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***PETITION SEEKING TO BAN GENETICALLY ENGINEERED CROPS AND
NEONICOTINOID INSECTICIDES ON ALL NATIONAL WILDLIFE REFUGES***

TABLE OF CONTENTS

TABLE OF CONTENTS	2
ACTIONS REQUESTED.....	6
PETITIONERS	6
INTRODUCTION	10
STATEMENT OF LAW	11
I. ADMINISTRATIVE PROCEDURE ACT, 5 U.S.C. § 500 <i>et seq.</i> (summarized in pertinent part).....	11
II. NATIONAL WILDLIFE REFUGE ACT, 16 U.S.C. § 668dd <i>et seq.</i> (summarized in pertinent part).....	11
A. Description of the Act	11
B. Compatibility Determinations	12
C. FWS's Policy on Biological Integrity, Diversity, and Environmental Health	12
III. ENDANGERED SPECIES ACT, 16 U.S.C. § 1531 <i>et seq.</i> (summarized in pertinent part)	13
STATEMENT OF FACTUAL GROUNDS	14
I. GE CROPS GENERALLY	14
II. NEONICOTINOIDS GENERALLY	15
PROCEDURAL BACKGROUND.....	17
I. PAST CASES.....	17
II. MOVING FORWARD	18
STATEMENT OF LEGAL GROUNDS.....	19
I. FWS MUST TAKE ACTION TO PROHIBIT THE GROWING OF GE CROPS ON REFUGE LANDS.....	19
A. FWS Should Act to Ban GE Crops in NWRs	19
1. Legal Authority to Ban GE Crops Under the NWRA.....	19
2. Allowing GE Crops goes Against the Mission of the Refuge System.....	19
3. Legislative History of the 1997 Act	20
4. Examples of Other GE Crop Bans	21
B. GE Crops are not Compatible with Refuge Purposes	21
1. Overview of the Compatible Use Concept as it Relates to GE Crops	21
2. Case Law on Compatibility Determinations and GE Crops.....	23
3. Harms Associated with GE Crops.....	24
4. Growing Harmful GE Crops is Not Compatible with Refuge Values	29

C. Allowance of GE Crops Violates FWS's Policy	30
1. GE Crops are Being Unlawfully Grown on NWRs Across the Nation.....	30
2. GE Crops Pose Significant Threats to NWRs	32
3. GE Crops are Not Essential to Accomplish Refuge Purposes	42
4. GE Crops Must be Banned from NWRs	42
II. FWS SHOULD TAKE IMMEDIATE ACTION TO PROHIBIT THE USE OF NEONICONICIDS ON NATIONAL WILDLIFE REFUGES	42
A. FWS Has Authority to Ban the Use of Neonicotinoids on NWRs.....	42
1. Legal Authority Under the Refuge Act	42
2. Examples of European and Domestic Neonicotinoid Bans.....	43
B. Use of Neonicotinoids is Improper Under the NWRA	44
1. Refuge Act Purposes and Insects	44
2. Neonicotinoids Cause Substantial Harm, Especially to Pollinators.....	45
3. Neonicotinoid Use is Not Compatible with the Refuge Purposes.....	49
C. Neonicotinoids are Being Unlawfully Used in NWRs.....	49
1. Regulation of Agriculture and Pesticide Use in NWRs	49
2. Use of Neonicotinoids in NWRs	51
3. Neonicotinoid Use in NRWs is Unlawful	54
D. Neonicotinoids Must be Banned from NWRs.....	54
III. FWS SHOULD TAKE IMMEDIATE ACTION TO COMPLY WITH THE MANDATES OF THE ENDANGERED SPECIES ACT	54
A. FWS Should Ban GE Crops and Neonicotinoids to Comport with its Affirmative Conservation Duties Under the ESA	54
B. FWS Should Initiate Formal Programmatic Consultation for Agricultural Activities..	55
1. FWS's Requirements Under the Endangered Species Act.....	56
2. Existing Analysis Fails to Adequately Consider Impacts of GE Crops	57
3. Existing consultation documents do not contemplate the widespread use of neonicotinoid treated seeds or the impacts of neonicotinoid use.....	57
4. Failure to Consult Could Result in Unauthorized Take of Threatened and Endangered Species.	58
C. If FWS does not Undertake Programmatic Consultation, it Should Reinitiate Consultation for all NWRs that Grow GE Crops and/or use Neonicotinoid Treated Seeds.	59
1. FWS Retains Involvement and Control over Farming Activities on NWRs	60
2. The Amount or Extent of Taking Allowed is Likely Exceeded as a Result of FWS Allowing GE crops and Neonicotinoid Use.....	60
3. New Information on GE Crops and Neonicotinoids Reveals Affects not Previously Considered.	61
4. Allowing Farmers to Use GE crops and/or Neonicotinoid-treated Seeds Constitutes Action Later Modified to Cause Effects to Listed Species not Considered in Prior Consultation Documents	61

5. New Species and Critical Habitat Listings.....	62
REQUESTED RELIEF	62
CERTIFICATION.....	63
CONCLUSION	63

***PETITION SEEKING TO BAN GENETICALLY ENGINEERED CROPS AND
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Pursuant to the right to petition the government clause contained in the First Amendment of the United States Constitution,¹ the Administrative Procedure Act (APA),² the National Wildlife Refuge System Administration Act (Refuge Act or NWRA)³ and its implementing regulations,⁴ and the Endangered Species Act (ESA),⁵ Petitioners respectfully request that United States Fish and Wildlife Service (FWS) ban genetically engineered (GE) crops⁶ and neonicotinoid insecticides⁷ from all National Wildlife Refuges (NWRs, refuges, or system) and also take immediate action to ensure system-wide compliance with the ESA. The requested actions are necessary because they address activities that pose significant threats to the very purpose of NWRs. “The mission of the System is to *administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats* within the United States for the benefit of present and future generations of Americans.”⁸ This Petition will describe how the use of GE crops and neonicotinoid insecticides runs directly counter to conservation, management, and restoration, and how these practices imminently threaten the ability of present and future generations of Americans to enjoy plants and animals in the habitats these refuges were created to protect.

¹ “Congress shall make no law . . . abridging . . . the right of the people . . . to petition the Government for a redress of grievances.” U.S. Const. Amend. I. The right to “petition for a redress of grievances [is] among the most precious of the liberties safeguarded by the Bill of Rights.” *United Mine Workers of Am. Dist. 12 v. Ill. State Bar Ass’n*, 389 U.S. 217, 222 (1967). The Supreme Court has recognized that the right to petition is logically implicit in and fundamental to the very idea of a republican form of government. *United States v. Cruikshank*, 92 U.S. 542, 552 (1875).

² 5 U.S.C. § 553(e).

³ 16 U.S.C. §§ 668dd–668ee.

⁴ 50 C.F.R. §§ 25–38.

⁵ 16 U.S.C. § 1531 *et seq.*

⁶ For purposes of this petition, the terms GE and transgenic may be used interchangeably. GE crops include, but are not limited to, crops genetically engineered for herbicide tolerance and crops genetically engineered to contain plant incorporated pesticides such as corn genetically engineered to contain *Bacillus thuringiensis* (*Bt*). This merits specific mention because in years past refuges have approved *Bt* corn while failing to properly recognize it as a GE crop. See *Requirements of New Farming Policies from the U.S. Fish and Wildlife Southeastern Regional Office*, Wheeler National Wildlife Refuge (Feb. 2007). *Bt* crops are unquestionably GE crops; USDA has repeatedly considered *Bt* crops to be “regulated articles” because they are created using recombinant DNA technology. See, e.g., USDA/APHIS Environmental Assessment in Response to Monsanto Petition 06-298-01p, APHIS 2007-0030-0034, <http://www.regulations.gov/#!documentDetail;D=APHIS-2007-0030-0034>.

⁷ For purposes of this petition, all references to neonicotinoids references both direct applications of neonicotinoid insecticides and the use of seeds treated with neonicotinoids. The term “neonicotinoid” refers to all insecticides within the neonicotinoid group.

⁸ 16 U.S.C. § 668dd(a)(2) (emphasis added).

ACTIONS REQUESTED

Petitioners call on FWS to carry out the following specific actions:

1. Rescind the Policy on Biological Integrity, Diversity, and Environmental Health (GMO Policy), and issue a new Policy declaring that farming with GE crops or neonicotinoids is not a compatible use of refuge lands.
2. Issue new regulations banning GE crops, neonicotinoid pesticides, and seeds or plants pre-treated or coated with neonicotinoid pesticides from all NWRs.
3. Ensure that all NWRs comply with the mandates of the ESA, particularly its consultation requirements and the prohibition against take, as these requirements relate to threatened and endangered species potentially affected by GE crops and neonicotinoids.
4. Adopt a monitoring program whereby FWS conducts field surveys of the areas where GE crops are planted. Provide the public with information regarding the location of these crops, acreage planted, the type of crop (e.g., Roundup Ready, *Bt*, etc.) and the types of pesticides (including herbicides) used, including the dates and amounts of application.
5. Conduct field surveys in 2014, 2015, and 2016 in the same areas to locate “volunteers,” i.e., new GE plants that germinate in the fields, and remove or destroy any such volunteers. Publicly report the quantity and location of any volunteers that are located and how they were removed or destroyed.

PETITIONERS

CFS is a Washington, D.C.-based, public interest, nonprofit membership organization that has offices in San Francisco, CA; Portland, OR; Honolulu, Hawai’i; and Washington, D.C. Since CFS’s founding in 1997, it has sought to ameliorate the adverse impacts of industrial farming and food production systems on human health, animal welfare, and the environment. CFS has more than 400,000 members nationwide. CFS seeks to protect human health and the environment by advocating for thorough, science-based safety testing of new agricultural products prior to any marketing and cultivation of crops in a manner that minimizes negative impacts such as increased use of pesticides and evolution of resistant pests and weeds. A foundational part of CFS’s mission is to further the public’s fundamental right to know what is in their food and food production methods.

To achieve its goals, CFS disseminates to government agencies, members of Congress, and the general public a wide array of educational and informational materials addressing the introduction of pesticides and GE crops into the environment and food supply. These materials

include, but are not limited to, reprints of news articles, policy reports, legal briefs, press releases, action alerts, and fact sheets. CFS also sends out action alerts to its True Food Network. These action alerts generate public involvement, education, and engagement with governmental officials on issues related to genetic engineering and other issues affecting a sustainable food system. Collectively, the dissemination of this material has made CFS an information clearinghouse for public involvement and governmental oversight of the use of genetic engineering and other technologies in our nation's food supply.

When necessary CFS also engages in public interest litigation to address the impacts of pesticides and GE crops on the environment, its members, and the public interest. Many of CFS's past lawsuits have involved protecting wildlife and the environment in the NWR System. CFS was a plaintiff in litigation concerning the planting of GE crops on the Prime Hook National Wildlife Refuge, which resulted in a decision enjoining the planting of GE crops until the refuge attained full compliance with National Environmental Policy Act (NEPA) and the Refuge Act.⁹ CFS was also a plaintiff in litigation concerning the planting of GE crops on Bombay Hook National Wildlife Refuge,¹⁰ which was resolved by a settlement agreement in February 2011. CFS also brought lawsuits challenging FWS's issuance of regional EAs to allow cultivation of GE crops in the Southeast and Midwest Regions.¹¹ These cases prompted FWS to end GE crop planting in the entire 12-state Northeastern Region and halt GE crop cultivation on twenty-five refuges across eight states in the Southeast.

The farming programs at the refuges injure CFS members by interfering, *inter alia*, with their aesthetic enjoyment of wildlife refuges and their inhabitants. In addition, the refuges' farming programs injure CFS's members' recreational enjoyment of refuges because the programs increase the use of pesticides. As a result, CFS's members are at greater risk of suffering health effects from pesticide use. Additionally, cultivation of GE crops compromises members' enjoyment of refuges because the crops pose risks to wildlife and injure the aesthetic and recreational interests of those who seek to maintain biodiversity and are opposed to altering the DNA of plants.

