon there were only two human cases and six equine cases.[54] In addition, the primary vector of West Nile virus in the United States is mosquitoes in the genus *Culex*; 90% of the mosquitoes emerging from Bandon Marsh are *Aedes dorsalis*, which is not known as an important vector of the disease.

The EA also discusses other mosquito-borne diseases. "Western equine encephalitis and St. Louis encephalitis viruses, both of which can be transmitted by mosquitoes, are the primary types of encephalitis found in California residents, but were not detected in Oregon in 2013 (USGS 2013)." (EA, p. 11). The actual risk of these diseases in Coos County is minimal to non-existent. The Centers for Disease Control and Prevention and the U.S. Geological Survey provide data and trends on these diseases. Since 1964 there have only been approximately five human cases per year of Western Equine Encephalitis reported in the *entire* United States. From 1964 to 2010, there have been only two human cases of St. Louis Encephalitis reported in Oregon, and in 2013 there were no St. Louis Encephalitis cases in the entire United States. Furthermore, the majority of mosquito species produced in 2013 at Bandon Marsh are not known as important vectors of these viruses.

B. FWS Failed To Comply with the Bandon CCP

The Bandon CCP clearly states that:

> Under draft refuge policy (72 FR 71939), mosquito populations on refuge lands are allowed to fluctuate and function unimpeded unless they pose a threat to wildlife and/or human health . . . ***To protect human and wildlife health and safety***, the state or a local vector control agency would be allowed to control mosquito populations on refuge lands using pesticide treatments (larvicides,

[54] Human cases: http://diseasemaps.usgs.gov/wnv_us_human.html Equine cases: http://diseasemaps.usgs.gov/wnv_us_veterinary.html

> pupacides, or adulticides) ***only if local, current population monitoring and/or disease surveillance data indicate refuge-based mosquitoes pose a health threat to humans*** and/or wildlife.[55]

The Preferred Alternative A in the EA contradicts these stated goals. FWS has broadly defined "Health Threat" under the EA as follows:

> Health Threat. An adverse impact to the health of human, wildlife, or domestic animal populations from mosquito-borne disease identified and documented by federal, state, and/or local public health authorities. Health threats are locally derived and are based on the presence of endemic or enzootic mosquito-borne diseases, including the historical incidence of disease, and the presence and abundance of vector mosquitoes. Health threat levels are based on current monitoring or vectors and mosquito-borne pathogens. ***We refer to "adverse impact" in terms of non-disease health impacts to humans from mosquito bites.*** (EA, pp. 9 -10. Emphasis added).

The highlighted language demonstrates that FWS's definition extends far beyond the intent of the Bandon CCP, which equates "health threats" with mosquito-borne illness or disease. There is no indication in the Bandon CCP that a "health threat" includes any lesser effects, including the nuisance effects encompassed by the EA's use of the "adverse impacts" language. Accordingly, FWS has impermissibly attempted to extend its delegated authority to resort to pesticide use far beyond the bounds of what would be allowed based on the Bandon CCP.

C. Alternative B, with the Inclusion of Clearly Defined Treatment Thresholds and Use Parameters, is the Appropriate Method to Respond to the Temporary Increase in Mosquito Abundance

While the use of insecticides to control nuisance mosquitoes is not supported by national wildlife refuge mosquito management guidelines, this case is somewhat unique in that new breeding habitat highly suitable for *Aedes dorsalis* was created inadvertently by Refuge staff in the course of a marsh restoration project, thus causing what could be interpreted as unnaturally high numbers of mosquitoes in the area.

We fully support the stated national wildlife refuge guidelines that acknowledge native mosquitoes as an important part of wetland ecology and allow them to function unimpeded in the absence of a public health emergency. However, we realize that *Aedes dorsalis* is a determined and aggressive day-biting mosquito that can fly several miles from its emergence site, and that the daily activities of many Bandon residents were rendered unpleasant by the unusually large numbers of mosquitoes produced in 2013 at the Bandon Ni-Les'tun Unit. In light of this fact, and because the mosquito production occurred as the unintended result of a habitat restoration project that is scheduled to be remediated in 2014 and 2015, we recognize that FWS is under

[55] See Bandon Marsh National Wildlife Refuge Comprehensive Conservation Pan ("Bandon CCP", pp 2 – 6) (Emphasis added).

tremendous pressure to address current mosquito issues during the period that they conduct remediation to remove these introduced breeding areas from the habitat.

1. Bti is an Effective and Least-Toxic Targeted Larvicide that Meets FWS Objectives for Reducing Adverse Impact Caused by Mosquito Bites and Maintains the Integrity of the Salt Marsh

Bti is a more targeted, less-toxic pesticide known to be extremely effective at killing early life stages (instars) of mosquito larvae. Rational use of Bti would provide effective management of mosquito populations at the Refuge with a minimal number of applications. Monitoring now at sites already known as mosquito-producing pools will enable FWS staff to note the first hatch of overwintered mosquito eggs, at which point specific spot-treatment with Bti could be done to substantially reduce larval numbers and thus prevent adult emergence.

Continued monitoring will enable subsequent hatches of overwintering eggs (as egg hatch is not 100% synchronous in species such as *Aedes dorsalis*) to be noted and treated again with Bti if larval abundances reach high levels. In the absence of a new generation of biting, breeding females, the egg bank would be depleted and mosquito numbers would return to normal.

We believe that, given the circumstances, *Alternative B: Mosquito Control Without Synthetic Larvicides* which prescribes the use of only *Bacillus thuringiensis israelensis* (Bti) is the only acceptable pesticide option. However, additional parameters must be incorporated into Alternative B, requiring that Bti only be used in accordance with the accepted tenets of Integrated Pest Management.

These specific required elements are lacking in the EA: a description of which Bti product(s) will be used (identified by the EPA registration number) and how often the product(s) will be applied; a statement that applications will be limited to only the Ni-les'tun Unit of the Refuge; a defined threshold abundance of mosquito larvae and/or adults that will trigger treatment; and a set timeframe to end treatments in order to allow native mosquito populations to function unimpeded for the good of the wildlife Congress set aside this refuge to preserve.

These parameters must be included as part of effective integrated management protocol. Detailed discussion of these items is presented in subsequent sections.

2. The Management Plan Must Include Limits on Application Area to the Mosquito Source Pools Created by Earlier Restoration Efforts in the Ni-les'tun Unit.

The basis for the treatment is that the restoration created new mosquito breeding habitat that was not the intended or anticipated result of restoration; therefore, mosquito management should be limited to the restoration area. (EA, p. 1). Language in several parts of the EA indicates that the treatment area could be larger than the Ni-les'tun Unit and include natural ponds that already exist elsewhere on the Refuge. We strongly oppose treatment in these areas.