In addition, CFS members grow organic seed crops and consume products made with non-GE materials and without pesticides. CFS members also regularly eat organic foods and desire foods that are free of GE material and chemical pesticides. The proliferation of GE crops on refuge lands can contaminate non-GE crops nearby, and reduce the supply of food containing ingredients that are not contaminated with GE material. FWS's actions in allowing chemical pesticides and GE crops in refuges may make it more difficult for CFS members to produce, sell,

⁹ *Del. Audubon Soc'y, Inc. v. Sec'y of the U.S. Dep't of Interior*, 612 F. Supp. 2d 442 (D. Del. 2009).

¹⁰ *Del. Audubon Soc'y, Inc. v. U.S. Dep't of the Interior*, No. C10-162 GMS (D. Del. filed Feb. 25, 2010).

¹¹ *Ctr. for Food Safety v. Salazar*, 900 F. Supp. 2d 1 (D.D.C. 2012); *Ctr. for Food Safety v. Salazar*, 898 F. Supp. 2d 130 (D.D.C. 2012).

and eat foods not contaminated by GE material.

Public Employees for Environmental Responsibility (PEER) is a nonprofit organization, based in Washington, D.C., with field offices throughout the United States. PEER is a national alliance of local, state, and federal scientists; law enforcement officers; land managers; and other professionals dedicated to upholding environmental laws and values. PEER works to ensure that the nation's laws are being upheld and that the environment is being protected. PEER seeks to achieve these goals through advocacy, strategic communications, administrative actions and litigation.

PEER is active in addressing issues concerning the planting of GE crops on NWRs. With CFS, PEER was a plaintiff in litigation concerning GE crop cultivation on the Prime Hook NWR, litigation concerning GE crop cultivation on Bombay Hook NWR, and lawsuits challenging FWS's issuance of regional EAs to allow GE crop cultivation in the Southeast and Midwest Regions.

PEER members are injured by FWS's farming practices on NWRs. Members of PEER retreat to NWRs around the country to partake in birding and to derive aesthetic enjoyment from these public lands. Additionally, PEER members who are also FWS professionals are harmed by having to engage in practices that they believe are detrimental to the refuges, not in compliance with the Refuge Act and in violation of NEPA and the ESA. Further, PEER members are being harmed by the failure of FWS to comply with environmental laws and act in accordance with the mission of the National Wildlife Refuge System to conserve and manage land and water, and where appropriate, to provide for the restoration of fish, wildlife and plants within the refuge system.

Beyond Pesticides is a national nonprofit organization based out of Washington D.C. with members in 44 states and the District of Columbia. Beyond Pesticides and its members are being, and will be, adversely affected by Defendants' decisions to permit harmful pesticide use and GE crop cultivation without site-specific analysis. Beyond Pesticides promotes safe air, water, land, and food, and works to protect public health and the environment by encouraging a transition away from the use of toxic pesticides.

With the resources of Beyond Pesticides made available to the public on a national scale, Beyond Pesticides contributes to a significant reduction in unnecessary pesticide use, thus improving protection of public health and the environment. The risks to public health and the environment from pesticides are vast.

Beyond Pesticides and its members also aim to reduce the proliferation of GE crops designed to be herbicide-resistant, because herbicide-resistant crops exacerbate the herbicide and

pesticide treadmill that threatens the health of Beyond Pesticides members. About eighty-five percent of all GE crops are altered to be herbicide-resistant. These herbicide-resistant crops are the variety of GE crops approved for use on National Wildlife Refuges. Thus, it is the goal of Beyond Pesticides to educate on the public health and environmental consequences of this technology, and generate support for sound ecological-based regulatory and management systems.

Many Beyond Pesticides members live, work, and recreate in and near Refuges. Pesticide use and GE crop cultivation injures Beyond Pesticides members by interfering, *inter alia*, with their aesthetic enjoyment of wildlife refuges and their inhabitants. In addition, the Refuges' farming programs injure Beyond Pesticides members' recreational enjoyment of Refuges because the farming involves the use of highly toxic pesticides. Certain pesticides used on Refuges decrease biodiversity and impact pollinators and wildlife.

GE crop use on Refuges also injures Beyond Pesticides members. GE crops increase the use of certain herbicides by encouraging the growth of weeds that are resistant to herbicides. In turn, farmers have to use more, and more toxic, pesticides to stop these cultivated "superweeds." As a result, Beyond Pesticides members are at greater risk of suffering health effects from pesticide use. Additionally, GE crop cultivation compromises members' enjoyment of Region 3 Refuges because the crops pose risks to wildlife and reduce biodiversity.

The Center for Biological Diversity (CBD) is a nonprofit conservation organization with more than 50,000 members dedicated to the preservation, protection, and restoration of biodiversity and ecosystems throughout the world. CBD works to insure the long-term health and viability of animal and plant species across the United States and elsewhere, and to protect the habitat these species need to survive.

CBD has offices in San Francisco, Joshua Tree, and Los Angeles, California; Portland, Oregon; Silver Springs, New Mexico; Tucson and Flagstaff, Arizona; Anchorage, Alaska; Richmond, Vermont; Seattle, Washington; Minneapolis and Duluth, Minnesota; Las Vegas, Nevada; and Washington, D.C. CBD is actively involved in species and habitat protection issues throughout the United States, including the U.S. territories, as well as outside of the United States.

CBD has worked to protect wildlife on NWR lands by gaining protection under the Endangered Species Act for species that rely upon wildlife refuges. CBD has further worked to minimize the harm to sensitive species on NWR lands through litigation, outreach and advocacy. CBD's pesticide reduction campaign has further worked to minimize the harm to endangered species from pesticide use, including pesticides such as neonicitinoids.

CBD and its members regularly use and enjoy National Wildlife Refuge lands for a number of activities including hiking, fishing, hunting, camping, photographing scenery and

wildlife, and engaging in other vocational, scientific, and recreational activities. CBD and its members derive recreational, inspirational, religious, scientific, educational, and aesthetic benefits from their regular use and activities on these public lands. CBD and its members intend to continue to use and enjoy National Wildlife Refuge lands frequently and on an ongoing basis in the future. The aesthetic, recreational, scientific, educational and religious interests of CBD and its members have been and will continue to be adversely affected and irreparably injured by the use of neonicotinoid pesticides and genetically engineered crops in wildlife refuges.

INTRODUCTION

The National Wildlife Refuge System is a critical component of the natural heritage of all Americans. Congress created NWRs to ensure that present and future generations benefit from the national network of lands set aside for the conservation, management, and restoration of fish, wildlife, plants, and their habitats. NWRs contain a diverse array of protected habitat types, including rare and ecologically significant lowland grasslands and wetlands. Protections for these habitat types are crucial, because NWRs are often in the very ecosystems most threatened by development. Recent changes in commodity prices have made grassland and wetland conversion to cropland especially lucrative in Western Corn Belt States such as North Dakota, South Dakota, Nebraska, Minnesota, and Iowa.¹² Wildlife habitat is disappearing at an alarming rate: researchers have documented a net decline in grass-dominated land cover totaling nearly 530,000 hectares between 2006 and 2011 as grassland and associated wetlands are converted to soy and corn fields.¹³ The rapid conversion of wildlands to croplands threatens many already imperiled species, thus making the safeguarding of habitat in NWRs more important than ever.

This Petition requests that FWS prohibit two agricultural practices, the planting of GE crops and use of neonicotinoids, in NWRs. This action is compelled because GE crops and neonicotinoids are incompatible with the achievement of refuge purposes. Petitioners request new rules to amend NWR regulations on compatible uses to specifically exclude GE crops and neonicotinoid insecticides. In carrying out this action, FWS should include specific instructions and deadlines for expeditiously phasing out such practices where they exist. Petitioners also request that FWS take specific actions in order to comply with the mandates of the ESA. Finally, the Petition requests that FWS monitor and report on GE crops, pesticide use, and GE volunteers, so the public is informed about farming practices on refuge lands.

¹² Christopher K. Wright & Michael C. Wimberly, *Recent Land Use Change in the Western Corn Belt Threatens Grasslands and Wetlands* abstract, Proceedings of the Nat'l Acad. of Sci. (Feb. 2013), available at <http://www.pnas.org/content/early/2013/02/13/1215404110.abstract>.

¹³ *Id.*

STATEMENT OF LAW

I. ADMINISTRATIVE PROCEDURE ACT, 5 U.S.C. § 500 *et seq.* (summarized in pertinent part)

Under the APA, agencies must “give an interested person the right to petition for the issuance, amendment, or repeal of a rule.”¹⁴ Agency decisions “that [are] inconsistent with a statutory mandate or that frustrate the congressional policy underlying a statute” are impermissible.¹⁵ The APA establishes the applicable standard for review of agency actions, which is whether the agency’s decision was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law.¹⁶ The APA requires an agency to “conclude a matter presented to it” “within a reasonable time.”¹⁷ Judicial review under the APA requires that “the reviewing court shall compel agency action unlawfully withheld or unreasonably delayed.”¹⁸

II. NATIONAL WILDLIFE REFUGE ACT, 16 U.S.C. § 668dd *et seq.* (summarized in pertinent part)

All National Wildlife Refuge activity is governed by the National Wildlife System Administration Act of 1966 and the National Wildlife Refuge Improvement Act of 1997, collectively known as the Refuge Act, the organic act for the system.¹⁹ The Secretary and FWS are responsible for managing NWRs.²⁰

A. Description of the Act

The mission of the NWR System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”²¹ The Refuge Act requires individual refuges to complete Comprehensive Conservation Plans (CCPs) to guide refuge action. A CCP is “a document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge.”²² The Secretary

¹⁴ 5 U.S.C. § 553(e).

¹⁵ See *Ocean Advocates v. U.S. Army Corps of Eng’rs*, 402 F.3d 846, 858–59 (9th Cir. 2005) (internal citation omitted).

¹⁶ 5 U.S.C. § 706(2)(A); see also *W. Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 496 (9th Cir. 2010).

¹⁷ 5 U.S.C. § 555(b) (“[W]ithin a reasonable time, each agency shall proceed to conclude a matter presented to it.”); *id.* § 706(1) (“The reviewing court shall . . . compel agency action unlawfully withheld or unreasonably delayed.”); *id.* § 555(e) (“Prompt notice shall be given of the denial in whole or in part of a written application, petition, or other request of an interested person made in connection with any agency proceeding.”).

¹⁸ *Id.* § 706(1).

¹⁹ 16 U.S.C. § 668dd.

²⁰ *Id.* § 668dd(a)(1).

²¹ *Id.* § 668dd(a)(2).

²² 50 C.F.R. § 25.12.

must “prepare a comprehensive conservation plan . . . for each refuge within 15 years after the date of the enactment of the National Wildlife Refuge System Improvement Act of 1997,” and revise the plans every 15 years thereafter.²³ Draft CCPs must be published in the Federal Register, and the public must have the opportunity to comment on these plans.²⁴

B. Compatibility Determinations

Under the Refuge Act, “[t]he Secretary is authorized . . . to permit the use of any area within the System for any purpose . . . whenever he determines that such uses are compatible with the major purposes for which such areas were established.”²⁵ Under the Refuge Act, “the Secretary shall not initiate or permit a new use of a refuge or expand, renew, or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety.”²⁶ A compatible use is defined as a “wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”²⁷ Compatible uses are determined in compatibility determinations (CDs). Refuge managers must employ sound professional judgment “consistent with principles of sound fish and wildlife management and administration, [and] available science and resources.”²⁸ If a proposed use is found to be incompatible with the NWR’s purpose then “the conflict shall be resolved in a manner that first protects the purposes of the refuge, and, to the extent practicable, that also achieves the mission of the System.”²⁹

C. FWS’s Policy on Biological Integrity, Diversity, and Environmental Health

The Refuge Act “clearly establishes that wildlife conservation is the singular National Wildlife Refuge System mission” and FWS recognizes that “biological integrity, diversity and environmental health are critical components of wildlife conservation.”³⁰ To that end, FWS has established a national policy expressly prohibiting the use of transgenic crops unless they are “essential” to accomplishing refuge purposes.³¹ “We do not use genetically modified organisms in refuge management unless we determine their use is essential to accomplishing refuge purpose(s) and the Director approves the use.”³² The Midwest incorporated the national policy, and limited which GE crops could be used if essential, in the Region’s 2010 statement of policy.

²³ 16 U.S.C. § 668dd(e)(1)(A), (B).

²⁴ *Id.* § 668dd(e)(1)(A)(i), (ii).

²⁵ *Id.* § 668dd(d)(1)(A).

²⁶ *Id.* § 668dd(d)(3)(A)(i).

²⁷ *Id.* § 668ee(1).

²⁸ *Id.* § 668ee(3).

²⁹ *Id.* § 168dd(a)(4)(D).

³⁰ U.S. FWS, *Biological Integrity, Diversity, and Environmental Health*, 601 FW 3, 3.15(C) (2001).

³¹ *Id.*

³² *Id.*

Where feasible and consistent with Refuge purpose(s), Region 3 staff (we) restore and manage degraded or modified habitats in the pursuit of biological integrity, diversity, and environmental health. We do not allow uses or management practices that result in the maintenance of non-native plant communities unless we determine there is no feasible alternative for accomplishing the Refuge purpose(s). Where farming is not required for refuge purpose(s), we cease farming and strive to restore natural habitats. *We do not use genetically modified organisms in Refuge management unless we determine that their use is essential to accomplishing Refuge purpose(s).* . . . The use of genetically modified organisms is limited to herbicide-resistant crops only.³³

FWS's biologists have recognized "several significant risks in connection with planting genetically modified crops [on refuges] including biological contamination, increased weed resistance, and damage to soils."³⁴ Thus, this policy is intended to reign in agricultural activity that harms refuge values.

III. ENDANGERED SPECIES ACT, 16 U.S.C. § 1531 *et seq.* (summarized in pertinent part)

Congress enacted the ESA for the purpose of providing a "means whereby the ecosystems upon which endangered species and threatened species depend may be conserved . . ."³⁵ Section 7(a)(2) of the ESA requires federal action agencies, here FWS, to insure that their actions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical habitat]."³⁶ It also requires an agency to enter into consultation if a proposed action may affect endangered or threatened species or critical habitat.³⁷ Agencies must use the best available scientific and commercial data available to comply with its obligations under section 7.³⁸

In addition, the ESA prohibits the "take" of endangered species.³⁹ "Take" includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."⁴⁰ If an agency determines that an activity will take protected species, it must enter into formal consultation where FWS closely studies the impacts of the project, documents this in a biological

³³ *Id.* (emphases added).

³⁴ *Del. Audubon Soc'y, Inc. v. Sec'y of the U.S. Dep't of Interior*, 612 F. Supp. at 442.

³⁵ 16 U.S.C. § 1531(b).

³⁶ *Id.* § 1536(a)(2).

³⁷ *Id.*

³⁸ *Id.* § 1536(b); *Res. Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1304 (9th Cir. 1994).

³⁹ 16 U.S.C. § 1538(a)(1)(B).

⁴⁰ See 50 C.F.R. § 17.3 (2012) (defining harm).

opinion, and then, if the take is not purposeful and will not jeopardize the species, may issue an incidental take statement that authorizes limited incidental take.⁴¹

After the agency completes the consultation process, it may proceed with a project. However, the ESA requires the agency to reinitiate consultation in a number of situations, including if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat is designated that may be affected by the action.⁴²

STATEMENT OF FACTUAL GROUNDS

I. GE CROPS GENERALLY

Despite a quarter century of promises, agricultural biotechnology has yet to provide any concrete advancements towards reducing world hunger, ameliorating global malnutrition, combating, creating miracle drugs through GE plants or animals, or climate change⁴³. Instead, the world's largest biotechnology companies have primarily focused on saturating the marketplace with a handful of heavily subsidized GE commodity crops that either produce the pesticide Bt and/or withstand direct application of herbicides, especially glyphosate.⁴⁴ Crops genetically engineered for herbicide resistance can survive what would normally be a toxic dose of a broad-spectrum herbicide; this in turn facilitates the indiscriminate spraying of agricultural fields with herbicides; over five of every six acres of transgenic crops worldwide (84 percent) are engineered for herbicide resistance.⁴⁵ Despite repeated claims that these crops somehow increase yields, the only independent study of their results, conducted by the Union of Concerned Scientists, concluded that this is simply not the case.⁴⁶ Traditional breeding practices have, however, succeeded in increasing crop yields.⁴⁷

⁴¹ 16 U.S.C. § 1536(a)(2), (b)(4), (o).

⁴² 50 C.F.R. § 402.16(b) (“Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) If a new species is listed or critical habitat designated that may be affected by the identified action.”)

⁴³ Debbie Barker, Ctr. for Food Safety, *The Wheel of Life: Food, Climate, Human Rights, and the Economy*, 42-45 (2011), available at http://www.centerforfoodsafety.org/files/thewheeloflife_barker_40796.pdf.

⁴⁴ *Id.*

⁴⁵ Ctr. for Food Safety, Revised Comments Delivered at the Aug. 1, 2007 Meeting of the USDA’s Advisory Comm. on Biotechnology and 21st Century Agric., Genetically Modified (GM) Crops and Pesticide Use (Feb. 2009), available at <http://www.co.lake.ca.us/Assets/BOS/GE+Crops+Committee/6.+GM+Crops+and+Pesticide+Use.pdf>.

⁴⁶ Union of Concerned Scientists, *Failure to Yield: Evaluating the Performance of Genetically Engineered Crops* 1–5 (Apr. 2009), available at http://www.ucsusa.org/food_and_agriculture/science_and_impacts/science/failure-to-yield.html.

⁴⁷ *Id.*

Monsanto, now the world's largest seed company,⁴⁸ uses genetic engineering primarily to create patented "Roundup Ready" crops for use in tandem with its Roundup herbicide.⁴⁹ American soybeans, corn, cotton, canola, and sugar beets are now largely Roundup Ready.⁴⁹ This has made glyphosate (Roundup's active ingredient) the most heavily used chemical pesticide in history, with an astounding 180 to 185 *million* pounds applied in just one year in U.S. agriculture, according to the U.S. Environmental Protection Agency (EPA)'s most recent sales and usage figures.⁵⁰

The use of GE crops causes a variety of adverse impacts to farmers, the public at large, and the environment. This Petition will focus on three general categories of major adverse impacts on NWRs: (1) transgenic contamination; (2) the proliferation of "superweeds"; and, (3) increased the herbicide use associated with GE crops.

II. NEONICOTINOIDS GENERALLY

Neonicotinoids constitute a potent and relatively new class of insecticides that have quickly become the most widely used insecticides in the world, with billions of dollars in sales.⁵¹ The most common neonicotinoids on the market are imidacloprid, thiamethoxam, clothianidin, thiacloprid, dinotefuram, and acetamiprid.⁵² Annually, over 3.5 million pounds of neonicotinoids have been applied across the United States,⁵³ a number that continues to grow. Neonicotinoids are used as foliar sprays, and are also very widely used as a seed treatment for corn and other commodity crops such as wheat, soy, canola, and cotton.⁵⁴ Over *ninety-nine percent* of all the corn seed planted in North America is treated with neonicotinoids, primarily clothianidin and a closely related compound, thiamethoxam; only the 0.2 percent of total corn seed used for organic

⁴⁸ Karen Gullo, *Monsanto Sued on Behalf of Farmers*, Bloomberg, June 7, 2013, available at <http://www.bloomberg.com/news/2013-06-07/monsanto-sued-on-behalf-of-farmers-over-modified-wheat.html>.

⁴⁹ USDA figures show that 93 percent of all soybeans, 78 percent of all cotton, and 70 percent of all corn grown in the U.S. in 2010 were GE, HR varieties—nearly all Roundup Ready. U.S. Dep't Agric., Economic Research Serv., *Adoption of Genetically Engineered Crops in the U.S.*, <http://www.ers.usda.gov/Data/BioTechCrops/>; see William Neuman & Andrew Pollack, *Farmers Cope with Roundup-Resistant Weeds*, N.Y. Times, May 3, 2010, at http://www.nytimes.com/2010/05/04/business/energy-environment/04weed.html?_r=1&pagewanted=all.

⁵⁰ U.S. EPA, *Pesticide Industry Sales and Usage: 2006 and 2007 Market Estimates* tbl. 3.6 (Feb. 2011), available at http://www.epa.gov/opp00001/pestsales/07pestsales/market_estimates2007.pdf.

⁵¹ See generally Pierre Mineau & Cynthia Palmer, Am. Bird Conservancy, *The Impact of the Nation's Most Widely Used Insecticides on Birds* 12 (2013), available at http://www.abcbirds.org/abcpolicies/policy/toxins/Neonic_FINAL.pdf.

⁵² Jeroen P van der Sluijs et al., *Neonicotinoids, Bee Disorders and the Sustainability of Pollinator Services*, 5 Curr Opin Environ Sustain 293–305 (Sept. 2013), available at <http://www.sciencedirect.com/science/article/pii/S1877343513000493>.

⁵³ Memorandum from U.S. EPA, DP404793, Estimated Incremental Increase in Clothianidin Usage from Pending Registrations (2012).

⁵⁴ Larissa Walker, Ctr. for Food Safety, *Pollinators and Pesticides* i–ii (2013), available at http://www.centerforfoodsafety.org/files/pollinatorreport_final_19155.pdf.

production is spared this treatment.⁵⁵ Soy, canola, wheat, and cotton production also occur on millions of acres in the U.S.; neonicotinoid treated seeds are currently being planted on approximately *200 million acres* in the U.S.⁵⁶

When neonicotinoids are used as a seed treatment, the seed absorbs the insecticide and transports it throughout all parts of the growing plant's tissue, rendering the entire plant poisonous to insects.⁵⁷ Neonicotinoid treatment of seeds results in systemic expression in the plant, that is, the insecticide is taken up by the plant's vascular system as the seed grows and gets expressed through its tissues, including flowers, pollen, and nectar.⁵⁸ Thus the entire plant is toxic to insects.⁵⁹ Neonicotinoids paralyze insects by blocking a chemical pathway that transmits nerve impulses in their central nervous systems.⁶⁰

Neonicotinoids are extremely persistent in the environment, with half-lives that range from 148 days to 6,932 days depending on soil types and weather conditions.⁶¹ Their persistent nature leads to increased contamination of surface and groundwater in addition to soil.⁶² The main pathways for exposure to neonicotinoids are residues in pollen and nectar, dust from treated seeds and soils, planter exhaust, untreated but contaminated non-crop plants adjacent to treated fields, guttation droplets on both treated and untreated but contaminated plants, and residues from foliar uses.⁶³ Once treated with a neonicotinoid, a plant can become highly toxic to non-target invertebrates, including pollinators such as honey and bumble bees.⁶⁴ In addition to the obvious effects of lethal doses neonicotinoids, sub-lethal exposures can cause significant impacts to bees, including reduced learning, foraging ability, and homing ability.⁶⁵ Studies on the impacts of neonicotinoids have primarily focused on the significant harms they cause to

⁵⁵ V. Girolami et al., *Translocation of Neonicotinoid Insecticides From Coated Seeds to Seedling Guttation Drops: A Novel Way of Intoxication for Bees*, 102 J. Econ. Entomology 1808 (2009); Christian H. Krupke et al., *Multiple Routes of Pesticide Exposure for Honey Bees Living Near Agricultural Fields*, 7 PLoS ONE 1 (2012), available at e29268.doi:10.1371/journal.one.0029268; Andrea Tapparo et al., *Assessment of the Environmental Exposure of Honeybees to Particulate Matter Containing Neonicotinoid Insecticides Coming From Corn Coated Seeds*, 46 Envtl. Sci. & Tech. 2592 (2012), available at DOI: 10.1021/es2035152.