One example supporting our concern that habitat outside the Ni-Les'tun Unit would be treated is the statement "On-refuge treatment locations would be based on surveys that identify

areas that are being used for breeding." (EA, p. 26). This statement is very broad and could include numerous sites outside the scope of controlling mosquitoes that are breeding in the pools created inadvertently during a specific restoration project.

The EA notes that prior to this restoration project, mosquito production on the Refuge was never an issue with the public (EA, p. 11), which strongly suggests that existing mosquito populations within the rest of the marsh are regulated by natural factors. The ponds producing mosquitoes within the Ni-Les'tun Unit were mapped in previous years. Continued monitoring of these ponds in conjunction with work done simultaneously to remediate these introduced breeding sites will enable Refuge staff to know with certainty when source reduction and treatment with Bti have once again returned mosquito abundances to levels below threshold.

3. Early and Consistent Monitoring Is a Required Component of Integrated Pest Management

While the draft EA outlines monitoring efforts to be done by Coos County Public Health (CCPH), which currently lacks both the knowledge and trained staff to do so, it also states that this monitoring may not be feasible. Monitoring is at the core of any Integrated Pest Management effort, and in the absence of thorough monitoring, the proposed plan cannot be implemented with any reasonable expectation of success.

Monitoring early in the season allows the exact timing of the hatching of overwintering eggs to be noted, and provides data about larval abundances that is vital for knowing if and when treatment with Bti is needed. Furthermore, regular monitoring enables treatments to be applied when mosquito larvae are most susceptible to the effects of Bti, i.e. during the earlier (first and second) instars, and post-treatment monitoring allows treatment efficacy to be determined.

In addition, it is impossible to provide any credible presentation of disease risk without knowing which species of mosquitoes are present, whether they are important vectors of any mosquito-borne disease, and whether such disease pathogens are actually present in the region, in mosquitoes as well as in sentinel animals such as bird and livestock.

Contrary to integrated mosquito management techniques supported by the Centers for Disease Control and Prevention, the EA includes multiple statements indicating FWS would allow pesticide treatments to be implemented without any monitoring and/or surveillance:

> "CCPH may decide to pre-treat with a time-release (effective up to 40 days) formulation of *Bti* before larvae are detected" (EA, p. 26).
>
> "Mosquito-borne disease surveillance ***may be*** conducted by CCPH ***at its discretion*** to detect whether pathogens causing mosquito-borne diseases are present, by testing adult mosquitoes for pathogens or testing reservoir hosts for pathogens or antibodies. This information ***may be necessary*** to determine public health risks associated with mosquito-borne pathogens on or near the Refuge." (EA, p. 22. Emphasis added).
>
> "The specific timing and number of monitoring and treatment activities would depend on resources, weather, and results of monitoring as they become available, and therefore cannot be specified in this planning document" (EA, p. 24).

Monitoring and surveillance is necessary to quantify disease risk through knowledge of potential vector species. Without monitoring and surveillance in place, FWS would be attempting to justify pesticide use on a National Wildlife Refuge in an utter vacuum of data regarding the presence of mosquito vectors species and disease organisms as well as the prevalence and risk of infection.

The potential for over-treating in the absence of monitoring and surveillance is high. The EA already demonstrates this potential with the statement that lower thresholds could be set for mosquito species known to be important in the transmission of disease, i.e. "… [M]osquito vector species known to be important in the transmission cycle of a disease may have a lower action threshold than species with lesser transmission roles." (EA, p. 27).

Mosquito presence is not the same as a threat of disease, even if the mosquito species are known to have vector capacity. In the absence of the disease pathogen, there is no risk from a vector mosquito species beyond that of nuisance biting. In addition, some vector species prefer to bite animals other than humans, such as birds, rendering the risk of human infection lower even in instances where the pathogen is present in wildlife. Thus, ongoing surveillance of both mosquitoes and disease pathogens is critical to determine when and if a change to the larvicide regime is required to further reduce the numbers of biting adults produced.

Our concerns about inadequate or non-existent monitoring and surveillance are heightened as CCPH, the entity to which monitoring and surveillance has been delegated, has never had a mosquito control district, lacks the knowledge and resources to deal with mosquito management themselves and to assess plans proposed by outside entities, and intends to meet their needs for monitoring, surveillance, and mosquito species identification by hiring and training field technicians this season, from a pool of applicants whose minimum qualifications include a high school degree.

4. A Clear Timeline for When Insecticide Treatment Will Be Terminated Must Be Included in the Final EA

Mosquitoes are a normal and important component of wetland ecology and food webs. This fact is acknowledged in the stated procedure for managing mosquitoes at national wildlife refuges, which allows populations of native mosquitoes to function unimpeded in the absence of a documented public health threat. If FWS is to allow short-term use of Bti while it corrects the construction problem that led to what it has characterized as an unnatural level of aggressive daytime biting mosquitoes, short-term use of Bti when coupled with other Integrated Pest Management actions is understandable and may be permitted only if FWS establishes in the final EA a discrete timeframe for completion of pesticide treatments, lest the agency attempt to indefinitely continue such treatments under the guise of a temporary emergency.

As the draft EA states, Bandon Marsh was home to mosquitoes prior to the Ni-Les'tun restoration project. A combination of the types of habitat present and the diversity of wildlife within those habitats, including a variety of birds, amphibians, and invertebrates that prey on mosquitoes, most likely kept the populations in check.

Since the allegedly unusually high numbers of mosquitoes in recent years was due specifically to multiple pools that were created accidentally in the course of a tidal flow restoration project, the statement "mosquito populations are likely to remain high indefinitely unless they are actively managed" (EA, p. 7) must include the timeframe of "until the necessary source reduction is accomplished by planned physical habitat remediation and viable eggs in the created pools are largely expended." While FWS states a similar goal of depleting eggs (EA, p. 9), the EA appears to allow for indefinite pesticide use throughout Refuge lands:

> "Even after the restoration, although the Service fully expects a drastic reduction in the capacity of the Refuge to produce mosquitoes, there may be a need to apply larvicides to control mosquitoes at a lower intensity in future years." (EA, p. 24).
>
> "…larvicide treatments are proposed for use for as long as necessary" (EA Compatibility Determination).

These statements directly contravene established FWS policy for mosquito management, as well as the stated purpose and need in this EA. The EA acknowledges that the Marsh had native mosquitoes prior to this outbreak and that periodic increases in mosquitoes did occur. Tolerance of normal native mosquito populations must continue.

5. Control of Mosquito Management Must Be in the Hands of FWS; The Proposed Consultation Process with CCPH Provides the County with an Unacceptable Level of Authority and May Improperly Subordinate Federal Interests Through Subdelegation

As a general rule, "[w]hen a statute delegates authority to a federal officer or agency, subdelegation to a subordinate federal officer or agency is presumptively permissible absent affirmative evidence of a contrary congressional intent."[56] Nevertheless, courts draw "an important distinction between sub-delegation to a *subordinate* and sub-delegation to an *outside party*," finding that "subdelegations to outside parties are assumed to be improper absent an affirmative showing of congressional authorization."[57]

The *U.S. Telecom Ass'n* court provided a concise synopsis of the two primary concerns attendant to sub-delegations of federal authority to outside parties:

> When an agency delegates authority to its subordinate, responsibility—and thus accountability—clearly remain with the federal agency. But when an agency delegates power to outside parties, lines of accountability may blur, undermining an important democratic check on government decision-making. Also, ***delegation to outside entities increases the risk that these parties will not share the agency's "national vision and perspective" and thus may pursue goals inconsistent with those of the agency and the underlying statutory scheme***. In

[56] *U.S. Telecom Ass'n v. F.C.C.,* 359 F.3d 554,565 (D.C. Cir. 2004).
[57] *Id.; see also Fund for Animals v. Kempthorne,* 538 F.3d 124, 132 (2d Cir.2008) ("We agree with the D.C. Circuit that, absent statutory authorization, such delegation is impermissible."); *Inland Empire Pub. Lands Council v. Glickman,* 88 F.3d 697, 702 (9th Cir.1996).

> short, subdelegation to outside entities aggravates the risk of policy drift inherent in any principal-agent relationship.[58]

The highlighted concern is of particular relevance here, as FWS has a strict statutory mandate to manage refuges to "provide for the conservation of fish, wildlife, and plants, and their habitats within the [Refuge] System" and to "ensure that the biological integrity, diversity, and environmental health of the [Refuge] System are maintained for the benefit of present and future generations of Americans."[59] The goals of Coos County Public Health are not primarily concerned with Refuge habitat or the wildlife it sustains.

Notably, even where a federal agency has broad discretion to permit or forbid certain activities, courts carefully scrutinize the agency's conditioning of its "grant of permission on the decision of another entity."[60] Courts will only uphold such a sub-delegation if "there is a ***reasonable connection*** between the outside [entity's] decision and the federal agency's determination." [61]

While there is some indication in the legislative history that FWS has authority to sub-delegate to non-federal entities, that authority is limited. Specifically, the House report to the National Wildlife Refuge System Improvement Act expresses Congressional approval for FWS's entry into "cooperative arrangements." However, any management authority sub-delegated to the non-federal entity must be subject to "standards" established by FWS:

> The Secretary may enter into cooperative agreements with State fish and wildlife agencies and other entities or the management of programs on, or parts of, refuge, ***subject to standards*** established by and the overall management oversight of USFWS.[62] (Emphasis added). Additionally, there must be a "reasonable connection" between the non-federal entity's decision (*e.g.* to allow the use of pesticides") and FWS's determination based on that decision. As explained below, the EA fails to demonstrate (1) sufficient standards guiding the non-federal decision and (2) the required "reasonable connection" with FWS's decision to use pesticides on the Refuge.

The EA states that threshold treatments on the Refuge would be determined by CCPH in consultation with the Service. However, this means that pesticide use can be triggered by what local authorities conclude are health threats: "Health threats are locally derived and are based on the presence or potential of endemic or enzootic mosquito-borne diseases, including the historical incidence of disease, and the presence and abundance of mosquitoes, which can adversely impact health." (EA, p. 25).

The EA includes no thresholds of larval abundance that will trigger pesticide use and, under the current proposal, CCPH could declare a health threat even in the absence of disease.

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[58] *U.S. Telecom Ass'n v. F.C.C.,* 359 F.3d at 565-566 (citations omitted).
[59] 16 U.S.C. 668dd(a).
[60] *U.S. Telecom Ass'n,* 359 F.3d at 567.
[61] *Id.*
[62] H.R. Rep. No. 104-218, at 12 (1995).

Thus, the presence of an unstated number of mosquitoes could be used to trigger unnecessary pesticide use in the absence of any reasonable, known, or documented disease risk if those mosquitoes are potential vector species. This lack of clarity will result in pesticide use that is not in accordance with the mission and goals of the Refuge system or with an Integrated Pest Management program. The FWS must establish larval and adult abundance thresholds that can be used in the short-term to trigger the use of Bti in order to re-establish natural mosquito numbers.

CCPH is also given the authority to treat with pesticides even before larvae are detected: "CCPH may decide to pre-treat with a time-release (effective up to 40 days) formulation of *Bti* before larvae are detected to maintain control and reduce the likelihood of needing to use methoprene or CocoBear™ later (see below)." (EA, p. 26).

This decision-making power gives significant deference to a local entity whose goals differ greatly from, or even directly conflict with, those of the Refuge and Congress in setting aside this land. This difference is clearly revealed in the statement: "[T]he Refuge lies within a rural area adjacent to a more urban area that exhibits lower thresholds (relative to other areas of the country) and a general intolerance to mosquitoes. Number of mosquito complaints is a factor." (EA, p. 27). CCPH represents the community members with low tolerance for mosquitoes.

Furthermore, CCPH's ability to pre-treat before showing mosquito levels have risen to a level where they would trigger treatment, or before they are even known to be present, is a prophylactic use of pesticide that is completely contrary to Integrated Pest Management practices.

Lastly, this plan would also cause needless disturbance to the marsh ecosystem and food webs, with multiple treatments that may not even be needed, and would remove the ability to assess the need for treatment, the timing of applications, and their subsequent efficacy.

D. FWS's NEPA Analysis Is Inadequate

NEPA is our national charter for protecting the environment,[63] designed to ensure that federal agencies take a "hard look at the environmental consequences of their actions".[64] For the many reasons discussed in this section, FWS's draft EA is inadequate under NEPA, as the agency has failed to take the requisite "hard look at the environmental consequences" of the proposed action.[65] NEPA's fundamental tenets include ensuring comprehensive, timely, and transparent environmental review of agency actions, and this EA fails to meet those obligations.

1. Process and Public Participation

[63] 40 C.F.R. § 1500.1(a).
[64] *See, e.g., Sierra Club v. Bosworth*, 510 F.3d 1016, 1018 (9th Cir. 2007).
[65] *See, e.g., Friends of the Payette v. Horseshoe Bend Hydroelectric Co.*, 989, 993 (9th Cir. 1993); *see Overton Park v. Volpe*, 401 U.S. 402, 416 (1971).