⁵⁶ Univ. of Minn. Inst. of Agric. Professionals, *2013 Crop Pest Management Shortcourse 4* (2013), available at <http://www.extension.umn.edu/agriculture/ag-professionals/cpm/2013/docs/UMN-Ext-CPM13-Krupke.pdf>.

⁵⁷ See *id.*; Walker, *supra* note 54, at 4–5.

⁵⁸ *Id.*

⁵⁹ Jennifer Hopwood et al., *Are Neonicotinoids Killing Bees?* 18 2012), <http://ento.psu.edu/publications/are-neonicotinoids-killing-bees>.

⁶⁰ *Id.* at 3.

⁶¹ Memorandum from U.S. EPA, EFED Risk Assessment for the Seed Treatment of LClothianidin 600FS on Corn and Canola 40–41 (2013), available at <http://www.epa.gov/pesticidse/chemical/foia/cleared-reviews/reviews/044309-2003-02-20a.pdf>.

⁶² See *id.*; Walker, *supra* note 54, at 6.

⁶³ See *id.*; V. Girolami et al., *supra* note 55; Krupke et al., *supra* note 55, at 2–3; Tapparo et al., *supra* note 55.

⁶⁴ Dave Goulson, *An Overview of the Environmental Risks Posed by Neonicotinoid Insecticides*, 50 J. Applied Ecology, 977, 977 (Aug. 2013), available at Doi: 10.1111/1365-2664.12111.

⁶⁵ *Id.* at 983–84.

pollinators; however, researchers are now starting to identify harm resulting from neonicotinoid use on aquatic invertebrates and birds.⁶⁶

PROCEDURAL BACKGROUND

I. PAST CASES

Petitioners have now brought five separate legal actions concerning the unlawful cultivation of GE crops on NWRs in various regions in order to stop this practice and to bring Refuges into compliance with the APA, and NEPA.⁶⁷ As a result of this litigation GE crops are grown on fewer refuges, and the agency has had to analyze and acknowledge the environmental impacts of GE crops on NWRs.

The first case, *Delaware Audubon Society v. Secretary of the U.S. Department of Interior*, challenged FWS's decision to allow farming of transgenic crops on the Prime Hook National Wildlife Refuge without complying with NEPA or the Refuge Act.⁶⁸ The district court concluded FWS violated NEPA, the Refuge Act, and the APA, and granted the plaintiffs summary judgment and injunctive relief.⁶⁹ It noted that the “defendants permitted [the farming of transgenic crops] in contravention of (and in spite of) their own ‘GMO policy,’” and that “it is undisputed that farming with genetically modified crops at Prime Hook poses significant environmental risks.”⁷⁰ The court took special note of the fact that FWS’s “own biologists had identified several significant risks in connection with planting genetically modified crops at Prime Hook, including biological contamination, increased weed resistance, and damage to soils.”⁷¹

After the Prime Hook decision, the plaintiffs filed another suit alleging similar violations of NEPA and the Refuge Act at the Bombay Hook NWR.⁷² The parties settled, with FWS agreeing not to authorize further planting of GE crops at Bombay Hook and four other NWRs in the Northeast Region which had previously permitted such farming, unless and until appropriate NEPA analysis was completed.⁷³ The Northeast region has now discontinued its farming program.

⁶⁶ See Mineau & Palmer, *supra* note 51, at 40–51.

⁶⁷ 42 U.S.C. § 4321 *et seq.*

⁶⁸ 612 F. Supp. 2d at 446.

⁶⁹ *Id.* at 453.

⁷⁰ *Id.* at 452, 453.

⁷¹ *Id.* at 451.

⁷² *Del. Audubon Soc'y, Inc. v. U.S. Dep't of the Interior*, No. 10-162 GMS (D. Del. filed Feb. 25, 2010) (*Bombay Hook*).

⁷³ See Joint Status Report (Dkt. No. 10), *Bombay Hook*, No. 10-162 GMS (D. Del. Nov. 22, 2010).

Following the decisions in *Prime Hook* and *Bombay Hook*, Petitioners sent a letter to the Secretary on August 11, 2009 urging “a moratorium on all [transgenic] crop cultivation in National Wildlife Refuges” until the agency complied with NEPA and the Refuge Act.⁷⁴ The Secretary never responded to Petitioners regarding that letter. Also in 2009, FWS’s Acting Director sent a memorandum to regional NWR Directors stressing that all refuge farming programs must be in compliance with NEPA, the APA, and its policies on Refuge Compatibility and Biological Integrity, Biological Diversity and Environmental Health. Still, some NWRs continued to allow GE crops.

In August 2011, plaintiffs challenged FWS’s approval of GE crops on NWRs in the Southeast Region. Once again Petitioners prevailed when the court recognized that FWS had violated the law with its arbitrary and capricious decision to allow the growing of GE crops in the region.⁷⁵ The court there vacated FWS’s authorization of GE crop plantings and required it to amend its standard cooperative-farming agreement and all future cooperative farming agreements to prohibit the use of GE crops, pending appropriate NEPA analysis.⁷⁶ Recognizing contamination risks, the court also ordered FWS to conduct field surveys for three years to locate GE “volunteer” crops and to remove or destroy any crops they located.⁷⁷

Finally, on November 2, 2011, Petitioners challenged the Midwest Region’s analysis for continued use of GE farming throughout the Midwest Region. On October 15, 2012, a district court found that this Programmatic EA passed muster and that the plaintiffs needed to challenge the site specific agency determinations.⁷⁸ Accordingly, in August of 2013, Petitioners filed a new complaint against five specific Midwest refuges challenging their use of GE crops and dangerous pesticides including neonicotinoids.⁷⁹ This ongoing litigation pertains to activities on Crab Orchard NWR, Cypress Creek NWR, Iowa WMD, Detroit Lakes WMD, and Swan Lake NWR.⁸⁰

II. MOVING FORWARD

The aforementioned piecemeal approach to halting the use of GE crops and highly toxic pesticides including neonicotinoids in individual and regional NWRs is a resource intensive process for both Petitioners and FWS. We believe that the agency’s resources would be better spent issuing a new policy followed by a regulation banning these unlawful practices on all refuges nationwide, and furthering the Refuge Act’s mission, rather than defending itself for

⁷⁴ Letter from Center for Food Safety et al. to Secretary of Interior (Aug. 11, 2009).

⁷⁵ *Ctr. for Food Safety v. Salazar*, 900 F. Supp. 2d 1, 4 (D.D.C. 2012).

⁷⁶ Order, *Ctr. for Food Safety v. Salazar*, No. 11-1457 JEB (D.D.C. Nov. 5, 2012).

⁷⁷ *Id.*

⁷⁸ *Ctr. for Food Safety v. Salazar*, 898 F. Supp. 2d 130 (D.D.C. 2012).

⁷⁹ Complaint, *Ctr. for Food Safety v. Jewell*, No. 13-2389 (N.D. Cal. Aug. 27, 2013).

⁸⁰ *Id.*

allowing agricultural practices that have no place in refuges in litigation on a region by region, refuge by refuge basis.

History illustrates that the requested actions are attainable with little to no disruption to refuge objectives. Both the Northeast and Southeast Regions have seamlessly transitioned away from harmful agricultural practices on refuge lands. The Northeast region abandoned all refuge agriculture several years ago and similarly, the Southeast region stopped all GE agriculture over a year ago without any deleterious effects. These experiences prove that GE crop cultivation and other harmful agricultural practices are not needed to accomplish refuge purposes.

In fact, the Southeast Region—the breadbasket of the U.S.—expanded the variety of crops and thus biological diversity when it transitioned away from GE crops despite predictions from several refuge managers that continued farming would be impossible. A year after the transition, farmers were planting nearly the same acreage in Southeastern refuges as the year before—all without GE crops. The Southeast region’s farming program continued with farmers planting conventional, non-GE corn, and soy. Farmers also increased their reliance on rice, millet, clover, and sunflowers, crops that are more beneficial to birds and pollinating insects. The Southeast region’s transition obviates any claims that GE crops are essential to refuge purposes and illustrates that a national transition is possible.

STATEMENT OF LEGAL GROUNDS

I. FWS MUST TAKE ACTION TO PROHIBIT THE GROWING OF GE CROPS ON REFUGE LANDS

A. FWS Should Act to Ban GE Crops in NWRs

1. Legal Authority to Ban GE Crops Under the NWRA

In crafting the Refuge Act, Congress granted the Secretary of Interior, acting through FWS, the power to promulgate regulations to carry out the purposes of the Act.⁸¹ By promulgating regulations banning GE crops on NWRs, FWS will help carry out the Refuge Act, thereby furthering the System’s mission to conserve, manage, and restore habitat by protecting refuge lands from the myriad harms caused by the use of GE crops in agriculture.

2. Allowing GE Crops goes Against the Mission of the Refuge System

The Refuge Act states that the agency “shall . . . (B) ensure that the biological integrity, diversity, and environmental health of the [National Wildlife Refuge] System are maintained for the benefit of present and future generation of Americans; [and] (C) plan and direct the

⁸¹ 16 U.S.C. § 668dd(b)(5).

continued growth of the [National Wildlife Refuge] System in a manner that is best designed to accomplish the mission of the System, to contribute to the conservation of the ecosystems of the United States⁸² For the many reasons discussed throughout this Petition, including the threats of transgenic contamination, increased herbicide use, the proliferation of superweeds, and harm to threatened and endangered species, FWS should utilize its authority under the Refuge Act to ban GE crops from the entire refuge system. By doing so, FWS would be taking a critical step to managing NWRs in accordance with its mandate to ensure the health of the NWRs and to contribute to the conservation of this nation’s ecosystems.

3. Legislative History of the 1997 Act

The legislative history of the 1997 amendments to the 1966 Refuge Act is replete with expressions of concern that support the actions requested by Petitioners. Senator Graham noted that “public use has not always been carried out in a manner that is consistent with the well-being of our refuges and their wildlife.”⁸³ Senator Graham cited to a 1989 study by the General Accounting Office stating that secondary activities considered harmful to wildlife resources, including farming, were occurring on nearly sixty of refuges, and then a 1991 FWS study finding activities harmful to wildlife at 63 percent of refuges.⁸⁴ He went on to note that the 1997 amendments were necessary because “Refuge managers, despite their best efforts, have often been susceptible to outside pressure to allow these damaging activities because the laws governing the Refuge System are not completely clear.”⁸⁵ Senator Graham went on to discuss how decisions on what uses were compatible with wildlife conservation were often made improperly, making plain that the purpose of the 1997 amendments was to reign in these harmful activities and refocus agency activities on wildlife conservation.⁸⁶ While signing the 1997 amendments, President Clinton emphasized that the wildlife-centered mission of the Refuge System stating that “[w]ildlife conservation is the purpose of the refuges.”⁸⁷

These expressions of intent make plain that the Refuge Act allows—even mandates—the actions requested by Petitioners. The farming practices at issue do nothing to promote wildlife conservation and indeed, they cause significant harm to wildlife. These are the very types of harms that the 1997 amendments to the Refuge Act were enacted to prohibit.

⁸² *Id.* § 668dd(4)(B)-(C).

⁸³ 143 Cong. Rec. S9092-04, 1997 WL 561070 (statement of Sen. Graham).

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ The White House, Office of Communications, President’s Statement on Signing the National Wildlife Refuge System Improvement Act of 1997, October 9, 1997.

4. Examples of Other GE Crop Bans

Despite the widespread adoption of GE crops in the U.S., numerous jurisdictions have banned GE crops in recognition of the many harms associated with their use in agriculture. Local governments from Montville, Maine to Mendocino County, California have enacted prohibitions on GE crops.⁸⁸ These bans have been passed on the basis of citizen concerns including the environmental impacts of GE crops. In addition to U.S. GE crop bans, several nations, including Japan, New Zealand, and Ireland, have enacted bans against GE crops. These entities have recognized that GE crops cause unacceptable harms, and their action has shown that it is entirely possible to ban GE crops. Indeed, many of the entities that have banned GE crops currently support robust agricultural economies. FWS should follow the lead of these domestic and international leaders and, in recognition of the dangers associated with GE crops, take immediate action to ban their use on NWRs.