NEPA "is a procedural statute intended to ensure environmentally informed decision-making by federal agencies."[66] In taking a "hard look" at the consequences of major decisions, agencies are required to "involve the public in preparing and implementing their NEPA procedures."[67] Further, agencies have an obligation to afford "interested persons an opportunity to participate in the rule making."[68]

The very purpose of NEPA is to "ensure that federal agencies are informed of environmental consequences before making decisions and that the information is available to the public."[69] Meaningful and effective public participation is one of the cornerstones of NEPA because it gives the public an opportunity to inform the agency of environmental consequences the agency may not have considered. For this reason, NEPA's implementing regulations require that agencies "make diligent efforts to involve the public in preparing and implementing their NEPA procedures."[70] Thus, the agency must "hold or sponsor public hearings or public meetings whenever appropriate"[71] and "provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents" so that interested persons can be informed.[72] Also, federal agencies must to the fullest extent possible "encourage and facilitate public involvement in decisions which affect the quality of the human environment."[73]

FWS has failed to make an adequate effort to engage public participation in this process by: 1) timing the release of the EA so close to the time of anticipated action; 2) providing only a 30 day comment period; and 3) holding only one public meeting, which involved taping portions of the EA to the wall of the meeting room and having agency staff on hand to answer individual questions.

Furthermore, according to its website, the Coos County Board of Commissioners appears to be moving ahead with mosquito control, as approval of a contract for mosquito control services was on the agenda for the March 25, 2014 meeting. This action is clearly premature as the comment period on the draft EA is not even complete, and is in direct contravention of both the spirit and the law because it reduced NEPA analysis to a mere procedural hurdle, rather than a meaningful analysis that informs subsequent decision-making.

Millions of Americans and many local residents in the Bandon area with an interest in management of National Wildlife Refuges do not check the Federal Register for actions that may affect refuges, and may not even know that the comment period for this EA is open. Using insecticides to control native mosquito species in the absence of a documented public health threat at a federal wildlife refuge will set a precedent that is contrary to existing mosquito management policies established at the federal level for national wildlife refuges, and thus FWS should have done significantly more to solicit public comment, and must wait until it has

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[66] *Tillamook Cnty. v. U.S. Army Corps of Eng'rs,* 288 F.3d 1140, 1142 (9th Cir.2002).
[67] 40 C.F.R. § 1506.6(a).
[68] 5 U.S.C. § 553(c).
[69] *Citizens to Preserve Better Forestry v. U.S.D.A.*, 341 F.3d 961, 970-71 (9th Cir. 2003).
[70] 40 C.F.R. § 1506.6(a).
[71] *Id.* at § 1506.6(c).
[72] *Id.* at § 1506.6(b).
[73] *Id.* at § 1500.2(d).

completed the NEPA process, thus facilitating informed decision-making, before allowing any additional decisions to be made regarding mosquito spraying at Bandon Marsh.

2. The EA Fails To State a Valid Purpose and Need for this Project

In preparing a NEPA document and determining the appropriate scope of analysis, the first thing an agency must define is the project's purpose.[74] The purpose and need statement is one of NEPA's threshold requirements, but in this EA, FWS relies on a purpose and need for this proposed action that is simply not valid. The "human health threat" and "adverse impacts" described in the purpose and need statement are exaggerated and without basis in scientific fact. For example, as mentioned earlier in these comments, FWS discusses malaria, which was officially eliminated from the US as an endemic disease over 60 years ago, as a potential human health threat, but acknowledges that there is no evidence of a single case of malaria on the Oregon coast. (EA, p. 49). Furthermore, none of the mosquito species inhabiting the marsh are in the genus *Anopheles*, which is the only genus of mosquito capable of transmitting the malaria parasite. Similarly, there is no evidence based on data from the Centers for Disease Control that supports the existence of other human health threats raised by FWS in this document as a valid and immediate risk. It is not valid to base a purpose and need statement on the threat of diseases that have not been documented in the county in recent years. The agency cannot possibly take the requisite "hard look" where it failed to articulate a proper purpose and need for the underlying action.

3. FWS Fails to Properly Consider Cumulative Impacts

Cumulative impacts are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period time."[75] A thorough consideration of cumulative impacts is required in the preparation of an EA.[76] Specifically, an EA must provide a quantified assessment of project's environmental impacts when combined with other projects.[77] Notably, courts and the CEQ emphasize that a detailed cumulative impacts analysis is especially important in an EA, because there is a much higher risk of cumulative impacts resulting from many smaller decisions for which EAs are prepared.[78]

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[74] *See Citizens Against Burlington, Inc. v. Busey,* 938 F.2d 190, 195–96 (D.C. Cir.1991).
[75] 40 C.F.R. § 1508.7.
[76] *See, e.g., Kern,* 284 F.3d at 1075.
[77] *Great Basin Mine Watch*, 456 F.3d at 972.
[78] *See, e.g., Native Ecosystems Council v. Dombeck*, 304 F.3d 886 (9th Cir. 2002); *Kern*, 284 F.3d. at 1076, 1078 (emphasis in original) (quoting CEQ, Considering Cumulative Effects Under the National Environmental Policy Act at 4, January 1997) ("Given that so many more EAs are prepared than EISs, adequate consideration of cumulative effects requires that EAs address them fully." "Without such individually minor, but cumulatively significant effects, "it would be easy to underestimate the cumulative impacts" of the action . . . and "of other reasonably foreseeable future actions, on the [environment].").

It is well-established that "a cumulative impacts analysis must include 'some quantified or detailed information' since without such information it is not possible for the court or the public to be sure that the agency provided the hard look that is required of its review.'"[79] In a cumulative impact analysis, "general statements about possible effects and some risk do not constitute a hard look. . . . The cumulative impact analysis must be more than perfunctory; it must provide a 'useful analysis of the cumulative impacts of past, present, and future projects."[80] Moreover, a cumulative impact analysis must be timely; "it is not appropriate to defer consideration of cumulative impacts to a future date when meaningful consideration can be given now."[81] "If the agency did not present this detailed information and analysis it will be found to have violated NEPA unless it provides a convincing justification as to why more information could not be provided."[82]

In order to address the cumulative impact requirement, FWS must examine and evaluate the cumulative impacts of reasonably foreseeable actions. Here, however, FWS's brief, perfunctory two paragraph analysis omits a number of reasonably foreseeable actions.[83]

The cumulative impact analysis must include an assessment of potential aesthetic, historic, cultural, economic, social, and health impacts.[84] FWS does not analyze these kinds of cumulative impacts.

As indicated by the controversy surrounding this issue, in the record and public comments, the potential significant socioeconomic, cultural and other foreseeable impacts are considerable, yet these were not considered in the context of cumulative effects. FWS also completely failed to consider the cumulative effects of managing mosquitos at Bandon Marsh along with the reasonably foreseeable effects of other mosquito management activities undertaken by private, municipal, and state entities. Given the response of some private and County actors to the recent increase in mosquito numbers, it is entirely reasonable to conclude that they will be undertaking mosquito control measures of their own in foreseeable future. These measures, combined with the actions contemplated in this EA, could have an array of impacts that FWS declined to consider. For example, if mosquito numbers are drastically reduced beyond pre-outbreak levels due to the combined effects of county, state, federal, and private actors, how will the many fish and bird species that rely on mosquitos be affected? Could the effects rise to the level where Bandon Marsh no longer meets the basic requirements for these species? If so, where will they go instead? Also, what are the cumulative impacts of all these entities ramping up mosquito control activity at the same time in terms of water quality? Will these actions cumulatively contribute to the degradation of water quality in area waterbodies?