B. GE Crops are not Compatible with Refuge Purposes

1. Overview of the Compatible Use Concept as it Relates to GE Crops

Under the Refuge Act, the Secretary is authorized to “permit the use of any area within the System for any purpose . . . whenever he determines that such uses are compatible with the major purposes for which such areas were established.”⁸⁹ A “compatible use” is defined as a “wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”⁹⁰ The agency “shall not initiate or permit a new use of a refuge or expand, renew, or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety.”⁹¹ Compatible uses are determined in compatibility determinations and the agency may not expand or extend any of the allowed uses of NWRs, including farming or specific farming

⁸⁸ See Ctr. For Food Safety, *Genetically Engineered Crops and Foods: Regional Regulation and Prohibition* 10–11 (June 2006). The town of Montville, Maine; Trinity, Marin, Santa Cruz, and Lake counties; Arcata and Point Arena, California; and Hawaii County, Hawaii have passed mandatory prohibitions on GE crops. See Point Arena, Cal., Municipal Code, ch. 8.25 (2008); Santa Cruz CAL., Municipal Code, ch. 6.10 (2006) (banning cultivation of GM crops); Santa Cruz County, CAL. Code, ch. 7.31 (2006); Trinity County, CAL., Code, ch. 8.25 (2004); Marin County, CAL., Code, ch. 6.92 (2004); Mendocino County, CAL., Code, ch. 10A.15 (2004); Arcata, CAL., Municipal Code, ch. 10.5 § 5920–5960 (2004); Hawaii County, HAW. Code, ch. 14.90 (2008) (banning cultivation of transgenic coffee and taro root). Eighty-three towns in Vermont have also passed non-binding resolutions against GE crops. See GE Free Vermont, *Town Meeting Resolution Updates - 4 More Towns Say NO to GMOs!* (listing Vermont towns having passed resolutions against GM crops). The Maine towns of Brooklin and Liberty have also passed nonbinding resolutions declaring themselves “GE-free zones.” See Montville’s Genetically Modified Organisms Ordinance, available at http://www.montvillemaine.org/uploads/GMO_ordinance_3-08.pdf.

⁸⁹ 16 U.S.C. § 688dd(d)(1)(A).

⁹⁰ *Id.* § 668ee(1).

⁹¹ *Id.* § 688dd(d)(3)(A)(i).

practices, without making additional CDs.⁹² The Director delegates authority to make CDs through the Regional Director to the refuge manager. In making these determinations, the refuge manager is expected to exercise professional judgment “consistent with principles of sound fish and wildlife management and administration, [and] available science and resources.”⁹³

The Refuge Act is explicit in stating that achieving the Refuge’s purpose and fulfilling the mission of the System take precedent over other activities and proposed secondary activities cannot occur if they conflict with the established priorities. When a CD results in a finding that the proposed use is incompatible with the NWR’s purpose then “the *conflict shall be resolved in a manner that first protects the purposes of the refuge*, and, to the extent practicable, that also achieves the mission of the System.”⁹⁴

Thus the Refuge Act makes plain that farming practices may only be allowed on NWRs when compatible with the purposes of a refuge.⁹⁵ CDs are required for all refuges where farming takes place.⁹⁶ CDs must be in writing and their conclusions must be based on “sound professional judgment.”⁹⁷ CDs must address issues such as the nature and extent of the new use, the reason why the new use is being proposed, the expected impact of the new use on the individual refuge and the system as a whole, the new uses’ cost of administration, and explanations of how proposed use would be compatible and not detract from the purpose of that refuge or mission of the system.⁹⁸

Farming with GE crops requires specific mention in CDs because, as FWS has recognized, growing GE crops is different from traditional farming and requires special consideration.⁹⁹ FWS’s Policy on growing GE crops in NWRs explains: “[w]e do not use genetically modified organisms in refuge management unless we determine their use is *essential to accomplishing refuge purpose(s)* and the Director approves the use” (“essentiality” requirement or determination).¹⁰⁰ By requiring that GE crops must be essential to fulfilling a Refuge’s purpose *and* special approval even if that finding is made, FWS’s leadership has

⁹² *Id.*

⁹³ *Id.* § 668ee(3).

⁹⁴ *Id.* § 668dd(a)(4)(D) (emphasis added).

⁹⁵ *Id.* § 688dd(d)(1)(A).

⁹⁶ 50 C.F.R. § 25.12.

⁹⁷ *Id.*

⁹⁸ *Id.* § 26.41(a)

⁹⁹ See, e.g., U.S. FWS, *Midwest Region, Environmental Assessment, Use of Row Crop Farming and Genetically-modified, Glyphosate-tolerant Corn and Soybeans on National Wildlife Refuges and Wetland Management Districts* (Jan. 2011), http://www.fws.gov/midwest/planning/farmingNEPA/MidwestRegion_FarmingEA_January2011.pdf (analyzing specific impacts of GE crops on NWRs).

¹⁰⁰ U.S. FWS, *Biological Integrity, Diversity and Environmental Health*, 601 FW 3.15(c) (2001), available at <http://www.fws.gov/policy/601fw3.pdf> (emphasis added).

already recognized the dubiousness of GE crops having a place in NWRs because refuges cannot legitimately show that the essentiality requirement has been met.¹⁰¹

Recognizing the centrality of CDs in refuge management, the Refuge Act's implementing regulations provides refuge managers with discretion to reevaluate CDs when needed. Refuges managers shall

re-evaluate compatibility determinations for all existing uses other than wildlife-dependent recreational uses when conditions under which the use is permitted change significantly, or if there is significant new information regarding the effects of the use, or at least every 10 years, whichever is earlier. In addition, a refuge manager always may re-evaluate the compatibility of a use at any time.¹⁰²

This trigger provides refuge managers the opportunity to correct CDs wrongly made in the past in order to ensure proper refuge management moving forward. This flexibility is crucial in addressing uses which are now known to be incompatible with refuge purposes, such as the growing of GE crops, which cause significant harm to the very environments NWRs were created to protect. Some farmers may prefer to plant GE crops for various, often economic, reasons, but growing GE crops is not compatible with any individual refuge's purpose. Further, as a threshold matter, they are not compatible with the achievement of refuge purposes or the mission of the NWR system as a whole.

2. Case Law on Compatibility Determinations and GE Crops

A surprising number of refuge managers have failed to meet the threshold requirement to complete CDs, and specifically CDs that discuss GE as opposed to conventional farming, where such uses are contemplated on their refuges. In considering the concerns of Petitioners and others at the Prime Hook NWR, the District Court of Delaware carefully considered the role of CDs in the management of NWRs and determined that the failure to complete a CD warranted substantial judicial intervention.

In that case, Prime Hook's managers had entered into cooperative farming agreements without first issuing CDs, and continued to allow farming with GE crops despite the agency's stated goal of phasing out use of GE crops because such crops did not contribute to the achievement of refuge objectives.¹⁰³ Despite having this goal, over a period of several years defendants made repeated exceptions to their own policy on GE crops by continuing to allow the growth of the very GE crops they had determined presented significant risks to the environment

¹⁰¹ See, e.g., *Prime Hook*, 612 F. Supp. 2d at 446.

¹⁰² 50 C.F.R. § 25.21(g).

¹⁰³ See *Prime Hook*, 612 F. Supp. 2d at 445–46.

at Prime Hook NWR.¹⁰⁴ FWS's own biologists identified biological contamination, increased weed resistance, and soil damage as significant risks associated with allowing GE crops at Prime Hook. At Prime Hook, amongst the other significant failures that occurred between 2003 and 2006, the defendants failed to make any CDs, thus the court granted summary judgment for plaintiffs.¹⁰⁵ The court did not entertain any argument that growing GE crops could be compatible with the achievement of refuge objectives. Instead, it held that because Prime Hook had failed to complete CDs for farming the "public interest in protection of the nation's wildlife refuges," amongst other things, merited the court granting the extraordinary remedy of an injunction.¹⁰⁶ In determining that irreparable injury would incur if it did not enjoin FWS from allowing farming pending a CD,¹⁰⁷ the court made plain that the requirement for refuges to complete CDs to allow agricultural activities is nondiscretionary.

In another case, the court again sided with Petitioners against FWS regarding violations of the Refuge Act, NEPA, and the APA this time at twenty five refuges in the Southeast Region.¹⁰⁸ Even though those refuges had completed CDs addressing farming generally, they did not specifically address the use of GE crops.¹⁰⁹ The court also noted that FWS policy "prohibits the use of genetically engineered crops on refuge lands unless there is 'no feasible alternative' for accomplishing refuge purposes."¹¹⁰ The region had promised to halt the farming of GE crops pending required environmental study, but the court found FWS's argument that this rendered the case moot unpersuasive, and ruled on behalf of Petitioners.¹¹¹

3. Harms Associated with GE Crops

As recognized by the biologists at Prime Hook, growing GE crops is harmful for the environment, specifically because GE crops lead to transgenic contamination, the creation of herbicide resistant (HR) "superweeds," and because growing GE crops results in the increased use of herbicides.

i. Transgenic contamination generally

One major adverse impact stemming from the cultivation of GE crops is transgenic contamination: the unintended and undesired presence of GE material in organic or conventional

¹⁰⁴ *Id.* at 446.

¹⁰⁵ *Id.* at 447.

¹⁰⁶ *Id.* at 453.

¹⁰⁷ *Id.* at 452.

¹⁰⁸ *Ctr. for Food Safety v. Salazar*, 900 F. Supp. 2d at 3.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *Id.* at 7.

(non-GE) crops, as well as in wild species.¹¹² A GE crop can cross-pollinate with a crop or wild plant of a related species and thereby transfer its transgene and associated trait to that plant. GE crop seeds can contaminate non-GE crops in numerous ways including through wind (for light seeds), pollinators, flooding, improper cleaning of machinery, spillage during transport, and a throughout the many human activities that can occur at each stage of the crop production process.¹¹³

Harm from transgenic contamination includes both a socioeconomic and environmental component.¹¹⁴ Transgenic contamination has caused significant and widespread economic harm to the agricultural economy, both domestically and abroad;¹¹⁵ the fundamental loss of choice for farmers and consumers;¹¹⁶ and irreparable contamination of wild plants and lands.¹¹⁷ Unlike standard chemical pollution, transgenic contamination is living pollution that can propagate itself via gene flow.¹¹⁸ In wild lands, transgenic contamination is essentially impossible to contain.¹¹⁹ Similarly, on croplands, as one federal court found, “[o]nce the gene transmission occurs and a

¹¹² See *Geertson Seed Farms v. Johanns*, 2007 WL 518624, at *5 (N.D. Cal. Feb. 17, 2007) (“Biological contamination can occur through pollination of non-genetically engineered plants by genetically engineered plants or by the mixing of genetically engineered seed with natural or non-genetically engineered seed.”).

¹¹³ See, e.g., Michelle Marvier & Rene C. Van Acker, *Can Crop Transgenes Be Kept on a Leash?*, 3 *Frontiers Ecol. Env’t* 95–100 (2005).

¹¹⁴ See, e.g., *Monsanto Co. v. Geertson Seed Farms*, 130 S. Ct. 2743, 2756 (2010) (holding that the “injury has an environmental as well as an economic component”); *Geertson Seed Farms*, 2007 WL 518624, at *8 (“Here, the economic effects on the organic and conventional farmers of the government’s deregulation decision are interrelated with, and, indeed, a direct result of, the effect on the physical environment; namely, the alteration of a plant species’ DNA through the transmission of the genetically engineered gene to organic and conventional alfalfa.”).