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[79] *Soda Mountain Wilderness Council v. Norton*, 424 F. Supp. 2d 1241 (E.D. Cal. 2006).
[80] *Muckleshoot Indian Tribe v. U.S. Forest Serv*, 177 F.3d 800, 810 (9th Cir. 1999).
[81] *Neighbors of Cuddy Mountain*.
[82] *Id*. (citing *Ocean Advocates v. Army Corps of Eng'rs*, 402 F.3d 846, 868 (9th Cir. 1998)). The cumulative impact analysis is wholly distinct from the scope requirements and analysis discussed above. *See Earth Island Inst. v. U.S. Forest Serv.*, 351 F.3d 1291, 1306 (9th Cir. 2003) ("Even if a single, comprehensive EIS is not required, the agency must still adequately analyze the cumulative effects of the projects within each individual EIS.").
[83] EA at 52–54.
[84] 40 C.F.R. § 1508.8; *see, e.g., id.* § 1508.14 (when "economic or social and natural or physical environmental are interrelated," then the NEPA analysis must discuss "all of these effects on the human environment); *Wyoming v. U.S. Dep't of Agric.*, 661 F.3d 1209, 1251 (10th Cir. 2011) (explaining that a cumulative impacts analysis must consider all of the effects listed at 40 C.F.R. section 1508.8).

Will these actions cumulatively harm any other species resource values? FWS's failure to consider the cumulative effects of the proposed action must be remedied.

E. FWS Fails to Consider Critical Issues, Rendering this EA Inadequate Because the Environmental Effects of the Preferred Alternative Remain Highly Uncertain

The draft EA is inadequate because it lacks specific and essential information on key issues such as the duration of the action. "In the absence of such fundamental information, it would seem that any alleged 'finding' that the project will not significantly affect the species is the purest sophistry."[85] Accepting FWS's failure to disclose basic information "would turn NEPA on its head, making ignorance into a powerful factor in favor of immediate action where the agency lacks sufficient data to conclusively show not only that the proposed action would harm an endangered species, but that the harm would prove to be 'significant.'"[86] At the very least, FWS is required to disclose uncertainties, explain their relevance, and has the burden to show why the necessary information could not be obtained.[87]

Underlying all discussion in the following section is one basic premise of NEPA, its demand for high-quality information and accurate scientific analysis.[88] FWS does not include information such as the duration of the proposed action or specific triggers for the various proposed mosquito treatments in this EA. Further, as discussed with greater detail below, FWS does not provide the public with any information on the effects to federally listed coho salmon as determined by the expert agency, the National Marine Fisheries Service, despite the fact that potential impacts to this species are one of most controversial aspects of the proposed action. The resulting uncertainty renders this analysis inadequate.

1. The Lack of Clarity on Pesticide Use in the Preferred Alternative Creates Significant Uncertainty of Risk

The Preferred Alternative provides a palette of multiple larvicides that may be used, but does not state specifically what triggers a shift from less-toxic to more toxic products (Bti to methoprene and CocoBear). Furthermore, the size of the area where products will be applied and the frequency and duration of their use are never clarified. This lack of detail makes an assessment of risk very difficult and a finding of "no significance" impossible. Without clarity on when, where, how often, and for how long these products will be used, it is impossible to understand the impact they will have on the Refuge ecosystem. FWS should strongly consider embarking on a ful Environmental Impact Statement to analyze these issues.

At a minimum FWS should provide worst-case endpoints of how frequently the product will be used, how much product will be applied for each treatment, how many applications will occur during the season, how many seasons it could be used, and the size and location of sites

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[85] *Sierra Club v. Norton*, 207 F.Supp.2d 1310, 1331 (S.D. Ala. 2002) (finding agency's FONSI arbitrary and capricious because it failed to address lack of certainty).
[86] *Id.* at 1335.
[87] 40 C.F.R. § 1502.22; *Envtl. Prot. Info. Ctr. v. Blackwell*, 389 F. Supp. 2d 1174, 1188 (N.D. Cal. 2004) (recognizing that 40 C.F.R. 1502.22 guides the court in determining "whether an agency can be charged with having failed to take a hard look" because information is incomplete or unavailable).
[88] 40 C.F.R. § 1500.1(b).

where it will be used. None of those parameters are stipulated in the EA, causing significant uncertainty and potentially putting the Refuge ecosystem at risk from pesticide applications for a native insect that is not currently a health threat.

The phased-in approach causes greater uncertainty as there is no clear trigger for when FWS would switch from use of Bti to methoprene and/or CocoBear. It could be that methoprene, which poses a greater risk to many different types of aquatic invertebrates, would be used the majority of the first season and possibly for multiple seasons. CocoBear, a non-selective petroleum oil-based insecticide, could similarly be used for a large portion of each season that treatment occurs. The long-term impact of these continued uses could have a significant impact on the Marsh's ecology.

As the Preferred Alternative is currently written, CCPH can apply the maximum label rates of a methoprene product for the maximum number of times per season over mosquito producing pools (both natural and those created during restoration) throughout the 1,000 acre Refuge and concurrently apply CocoBear at maximum labeled rates to all pools ¼ acre in size or smaller. Such action could have dramatic adverse environmental impacts.

2. The Preferred Alternative Creates Significant Controversy

FWS's actions in regard to mosquito control have already generated significant controversy, which this EA fails to put to rest. This EA's failure to provide triggers and mechanisms for pesticide use combined with the absence of a documented threat of disease is of concern as the Preferred Alternative is in stark contrast to Fish and Wildlife Service's Refuge System's established mosquito management protocols to "allow populations of native mosquito species to function unimpeded unless they cause a human and/or wildlife health threat.''[89]

The potential for this EA to codify the ongoing use of pesticides to treat nuisance-biting mosquitoes sets a dangerous precedent for wildlife refuges across the United States. Excessive mosquito production has not been known as a problem at Bandon Marsh previously, and even in the face of the recent dramatic increase in the numbers of nuisance-biting mosquitoes, the use of insecticides proposed in fall of 2013 created a significant public outcry. Resistance to widespread spraying of toxic pesticides was expressed not only by Bandon residents, but also by visitors to the nearby state park, which opted out of the proposed adulticide spraying as the individuals camping there at the time were not in favor of it.

3. The Risks Associated with Two of the Pesticides To Be Used in the Preferred Alternative A, Methoprene and CocoBear, Are Understated

The detrimental effects of methoprene have been well documented since the 1970s and new risks continue to be documented. Still, the EA consistently downplays these concerns. The following statements severely under-represent risk:

[89] Federal Register. 2007. Department of the Interior, Fish and Wildlife Service, Draft Mosquito and Mosquito-borne Disease Management Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997. *Fed. Reg.* 72 (198):58321 – 58333.