¹¹⁵ See, e.g., Carey Gillam, *U.S. Organic Food Industry Fears GMO Contamination*, Reuters, Mar. 12, 2008, available at <http://www.reuters.com/article/idUSN1216250820080312>; Andrew Harris & David Beasley, *Bayer Agrees to Pay \$750 Million to End Lawsuits Over Gene-Modified Rice*, Bloomberg News, July 1, 2011, at <http://www.bloomberg.com/news/2011-07-01/bayer-to-pay-750-million-to-end-lawsuits-over-genetically-modified-rice.html>; K.L. Hewett, *The Economic Impacts of GM Contamination Incidents on the Organic Sector*, 16th IFOAM Organic World Congress Modena, Italy (June 16–20, 2008); Stuart Smyth et al., *Liabilities and Economics of Transgenic Crops*, 20 *Nature Biotech* 6 (June 2002).

¹¹⁶ See, e.g., *Geertson Seed Farms*, 2007 WL 518624, at *9 (“For those farmers who choose to grow non-genetically engineered alfalfa, the possibility that their crops will be infected with the engineered gene is tantamount to the elimination of all alfalfa; they cannot grow their chosen crop.”); see also *Ctr. for Food Safety v. Vilsack*, 2009 WL 3047227, at *9 (N.D. Cal. Sept. 21, 2009).

¹¹⁷ See generally *Ctr. for Food Safety, Contaminating the Wild? Gene Flow From Experimental Field Trials of Genetically Engineered Crops to Related Wild Plants* 1 (2006), available at http://www.centerforfoodsafety.org/files/contaminating_the_wild_report_41399.pdf; see also, e.g., Jay R. Reichman et al., *Establishment of Transgenic Herbicide-Resistant Creeping Bentgrass (*Agrostis solonifera L.*) in Nonagronomic Habitats*, 15 *Molecular Ecology* 4243–55, available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-294X.2006.03072.x/abstract>.

¹¹⁸ See, e.g., Rachel Bernstein, *Study Details Wild Crop of Genetically Modified Canola*, L.A. Times, Aug. 14, 2010, at <http://www.post-gazette.com/pg/10226/1079933-115.stm>; *New Study Finds GM Genes in Wild Mexican Maize*, New Scientist, Feb. 21, 2009; Mitch Lies, *Bentgrass Eradication Plan Unveiled*, Capital Press, June 16, 2011, at <http://www.capitalpress.com/newest/ml-scotts-061711>.

¹¹⁹ *Id.*

farmer's seed crop is contaminated with the Roundup Ready gene, there is no way for the farmer to remove the gene from the crop or control its further spread.”¹²⁰

ii. Superweeds generally

A second major adverse impact of transgenic crops is the growing epidemic of herbicide resistant (HR) “superweeds.” HR GE crops withstand direct, “over the top” application of a herbicide that is toxic to conventional crops, facilitating season-long application of a herbicide that otherwise is used primarily prior to planting or sprouting of a conventional crop seed in order to remove early season weeds.¹²¹ However, weeds are incredibly adaptable to their circumstances and thus, HR crops have fostered an ongoing epidemic of glyphosate-resistant weeds that is regarded by agronomists as one of the most serious challenges facing American agriculture.¹²² The weeds evolve most quickly when Roundup Ready crops are grown year after year, without break, on the same fields; like bacteria exposed to antibiotics, some weeds naturally resistant to glyphosate survive exposure, and then flourish and reproduce.¹²³

Glyphosate-resistant weeds were unknown in the two decades between the introduction of glyphosate in 1974 to the introduction of Roundup Ready crops in 1996, but since 2000, glyphosate-resistant weeds have evolved in an epidemic manner.¹²⁴ Glyphosate-resistant weed infested acreage in the U.S. more than doubled from November of 2007 to the summer of 2009.¹²⁵ The most recent reliable estimate is that approximately fifty to sixty-two million acres of U.S. land are currently infested with glyphosate resistant weeds.¹²⁶ These superweeds lead to increased use of glyphosate and additional toxic herbicides, greater utilization of soil-eroding tillage operations to physically remove weeds, and even the deployment of weeding crews to manually remove weeds.¹²⁷ All these measures increase farmers’ weed control costs, often dramatically.¹²⁸

¹²⁰ *Geertson Seed Farms*, 2007 WL 518624, at *5.

¹²¹ Debbie Barker, Ctr. for Food Safety, *The Wheel of Life: Food, Climate, Human Rights, and the Economy*, 42-45 (2011), available at http://www.centerforfoodsafety.org/files/thewheeloflife_barker_40796.pdf.

¹²² Stephen B. Powles, *Gene Amplification Delivers GR Weed Evolution*, PNAS 107, 955–56 (2010).

¹²³ *Id.*

¹²⁴ Robert Service, *A Growing Threat Down on the Farm*, Sci. 316, May 25, 2007, at 1114–17.

¹²⁵ Congressional testimony of Penn State weed scientist David A. Mortensen, available at <http://live.psu.edu/story/48259>.

¹²⁶ Charles M. Benbrook, *Impacts of Genetically Engineered Crops on Pesticide Use in the U.S.—the First Sixteen Years*, Environmental Sciences Europe 4 (Sept. 28, 2012), available at <http://www.enveurope.com/content/24/1/24>.

¹²⁷ See, e.g., Georgina Gustin, *Resistant Weeds Leave Farmers Desperate*, St. Louis Post-Dispatch, July 17, 2011, available at http://www.stltoday.com/business/local/article_f01139be-ace0-502b-944a-0c534b70511c.html.

¹²⁸ *Id.*

Leading agricultural experts have recognized the escalating problem of weed resistance,¹²⁹ and at least fourteen different weeds have been confirmed as glyphosate-resistant in thirty-six states in the U.S.¹³⁰ For example, GR horseweed has been reported in annual row crops in twenty-four U.S. states,¹³¹ and GR pigweed (Palmer amaranth) is expanding rapidly in the southern U.S.,¹³² where some pigweed populations have actually emerged to have a greater resistance to glyphosate than the Roundup Ready soybeans intentionally genetically engineered for glyphosate resistance by biotech companies.¹³³ Weedy resistance to glyphosate leads farmers to use harsher, more toxic herbicides.¹³⁴ On non-cultivated lands, superweeds are crowding out native plants and wildlife habitat, causing land managers to turn to increasingly toxic pesticides on these lands, resulting in increased wildlife exposure to toxic chemicals.¹³⁵

iii. Increased herbicide use generally

As discussed above, the most common use of genetic engineering in agriculture is to make crops resistant to herbicides, most often to the herbicide glyphosate. The rapid adoption of GE crops has also caused significant increases in overall use of herbicides in American agriculture, at an increase of 383 million pounds from 1996 to 2008.¹³⁶ Increased use of glyphosate is a significant contributing factor to this massive increase. Roundup Ready crop systems made glyphosate the most heavily used pesticide in the history of agriculture, with 180 to 185 million pounds applied by American farmers in 2007.¹³⁷ Overall glyphosate use in American agriculture jumped tenfold from 1995 to 2007.¹³⁸ While Roundup Ready crops led to glyphosate displacing certain other herbicides, the use of other, potentially more toxic herbicides has not subsequently diminished. For instance, atrazine use remained relatively constant at 70 to

¹²⁹ See Bob Hartzler, *Preserving the Value of Glyphosate*, Iowa State Univ. (Feb 20, 2004), <http://www.plant.uoguelph.ca/resistant-weeds/resources/preserving.html>.

¹³⁰ *Glyphosate Resistant Weeds by Species and Country*, Weedscience (2013), available at <http://www.weedscience.org/summary/MOA.aspx?MOAID=12>.

¹³¹ *Id.*; see also *Growth Stage Level Influences Level of Resistance in Glyphosate-Resistant Horseweed*, 2 Cal. Agric. 61, 67–70 (Apr.–June 2007).

¹³² Culpepper & Kichler, *University of Georgia Programs for Controlling Glyphosate-Resistant Palmer Amaranth in 2009 Cotton*, Univ. of Ga. Cooperative Extension (Apr. 2009); Bennett, D., *Resistant Pigweed ‘Blowing Up’ in Mid-South*, Delta Farm Press, July 30, 2008, available at <http://deltafarmpress.com/cotton/resistant-pigweed-0730>.

¹³³ E. Robinson, *Pollen Big Factor in Resistant Pigweed Spread*, Se. Farm Press, Apr. 28, 2009, available at <http://southeastfarmpress.com/cotton/herbicide-resistance-0428>.

¹³⁴ Friends of the Earth Int'l, *Who Benefits from GM Crops: The Rise in Pesticide Use* 7–12 (Jan. 2008), available at <http://www.foei.org/en/resources/publications/pdfs/2008/gmcrops2008full.pdf/view>.

¹³⁵ Service, *supra* note 124, at 1114–17.

¹³⁶ Charles Benbrook, *The Organic Center, Impacts of Genetically Engineered Crops on Pesticide Use: The First Thirteen Years* (Nov. 2009), available at http://www.organiccenter.org/science.pest.php?action=view&report_id=159.

¹³⁷ U.S. EPA, *Biological & Economic Analysis Div., Office of Pesticide Programs, Pesticide Industry Sales and Usage: 2006 and 2007 Market Estimate* tbl. 3.6 (2011). Total 2007 glyphosate usage in the U.S. of 198–208 million lbs. is more than twice as high as the second-leading pesticide, and exceeds even the peak U.S. production of DDT. Nat'l Pesticide Info. Ctr., Oregon State Univ., *DDT Technical Fact Sheet*, <http://npic.orst.edu/factsheets/ddttech.pdf>. Peak DDT production in the United States was 188 million lbs. in 1963. *Id.*

¹³⁸ Service, *supra* note 124, at 1114–17.

82 million pounds per year over the past two decades despite widespread adoption of Roundup Ready crops.¹³⁹ From 1994 to 2005, for instance, U.S. Department of Agriculture (USDA) data shows that aggregate use of glyphosate on soybeans, corn and cotton has risen from 7.9 million pounds to 119.1 million pounds, a 15-fold increase.¹⁴⁰

For some crops, adoption of Roundup Ready cropping systems increases herbicide use simply because current conventional production involves little herbicide application. The most prominent example of this is alfalfa, the fourth most widely grown crop in the United States which covers over 20 million acres in all fifty states.¹⁴¹ Because the majority of conventional alfalfa hay growers have historically used little or no herbicides,¹⁴² USDA has estimated that with adoption of GE alfalfa, glyphosate use could increase from under one-half million pounds to nearly twenty-five million pounds, assuming fifty-one percent adoption.¹⁴³ Extensive evidence, including warnings from FWS biologists, demonstrates that the greatly increased reliance on and use of glyphosate associated with Roundup Ready crops has fostered a dramatic increase in acreage infested with the superweeds discussed above.¹⁴⁴

The rapid evolution of HR weeds also set the stage for rapid adoption of the next generation of transgenic crops, crops that will be engineered for resistance to increasingly toxic herbicides such as 2,4-D, dicamba, and imidazolinones, often in combination.¹⁴⁵ These multiple HR, “stacked” crops—presented by the pesticide/biotech industry as the “solution” to superweeds—will in turn foster multiple HR weeds and a toxic spiral of increased herbicide use.¹⁴⁶ Further, 2,4-D, an active ingredient in the Agent Orange defoliant used in the Vietnam War, is a probable human carcinogen and endocrine disruptor, and a possible neurotoxin.¹⁴⁷ Similarly, studies show the potent herbicide dicamba to be a potential carcinogen and

¹³⁹ U.S. EPA, Biological & Economic Analysis Div., *supra* note 137, at tbl. 3.6; U.S. EPA, *Biological and Economic Analysis Div., Office of Pesticide Programs, Pesticide Industry Sales and Usage: 2000 and 2001 Market Estimates* tbl. 3.6 (2004), available at http://www.epa.gov/opp00001/pestsales/01pestsales/market_estimates2001.pdf.

¹⁴⁰ Friends of the Earth Int'l, *supra* note 134, at tbl. 4.

¹⁴¹ USDA, APHIS, *Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status: Final Environmental Impact Statement* 42–43 (Dec. 2010) [hereinafter Roundup Ready Alfalfa FEIS], available at <http://blogs.desmoinesregister.com/dmr/wp-content/uploads/2010/12/AlfalfaEIS.pdf>.

¹⁴² USDA, Nat'l Agricultural Statistics Serv., *Agricultural Chemical Usage: 1998 Field Crops Summary* 3 (1999), available at <http://usda01.library.cornell.edu/usda/nass/AgriChemUsFC//1990s/1999/AgriChemUsFC-05-19-1999.pdf> (finding that only 7 percent of alfalfa hay acres are treated with herbicides).

¹⁴³ USDA, APHIS, *Roundup Ready Alfalfa FEIS*, *supra* note 141.

¹⁴⁴ See, e.g., *Prime Hook*, 612 F. Supp. 2d at 446 (“The defendant’s own biologists identified several significant risks in connection with planting [GE] crops . . . biological contamination, increased weed resistance, and damage to soils.”); Service, *supra* note 124, at 1114–17.

¹⁴⁵ See, e.g., S. Kilman, *Superweed Outbreak Triggers Arms Race*, Wall St. J., June 4, 2010.

¹⁴⁶ See Bill Freese, Sci. Policy Analyst, Ctr. for Food Safety, *Response to Questions from Congressional Committee Investigating Herbicide-Resistant Weeds*, <http://www.centerforfoodsafety.org/wp-content/uploads/2011/03/Oversight-hearing-Freese-Response-to-Questions-corrected.pdf>.

¹⁴⁷ See Natural Res. Def. Council, *Petition to Revoke All Tolerances and Cancel All Registrations for the Pesticide 2,4-D*, EPA-HQ-OPP-2008-0877-0002 (filed Nov. 6, 2008), available at <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2008-0877-0002>.

developmental toxin.¹⁴⁸ Both herbicides are also highly volatile and are prone to drift in addition to off-target impacts, which can significantly harm nonresistant, conventional crops in the vicinity and destroy wildlife habitat.¹⁴⁹ Scientists estimate that use of these older, more toxic herbicides will increase by fifty-five million pounds a year if soybeans resistant to 2,4-D and dicamba are approved and widely adopted.¹⁵⁰

The use of GE crops results in transgenic contamination, superweeds, and increased herbicide use. These adverse impacts harm water quality and wildlife, in direct contravention of the National Wildlife Refuge system's very purpose.

4. Growing Harmful GE Crops is Not Compatible with Refuge Values

Growing GE crops is inherently incompatible with refuge purposes because GE crops are harmful to the environment. As discussed above, a compatible use is defined as a wildlife-dependent or other use that does not interfere or detract from the fulfillment of the System's mission.¹⁵¹ Where a compatibility determination results in a finding of incompatibility, "the conflict shall be resolved in a manner that first protects the purposes of the refuge."¹⁵² The Refuge Act's implementing regulations make plain that refuge managers must reevaluate CDs when conditions change, when new information about the effects of the use arise, when they prepare a new CCP, or at least every ten years, and further, they always retain discretion to re-evaluate compatibility.¹⁵³ In this way, the regulations express the intent of the Refuge Act to maintain close control on the types of activities allowed on refuges in order to ensure that these uses are compatible with refuge purposes.

Growing GE crops does not promote wildlife conservation. Indeed, by causing transgenic contamination, the proliferation of superweeds, and increasing herbicide use, GE crops are, as recognized by Prime Hook NWR's biologists, environmentally harmful and thus incompatible with refuge purposes. The Act is unambiguous that when a use is incompatible, the matter must be resolved in favor of protecting the refuge.

¹⁴⁸ Kenneth P. Cantor, *Pesticides and Other Agricultural Risk Factors for Non-Hodgkin's Lymphoma Among Men in Iowa and Minnesota*, 52 Cancer Res. 2447–55 (1992); Claudine Samanic et al., *Cancer Incidence Among Pesticide Applicators Exposed to Dicamba in Agricultural Health Study*, 114 Envtl. Health Persp. 1521–26 (2006).

¹⁴⁹ David Mercer, *Roundup Resistant Weeds Pose Environmental Threat*, Associated Press, June 21, 2010, at http://www.usatoday.com/tech/science/environment/2010-06-21-roundup-weeds_N.htm.

¹⁵⁰ *Id.*

¹⁵¹ 16 U.S.C. § 668ee(1).

¹⁵² *Id.* § 668dd(a)(4)(D).

¹⁵³ 50 C.F.R. § 25.21(g)

C. Allowance of GE Crops Violates FWS's Policy

FWS has recognized that GE crops should not be grown on NWRs. The agency's policy on Biological Integrity, Diversity, and Environmental Health codifies this recognition by subjecting GE crops to the essentiality requirement, a nearly impossibly rigorous test, in order to be grown on NWRs.¹⁵⁴

FWS has never successfully demonstrated in or out of court that growing GE crops is essential to refuge purposes. While some farmers may want to grow GE crops, this preference is not essential to refuge purposes. Indeed, many refuge managers have acknowledged that GE crops are not essential to accomplishing refuge purposes.¹⁵⁵ "I was a Refuge Manager for 30 years and I do not know of any set of circumstances in which it could be legitimately found that GE crops are essential to accomplishing a refuge purpose."¹⁵⁶ By allowing GE crops to be grown on refuges, refuge managers are flouting their breach of an agency wide policy, but by expeditiously acting to ban GE crops system-wide, FWS can bring the agency into harmony with law, existing policy, law, and common sense.

1. GE Crops are Being Unlawfully Grown on NWRs Across the Nation

GE corn and soy is grown on many wildlife refuges across the country.¹⁵⁷ Prime Hook NWR is just one example of the many refuges that has illegally permitted GE crop farming, and GE crops are widespread in some regions. At least six of the eight regions have refuges that allow GE crops and many of these refuges are allowing this harmful activity without including an analysis of it in their CCPs or even considering it in their CDs.

The widespread nature of this improper activity is astounding. For example, 41 of the 128 refuges in the Southeast (Region 4) grew GE crops (mostly engineered for herbicide resistance), without completing CDs or environmental impact statement (EIS), prior to Petitioner's litigation, which stopped this unlawful activity.¹⁵⁸ GE crop approval questionnaires from the Southeast region show limited and conclusory analyses regarding the necessity of planting GE crops. In at least one instance the Refuge manager apparently did not know that one of the most widespread categories of GE crops, *Bt* corn, was genetically engineered when

¹⁵⁴ U.S. FWS, *Biological Integrity, Diversity and Environmental Health*, 601 FW 3.15(c) (2001), available at <http://www.fws.gov/policy/601fw3.pdf>.

¹⁵⁵ See, e.g., Email from Grady Hocutt, PEER Refuge Keeper to Refuge Keeper, Forwarded by Steve Delehanty/R3/FWS/DOI on 04/09/2009 (on file with FWS, FWS000058).

¹⁵⁶ *Id.*

¹⁵⁷ See, e.g., PEER, *Wildlife Refuge Used for Genetically Modified Crops* (Nov. 7, 2005), <http://www.peer.org/news/news-releases/2005/11/07/wildlife-refuge-used-for-genetically-modified-crops/> (data compiled from FWS documents—41 of 128 refuges on wildlife refuges in the Southeast Region are growing GE crops).

¹⁵⁸ PEER, *One-Third of Wildlife Refuges Use GM Crops in Southeast* (June 25, 2009), <http://www.peer.org/news/news-releases/2009/06/25/one-third--of-wildlife-refuges-use-gm-crops-in-southeast/>.

Wheeler NWR permitted GE corn and soy cultivation, and stated that, “*Bt* corn has not been listed as a GM crop.”¹⁵⁹ No debate exists on whether *Bt* crops are GE, and this statement reflects poor implementation of FWS’s GE crop policy and even a lack of understanding of what in fact constitutes a GE crop.

In the Southwest Region, both the Sequoyah NWR in Oklahoma and Lower Rio Grande Valley NWR in Texas have cooperative farming agreements that allow farmers to plant GE crops, specifically HR corn and soy.¹⁶⁰ FWS approved the use of GE crops on both these refuges without CDs or environmental review under NEPA. Furthermore, the essentiality determinations that were completed lacked reasonable justification. For example, the Lower Rio Grande Valley NWR found GE crops to be “essential” for controlling non-native grass, yet failed to provide any justification whatsoever why a GE crop provided any particular benefit that a non-GE crop could not provide.¹⁶¹

In the Midwest Region, the Big Stone Wetland Management District (WMD), a NWR unit in Minnesota, has grown Roundup Ready soy and *Bt* corn since 1998,¹⁶² but its 2003 CCP didn’t even mention GE crop use or any CD addressing the matter.¹⁶³ Similarly, the 2001 DeSoto NWR CCP failed to mention GE crops,¹⁶⁴ but records show that GE corn and soy farming has occurred and likely continues on several hundred acres there.¹⁶⁵

In the Mountain-Prairie Region several refuges and WMD are growing GE crops, including Arrowwood NWR, Arrowwood WMD, and Rainwater Basin WMD.¹⁶⁶ Despite evidence showing the Arrowwood NWR was going to allow glyphosate-tolerant soy farming,¹⁶⁷ the CCP from 2007 includes no CDs for farming, and farming is mentioned only as a management tool for “dense nesting cover,”¹⁶⁸ with no explanation for the novel and de facto determination that a GE crop, rather than a non-GE alternative, is essential as nesting cover. The 2008 Arrowwood WMD CCP contains a CD for cooperative farming but again neglects to

¹⁵⁹ *Requirements of New Farming Policies from the U.S. Fish and Wildlife Southeastern Regional Office*, Wheeler Nat'l Wildlife Refuge (Feb. 2007).

¹⁶⁰ Letter from Dom Ciccone, Regional Chief, National Wildlife Refuge System, to Charles Sloan, on the planting of GE crops on Sequoyah NWR (Feb. 14, 2006); Memo from Project Leader, South Texas Refuge Complex to Regional Chief, NWRS on the Approval for Using Genetically Modified Organisms at the Lower Rio Grande Valley NWR (Aug. 11, 2006).

¹⁶¹ *Id.*

¹⁶² Genetically Altered Crops on Big Stone NWR/WMD/NTGP 1998–2007.

¹⁶³ U.S. FWS, *Region 3, Big Stone Wetland Management District Comprehensive Conservation Plan* (2003), available at <http://www.fws.gov/midwest/planning/bigstonewmd/ccp/fullccp.pdf>.

¹⁶⁴ U.S. FWS, *Region 3, DeSoto NWR Final Comprehensive Conservation Plan* (2001), available at <http://www.fws.gov/midwest/planning/desoto/index.html>.

¹⁶⁵ PEER, Untitled chart, http://www.peer.org/docs/nwr/09_25_6_gmc_acreage_chart.pdf (list of NWRs expressly approving use of GE crops 2007–2011).

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ U.S. FWS, *Arrowwood NWR Comprehensive Conservation Plan* (2007), available at http://www.fws.gov/mountain-prairie/planning/States/North%20Dakota/Arrowwood/ardccp_final_web.pdf.

mention how the cultivation of GE crops, as opposed to conventional crops, is essential to achieve the intended purpose of this farming operation, namely feeding birds and other wildlife.¹⁶⁹ Similarly, Rainwater Basin WMD in Nebraska has a 2007 CCP that includes a CD for farming generally,¹⁷⁰ but the CCP fails to analyze the effects of the hundreds of acres of GE soy grown there, and it does not describe why the GE soy is essential for fulfilling the refuge's purpose.

Finally, in the Western Region, San Joaquin NWR has a 2007 CCP that does not include a CD for farming, but mentions farming as a land management tool.¹⁷¹ A local farmer there grew hundreds of acres of herbicide-tolerant corn in 2007, ostensibly for winter migratory birds.¹⁷² In addition to neglecting to make a compatibility determination, the refuge manager also failed to make any showing that the GE corn was essential.