> "Methoprene has been shown to have some toxicity to certain other invertebrate species that use similar hormonal pathways for their development, such as marine crustaceans and some species of freshwater invertebrates" (EA, p. 54)
>
> "Although sub-lethal chronic effects on endocrine systems and development have been shown to some non-target invertebrates, the majority of field and laboratory studies suggest that methoprene is one of the safest mosquito larvicides available, and effects to non-target invertebrate species are limited. Although toxicity has been found to invertebrates in laboratory studies, the levels of methoprene predicted to be lethal to even the most sensitive species are often an order of magnitude greater than predicted environmental concentrations when methoprene is used for mosquito control at the labeled application rates for natural habitats." (EA, p. 54-55).

It is highly likely that the lethality endpoints to which the quote refers are LC_{50} values, which are calculated from acute toxicity tests as the amount that kills 50% of a test population. Concentrations below an established LC_{50} can still result in substantial mortality, and the statement further disregards the effects of sub-lethal and chronic exposures that have been documented in aquatic insects and crustaceans at levels likely to be seen in the environment.

The relational statement that methoprene is "one of the safest larvicides" is extremely general, and does not address the specific organisms and habitats involved in this case. Furthermore, the EA readily admits that FWS knows very little about the identity, diversity, and abundance of aquatic invertebrates on the Refuge. (EA, p. 70).

The Toxicological Review provides a partial overview of research into the impacts of methoprene. Setting an estimated environmental concentration of 10 ppb, the Review highlighted studies that found harm to invertebrates at levels comparable to those seen in the field as well as at levels not expected to be reached in the Bandon Marsh treatments. (See Toxicological Review, pp. 24-32).

Numerous other research papers not listed in the Toxicological Review have found concern with methoprene. These papers are listed below and electronic copies are submitted along with these comments:

Breaud, T.P., J.E. Farlow, C.D. Steelm,an, and P.E. Schilling. 1977. Effects of the insect growth regulator methoprene on natural populations of aquatic organisms in Louisiana intermediate marsh habitats. *Mosquito News* 37:704-712.

Gelbic, I.M., M. Papacek, and J. Pokuta. 1994. The effects of methoprene S on the aquatic bug *Ilyocoris cimicoides* (Heteroptera, Naucoridae). *Ecotoxicolog*y 3:89-93.

Gradoni, L., S. Bettini, and G. Majori. 1976. Toxicity of Altosid to the crustacean, *Gammarus aequicauda*. *Mosquito News* 36:294-297.

Meyer, R.P. 1994. Preliminary evaluation of the effect of Altosid (methoprene) on crustaceans associated with water-fowl holding ponds at the Kern National Wildlife Refuge. *Proceedings of the California Mosquito and Vector Control Association* 62: 73-98.

Miura, T. and R.M. Takahashi. 1974. Insect developmental inhibitors: effects of candidate mosquito control agents on non-target aquatic organisms. *Environmental Entomology* 3:631-636.

Norland, R.L. and M.S. Mulla. 1975. Impact of Altosid on selected members of an aquatic ecosystem. *Environmental Entomology* 4:145-152.

Recognizing the robust data set demonstrating the risks of methoprene to non-target invertebrates when applied at label rates, we take issue with the minimization of adverse effects included in the EA.

On a similar note, while the EA recognizes the potential risks of CocoBear to a broad range of aquatic invertebrates, the proposed mitigation measure to protect the Refuge's wildlife from CocoBear is woefully inadequate. CocoBear is a petroleum oil that will act to smother not just mosquito larvae and pupae but any invertebrate that obtains oxygen at the air/water interface, which includes many invertebrates known to feed on mosquito larvae, such as predatory aquatic bugs and beetles.

In response to this negative impact on a broad range of aquatic invertebrates, the EA states "Before treatment, habitat would be visually assessed for non-target invertebrate, fish, or amphibian species (terrestrial or aquatic stages) to avoid exposure to these species." (EA, p. 59).

Most aquatic insects and crustaceans are benthic (i.e. they live in or on the substrate) and will not be visible or able to be identified by a simple visual inspection of the habitat. Therefore, this assessment will provide almost no understanding of the existing aquatic invertebrate community. The EA admits that very little is known of the marsh's aquatic invertebrates, stating "There is no information about other species of aquatic invertebrates susceptible to surface films that may be present on the Refuge, or their relative importance to marsh ecology." (EA, p. 70). Thus, this this simple visual inspection will be utterly inadequate to both assess pre-existing aquatic invertebrate communities and to determine post-treatment impacts on these populations.

4. The Toxicological Review Uses a Blunt Measure of Risk and Dismisses Potential Adverse Impacts

The Toxicological Review and Environmental Effects Analysis for Mosquito Larvicides proposed for use at Bandon Marsh National Wildlife Refuge (Appendix C of EA) uses a risk quotient process to provide a basic evaluation of the risk of the Preferred Alternative. The Risk Quotient used in the Toxicological Review comes from the U.S. Environmental Protection Agency's Office of Pesticide Programs (EPA). EPA uses these ratios to complete registration processes for pesticides. This risk assessment tool is inadequate to meet the hard look that NEPA requires.

As the Review notes, using risk quotients to determine acute and chronic risk is a very blunt toxicity measurement and is likely to underestimate risk, as key components such as duration of exposure are not included in the calculation. (EA, p. 33). The risk quotient is calculated by dividing the amount of a chemical likely to be found in the water by the amount of that chemical that causes a negative effect. If the calculated value is above a pre-determined Level of Concern (LOC), the assessor will then assume that risk is present.

In the case of acute risk to aquatic invertebrates, the estimated environmental concentration of a pesticide is divided by the LC_{50}. The result of that equation is compared to a set LOC of 0.50. This means that, using this assessment tool, it is acceptable for invertebrate species to be exposed up to 50 percent of the amount that killed 50 percent of an invertebrate test population, a concentration that is still likely to cause significant mortality.

For chronic risk to aquatic invertebrates, the estimated environmental concentration is divided by the lowest amount found to cause an affect from chronic exposure. The result is compared to an LOC of 1. In this scenario it is acceptable for an invertebrate to be exposed up to the amount that caused a negative effect.

These risk quotients are not protective for the Refuge's wildlife. The risk quotients were created to meet the Federal Insecticide and Fungicide Act, which has built in the tolerance of acceptable risk. The Review itself specifically notes some of this method's failings, i.e."[t]his method does not account for duration of exposure for aquatic organism in any way". (EA, p 33).

Recognizing that risk quotients can underestimate risk, it is surprising that when the Reviewer did find risk, it is dismissed with the statement that the data inputs to the calculation were overly protective. This justification fails to note that the risk quotient calculation still found adverse impacts even with less-protective data inputs.

Dr. Reeves, who completed the Review, found that risk quotients for acute risk to freshwater aquatic invertebrates, chronic risk to freshwater aquatic invertebrates, and chronic risk to estuarine invertebrates with the use of the active ingredient methoprene at Bandon Marsh *all* exceed determined LOC--in other words, risk is expected.

Her calculations were based on the amount of methoprene that could be found in water if the insecticide was used at its highest label rate divided by the lowest amount of methoprene that caused an effect to a relevant invertebrate. Since the EA didn't state that the amount to be applied would be less than the labeled rate, her selection is well-founded. Furthermore, it is common practice to be cautious in assessing risk, as underestimation of risk can cause significant harm to fragile ecosystems. However, Dr. Reeves discounts her own finding of risk, stating that the contamination level she chose was a high end estimate: "an estimated concentration of 10 ppb is probably much higher than actual concentration will be." (Tox. Rev. p. 37).

Even if her cautious concentration selection was unrealistic, performing the simple equation using the amount that she considers a more realistic high end concentration still results in a finding of risk. On p. 38 of the Review, it states that 1 ppb is a more realistic high end environmental concentration. At 1 ppb, the EPA LOCs are met and exceeded for chronic risk to estuarine invertebrates and chronic risk to freshwater aquatic invertebrates, respectively.

It is concerning that such a blunt measure of risk was used and then systematically ignored. The Toxicological Review would provide a better understanding of impact if Probabilistic Methods were employed.

As described above, the Review used a deterministic method to evaluate risk driven by a very narrow range of data. This deterministic method can allow significant mortality or

other harm. This potential underestimation of risk does not meet the "hard look" NEPA requires.

In contrast, by evaluating a full dose-response curve, risk assessors acquire a much better understanding of toxicity. If the dose-response slope is steep, small changes in concentration elicit large changes in toxicity. Conversely, if the slope is gradual, much larger concentration changes are needed to elicit a change in toxicity. When there is a gradual slope, the amount of a substance that kills or harms two or three percent of a population is significantly less than the amount that kills 50 percent of the population.

A 2013 report released by the National Research Council (NRC) titled *Assessing Risks to Endangered and Threatened Species from Pesticides* underscores the need to move away from deterministic risk assessments, and recommends the use of probabilistic risk assessment. (See NRC, p. 152. 2013). Probabilistic risk assessment methods integrate uncertainties in the exposure and effects analyses using probability distributions.

5. The Toxicological Review Fails To Evaluate the Impact of Inert/Other Ingredients Even Though the Issue Is Raised

In further justifying why the LOC exceedances are not a concern, Dr. Reeves points out that one research paper evaluated does not make it clear whether tests were performed on a formulated product or an active ingredient.

In an attempt to be conservative (build in safety) Dr. Reeves assumed the research was performed on the active ingredient. She then goes on to say that this assumption "imparts a safety factor of approximately 20-fold on the hazard value (because the product the used was only 4.25% active ingredient)." (EA, p. 38).

This statement disregards the earlier statement in the Toxicological Review, as well as extensive research, that shows the other ingredients added to formulated products can have their own toxicological concerns and/or increase the risk of the active ingredient. (EA, p. 6 -7).

F. FWS Failed to Properly Consult with and Consider Impacts to Tribes

Native American tribes occupy a unique legal status, with certain rights established in the U.S. Constitution, treaties, Executive Orders, and by the judiciary. The federal government's trust obligation to tribes requires it to act in the best interest of Native American tribes and individuals. In addition, tribes have the right to government-to-government consultation with the federal government. This requirement is set forth in Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (EO 13175).[90] Section 5(a) of EO 13175 states

[90]Executive Order No. 13,175, 65 *Fed. Reg.* 67249 (November 9, 2000). EO 13175 expanded the breadth of tribal consultation to "ensure the meaningful and timely input by tribal officials in the development of regulatory policies [rules, policies, and guidance] that have tribal implications." Tribal implications are defined as having substantial direct effects on one or more tribes, on the relationship between the federal government and tribes, or on the distribution of power and responsibilities between the federal government and tribes. Among other things, EO 13175 requires federal agencies to respect tribal self-government and sovereignty, honor tribal treaty and other rights, and strive to meet responsibilities arising from the unique relationship between the federal government and tribes.

that "[e]ach agency shall have an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." Other than listing the names of a few tribes as consulting agencies, FWS has made no showing in this EA to indicate that it has considered the potential impacts of this action upon tribes or whether it has sought out any input from tribal officials. Potential impacts include, but are not limited to, impacts to tribal values resulting from coho smolts and other culturally significant species being exposed to methoprene.

G. FWS Failed to Properly Consider and Disclose Its Obligations to Migratory Birds

FWS also fails to properly consider and disclose its obligations to migratory birds. Like many national wildlife refuges, Bandon Marsh was set aside in large part to provide refuge to migratory birds. In the EA, FWS states that, "[b]ased on our literature review, there is concern about potential effects to non-target estuarine invertebrates providing forage for a variety of wildlife, especially migratory birds and fish." (EA, p. 33). FWS also notes that Bandon Marsh has "particular value in carrying out the national migratory bird management program," 16 U.S.C. 667b. (EA, p. 20). Despite these acknowledgements, FWS barely considers the impacts of the proposed action on migratory birds. Aquatic invertebrates are a key food source for migrating and breeding birds, as well as for many young duck hatchlings. The proposed mosquito control mechanisms could significantly decrease the quantity and diversity of food available to birds.

Further, FWS completely neglected to properly consider its obligations under the MBTA. The MBTA allows entities to obtain take permits in a limited number of situations if they adhere to narrowly prescribed requirements. Available permits include those for import and export,[91] banding or marking,[92] scientific collection,[93] taxidermists,[94] waterfowl sale and disposal,[95] Canada geese,[96] falconry,[97] raptor propagation,[98] rehabilitation,[99] depredation, [100]and special purposes.[101] The activity discussed in this EA is not covered by any of these permitting areas, thus under the MBTA, this activity may not "take" even a single migratory bird. Yet, FWS does not consider whether methoprene or CocoBear could result in the take of migratory birds. FWS fails to properly consider impacts to migratory birds that may result as a consequence of the proposed action.

H. FWS Fails To Adequately Consider Impacts to Bald Eagles

FWS acknowledges the presence of bald eagles at Bandon Marsh in the EA, but fails to take a hard look at impacts to these eagles under NEPA or consider whether the action violates

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[91] 50 C.F.R. § 21.2.
[92] *Id.* § 21.22.
[93] *Id.* § 21.23.
[94] *Id.* § 21.24.
[95] *Id.* § 21.25.
[96] *Id.* § 21.26.
[97] *Id.* § 21.29.
[98] *Id.* § 21.30.
[99] *Id.* § 21.31.
[100] *Id.* § 21.41.
[101] *Id.* § 21.27.

the mandates of the Bald and Golden Eagle Act. It simply mentions that they are present, without any additional analysis.

One of the eight categories of activities specified as likely to cause disturbance under the Bald and Golden Eagle Act is "helicopters and fixed-wing aircraft" (Category G), which would include those used for aerial pesticide applications such as those contemplated by FWS for Bandon Marsh. Further, under the National Bald Eagle Management Guidelines in 2007,[102] the Act may be used to impose limitations on areas where pesticide applications may or may not be administered. For example, when aerial mosquitocide treatments were proposed by vector control on an island in the Columbia River in Oregon that had active bald eagle nests, FWS required a permit be obtained for any activities undertaken during their nesting season (January 1 – August 15), and a 1,000 foot setback was mandated.[103] Here, FWS notes the presence of bald eagles, but fails to consider impacts to them under the Bald and Golden Eagle Act, whether limitations on spraying may be warranted, or to even take a hard look at the impacts to these iconic birds under NEPA.

I. FWS Fails To Adequately Assess Impacts on Threatened Coho Salmon

The proposed action would occur in known habitat for threatened coho salmon and could significantly affect this species, but FWS failed to properly consider effects under the ESA or provide adequate information regarding those effects in its NEPA documentation. The EA states that all mosquito management activities will be conducted in compliance with the ESA and that it will determine whether Section 7 consultation is required for specific species, but it does not actually provide *any* information regarding this matter.

The ESA's statutory scheme "reveals a conscious decision by Congress to give endangered species priority over the 'primary missions' of federal agencies."[104] Federal agencies are obliged "to afford first priority to the declared national policy of saving endangered species."[105] The statutory scheme and requirements for both informal and formal consultation are laid out in the statutory background section of these comments. In short, Congress specified in Section 7 of the ESA the process that "[e]ach Federal agency" must follow to "insure" against jeopardy. FWS must determine whether its action "may affect" any listed species or any designated critical habitat; if so, it must consult the designated expert agencies, NMFS for coho salmon, before carrying out any action.[106] Pending the completion of formal consultation with the expert agency, an agency is prohibited from making any "irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures."[107]

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[102] *FWS. 2007. National Bald Eagle Management Guidelines. 25 pp. Washington D.C. U.S. Fish and Wildlife Service.*
[103] Dana Green, Natural Resources Manager/Aviation, Port of Portland, Pers. Comm. October 2012
[104] *Tenn. Valley Authority v. Hill,* 437 U.S. 153, 185 (1978).

[105] *Id.*
[106] 50 C.F.R. § 402.14(a).
[107] 16 U.S.C. § 1536(d).

FWS has failed to show that it has complied with the procedural mandates of the ESA. Having spent a considerable number of hours reviewing thousands of pages of documents obtained via the Freedom of Information Act (FOIA) regarding this action from both NMFS and FWS, we have not come across any documents evincing progress in informal or formal consultation under the ESA. The agencies have acknowledged that consultation is called for, but the lack of consultation documents in the FOIA responses indicates that either, 1) the agencies improperly withheld documents or 2) that they are nowhere near completing consultation under the ESA.

While the ESA makes plain that the agency is prohibited from making any irreversible commitment of resources pending the completion of consultation, FWS here appears to be moving forward with its plans to control mosquitos at Bandon Marsh prior to completing ESA consultation. Such action is plainly contrary to the law. Further, FWS's failure to complete this consultation and disclose the results in the draft EA renders the EA inadequate because the public cannot provide meaningful feedback without the benefit of understanding how the proposed action will affect threatened coho.

Despite FWS's attempts found scattered throughout the EA to diminish potential impacts to federally listed coho, FWS has admitted in the document "Draft Bandon Post-treatment Assessment" that "[m]ethoprene is directly toxic to mosquitos but may be similarly toxic to some non-target invertebrate larvae. Indirect impacts may occur to insectivorous species, such as fish and birds, due to a reduction in invertebrate food resources." It also noted that the Refuge's creeks and marshes provide rearing habitat for juvenile coho, and that spraying methoprene could affect the insect food resources available to juvenile coho. Such statements provide a strong indication that this action "may affect" threatened coho salmon, an admission that triggers the need to consult. FWS must consult with NMFS on the acknowledged potential direct and indirect impacts to threatened coho, and it must also inform its decision on how to proceed with this matter with that analysis. It may not proceed with any irretrievable commitment of resources prior to doing.so. Thus, any proposed action must be delayed until FWS completes the consultation process under the ESA. Failure to do so would be arbitrary, capricious, and contrary to the mandates of the ESA.

J. FWS Fails to Provide Information Regarding Compliance with the Clean Water Act

FWS provides almost no information in this EA on how this action will comply with the Clean Water Act. The agency notes that "Refuges are encouraged to add stipulations to compatibility determinations and associated SUPs for mosquito control requiring MADs or other permittees to satisfy all relevant legal requirements for conduct of their work, including water quality permits, and training and certification requirements for any pesticide applicators." (EA, p. 16). It also acknowledges that a permit under the National Pollutant Discharge Elimination System (NPDES) established by Section 402 of the Clean Water Act may be needed, "depending on the scope of the action proposed each year." (EA, p. 21). It appears that the County obtained an NPDES permit for the 2013 action, but this permit would no longer be current. In addition, FWS is plainly the decision-making entity here. Thus, FWS must obtain an NPDES permit in order to proceed with the proposed action. Further, FWS should provide the public with information that such a permit would contain as part of a hard look in its NEPA analysis because this would shed light on the impacts of the proposed action to water quality.

IV. CONCLUSION

As we outline above, we support *Alternative B: Mosquito Control Without Synthetic Larvicides*, if clear parameters on the use of the larvicide Bti are provided in the Final EA. If proper surveillance of egg hatch and larval populations is done, appropriately timed and targeted applications of Bti will reduce mosquito numbers without the need to resort to more toxic options such as methoprene and/or CocoBear.

As explained in these comments, the EA strongly overstates potential health threats, as there is no reasonable risk of mosquito-borne disease in the county at this time. Furthermore, the EA fails to provide an adequate evaluation of risk to the Refuge's ecosystem if Alternative A, the Preferred Alternative, is implemented. In part this failure is due to the high level of uncertainty caused by lack of detail around the trigger for, and duration of, pesticide use.

For the above reasons, and additionally based on the body of evidence submitted in this administrative record, it is our position that FWS's draft EA is substantively, procedurally, scientifically, and legally inadequate. Issuance of a Record of Decision and Finding of No Significant Impact could result in violations of NEPA, the ESA, the MBTA, the Bandon CCP, the Eagle Act and the APA. Further, the Preferred Alternative will result in an improper subdelegation of FWS authority over the Refuge to the CCPH. In addition or in the alternative, the agency must prepare a substantially improved EA that analyzes and discloses the impacts of the proposed action on the environment based on sound science, and make findings regarding those impacts pursuant to its statutory authority.

Respectfully submitted,

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