In addition to the specific examples above, FWS's data shows that the following refuges are or have been growing GE crops without a determination that such farming is either compatible or essential to the purpose of the refuge and without proper analysis under NEPA:

Region 3, Crab Orchard;¹⁷³ Region 4, West Tennessee Complex, Grand Cote, Cache River, Wapanocca, Bald Knob, Holla Bend, Felsenthal, White River, Santee, Pocosin Lakes, Mattamuskeet, North Louisiana Complex, Central Louisiana Complex, Tennessee, Theodore Roosevelt Complex, North Mississippi Complex, St. Catherine Creek, Noxubee, Key Cave, Eufaula, and Clarks River;¹⁷⁴ Region 5, Eastern Neck and Montezuma; and Region 6, Lake Andes.¹⁷⁵

In sum, GE crops are neither compatible nor essential to NWR purposes yet they are being grown across our nation's NWR system.

2. GE Crops Pose Significant Threats to NWRs

The three main categories of harm associated with GE crops: transgenic contamination, superweed infestation, and increased herbicide use, are all especially harmful on NWRs. In addition to and because of these three harms, allowing GE crops on NWRs also results in

¹⁶⁹ U.S. FWS, *Arrowwood WMD Comprehensive Conservation Plan* (2008), available at http://www.fws.gov/mountain-prairie/planning/States/North%20Dakota/nd_wmd_ccp/nd_wmd_2008_ccp_all.pdf.

¹⁷⁰ U.S. FWS, *Rainwater Basin WMD Comprehensive Conservation Plan* (2007), available at http://www.fws.gov/mountain-prairie/planning/States/Nebraska/rwb/rwbccp_final/web_rwbccp.pdf

¹⁷¹ U.S. FWS, *San Joaquin NWR Final Comprehensive Conservation Plan* (2007), available at http://www.fws.gov/cno/refuges/sanjoaquin/SJR_CCP_FINAL.pdf

¹⁷² PEER, Untitled chart, http://www.peer.org/assets/docs/nwr/09_25_6_gmc_acreage_chart.pdf (list of NWRs expressly approving use of GE crops 2007–2011).

¹⁷³ *Id.*

¹⁷⁴ Memorandum from Jon Andrews, Regional Chief of Refuges, Southeast Region, to All Refuge Managers, Re: Delegation of Authority and Process for Approving the Use of Genetically Modified Crops on NWRs in the Southeast Region (Feb. 14, 2007).

¹⁷⁵ PEER, Untitled chart, http://www.peer.org/assets/docs/nwr/09_25_6_gmc_acreage_chart.pdf (list of NWRs expressly approving use of GE crops 2007–2011).

adverse impacts to wildlife, especially threatened and endangered species. This fourth category of harm is particularly significant because it directly threatens the very core of the System’s purposes.

The purpose of most refuges is protecting migratory bird populations and promoting biological diversity. Farming has been allowed on NWRs when refuge managers have determined that farming provides food or other benefits for refuge species. However, FWS biologists have recognized the dangers of farming with GE crops, including the emergence of herbicide resistant weeds, negative impacts to wildlife and biological diversity, as well as biological contamination.¹⁷⁶ Evidence of adverse impacts to the environment and lack of knowledge about the long-term effects of GE crops have lead many experts, including FWS biologists, to conclude that the use of GE crops should be discontinued on wildlife refuges.¹⁷⁷

Both FWS and federal courts have acknowledged the significant environmental impacts associated with growing GE crops on NWRs. In *Prime Hook*, the court found it “undisputed” that “farming with genetically modified crops” on that refuge “poses significant environmental risks.”¹⁷⁸ The extent to which GE crops adversely affect NWRs was recently recognized by FWS’s Southwest Region when it recognized the necessity of preparing an EIS on the use of GE crops in the Sequoyah NWR.¹⁷⁹ The Southwest Region’s decision to undertake the EIS process was based in part on substantial feedback it received regarding the significance of impacts in its previous draft environmental assessment.¹⁸⁰

The impacts discussed below apply to NWRs generally. However, FWS has approved the growing of GE crops on no less than *thirty-one* separate and distinct NWRs and WMDs, in addition to the many NWRs where GE crops are or have been grown where such use was never even approved. Each refuge has individual landscapes and native ecosystems, with unique wildlife and wildlife habitat factors therein. The three main risk categories discussed above

¹⁷⁶ Memorandum from FWS Director to Regional Directors, Delegation of Authority and Process for Approving the Use of Genetically Modified Crops on the National Wildlife Refuge System (Apr. 6, 2005). Soybeans generally fail to meet the dietary requirements of wildlife, thus soybeans are generally incompatible and GE soybeans are not justifiable. See, e.g., Gray Krapu, David Brandt & Robert Cox, *Less Waste Corn, More Land in Soybeans, and the Switch to Genetically Modified Crops: Trends with Important Implications for Wildlife Management*, 32 Wildlife Soc’y Bulletin1, 127–36 (2004).

¹⁷⁷ *Del. Audubon Soc’y, et al. v. Sec’y of the U.S. Dep’t of Interior*, 612 F. Supp. 2d 442, 445–46 (D. Del. 2009) (*Prime Hook*) (“Prime Hook’s stated goal in this regard was to phase out the use of [GE] crops because the crops ‘do not contribute to achieving refuge objectives.’”).

¹⁷⁸ *Id.* at 442, 453.

¹⁷⁹ 77 Fed. Reg. 7,172, 7,172–74 (Feb. 10, 2012) (“Based on the public comments already received . . . we have decided . . . that an [EIS] would be more appropriate than an EA to ensure that a full and fair discussion of all significant environmental impacts occurs, and to inform decision-makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts and enhance the quality of the human environment . . . ”).

¹⁸⁰ *Id.*

(transgenic contamination, the proliferation of superweeds, and the increased use of herbicides), plus the additional threat GE crops pose specifically to imperiled species all provide excellent reasons for FWS to ban their use on NWRs.

i. Transgenic contamination on NWRs

Transgenic contamination, including GE crops cross pollinating with wild relatives or GE seeds traveling beyond the boundaries of their fields, is of major concern on NWRs. In Oregon, a field trial of experimental GE creeping bentgrass resulted in a major incident of transgenic contamination at the Crooked River National Grassland.¹⁸¹ GE bentgrass, like most crops, has a number of wild and weedy relatives. Its ultra-light seeds traveled easily from the test plot to Crooked River, and now this GE contamination incident has proven nearly impossible to clean up. Despite nearly a decade since these field trials were ended, escaped GE bentgrass continues to be discovered, thriving in these wildlands. As producers of GE seeds continue to attempt to bring new GE products to market, the list of plants that could potentially cross breed with GE plants may increase and this threat will only grow.

Transgenic contamination is a particular threat to imperiled plants and wildlife that depend on habitat in NWRs; indeed, in 2009 FWS found that the deregulation of GE creeping bentgrass would have resulted in jeopardy to two endangered species, the Willamette daisy and Bradshaw's lomatium. In addition, deregulation of this plant would have adversely modified designated critical habitat for the Fender's blue butterfly and Willamette daisy.¹⁸² Transgenetic contamination from the GE creeping bentgrass could have resulted from the GE gross cross pollinating with native grasses relied upon by these listed species in addition to this glyphosate tolerant grass encroaching upon and eventually taking over the habitat of imperiled native plants.¹⁸³ Transgenic contamination in the wild is extremely difficult to eradicate and can persist indefinitely.¹⁸⁴

In addition, transgenic contamination of non-GE crop fields, including organic fields, is a threat where NWRs are farmed by both organic and conventional growers, or where NWRs are bordered by organic growers. FWS has recognized this as problematic. “[T]he use of [transgenic] corn on Refuge System lands may have some potential to negatively affect organic

¹⁸¹ JR Reichman et al., *Establishment of Transgenic Herbicide-Resistant Creeping Bentgrass (*Agrostis stolonifera L.*) in nonagronomic habitats*, Mol. Ecol., Nov. 2006.

¹⁸² U.S. FWS to USDA/APHIS, Biological Opinion Regarding the Effects of the Animal and Plant Health Inspection Service's Proposed Deregulation of Genetically Modified, Glyphosate Tolerant Creeping Bentgrass on Endangered Species Act-listed Wildlife and Plant Species and their Critical Habitats (Oct. 2009).

¹⁸³ *Id.* Additional reasons for the finding of jeopardy and adverse modification include the unintended spread of GE bentgrass outcompeting native plants and because of the decrease in glyphosate efficacy for preventing encroachment into wetland habitat, resulting in substantial habitat loss for these imperiled species.

¹⁸⁴ Geertson, 2007 WL 518624, at *4.

farmers,” and “could impact neighboring organic farmers.”¹⁸⁵ FWS should be encouraging less toxic farming methods on refuges and adjacent lands, and should not allow actions that threaten the livelihoods of organic farmers whose land provide habitat that can complement refuge habitat. Transgenic contamination, in both wild and cultivated fields, is a substantial and unnecessary risk on NWRs.

ii. Superweed Infestation on NWRs

The increased use of herbicides, such as glyphosate, in GE crop production is likely to result in NWRs suffering from the worsening epidemic of HR weeds. FWS personnel have acknowledged that superweed infestation is a foreseeable problem associated with GE crop, and the agency now should take action to ban GE crops on NWRs in order to contain this epidemic.

In an EA for Midwestern NWRs, FWS acknowledged the threat of glyphosate-resistant weeds.¹⁸⁶ “There are almost 200 species of herbicide resistant plants worldwide and many glyphosate resistant weeds in the Midwest Region. Herbicide resistance is a growing problem.”¹⁸⁷ It went on to state that growing of GE corn and soybeans “actually encourages herbicide resistance.”¹⁸⁸ FWS has specifically noted horseweed as a superweed that threatens NWRs, noting that it is found in five out of eight Midwest Region states, but that this should come as no surprise because “more than 90 percent of the soybeans and 80 percent of the corn planted in North America is glyphosate tolerant. Regular, widespread use of the same herbicide increases the risk of developing herbicide resistance.”¹⁸⁹ FWS is thus well aware of the link between GE crops and the development of superweeds.

Glyphosate has historically been a heavily used management tool on NWRs, but with its efficacy compromised, refuge managers can be expected to seek out herbicides even more harmful than glyphosate to control superweeds on NWRs. In making management decisions for NWRs, FWS should make decisions that allow it to fulfill its conservation purpose by utilizing the least toxic alternatives available. Using GE crops on refuges is essentially also a decision to utilize increasingly toxic chemicals for superweed management. This is the wrong choice for our nation’s native plants and wildlife. By banning GE crops from NWRs, FWS can help protect these lands from the harms associated with superweed infestation.

¹⁸⁵ Environmental Assessment, Use of Row Crop Farming and Genetically-Modified Glyphosate-Tolerant Corn and Soybeans on National Wildlife Refuges and Wetland Management Districts 35 (Mar. 2011), *available at* <http://www.fws.gov/midwest/planning/farmingnepa/eafinal.pdf>

¹⁸⁶ Environmental Assessment: Use of Row Crop Farming and Genetically-Modified, Glyphosate-Tolerant Corn and Soybeans on National Wildlife Refuges and Wetland Management Districts 23 (Jan. 2011), *available at* http://www.fws.gov/midwest/planning/FarmingNEPA/MidwestRegion_FarmingEA_January2011.pdf.

¹⁸⁷ *Id.*

¹⁸⁸ *Id.* at 23–24.

¹⁸⁹ *Id.* at 23.

iii. Increased Herbicide Use in NWRs

The increased use of herbicides, including glyphosate, associated with HT GE crops is a major threat to the core mission of NWRs because of the harms herbicides caused by them to ecosystems, especially wetlands. The EA for the Midwest Region of NWRs recognized that water contamination by glyphosate-based herbicides is an issue of concern because the high quality wetlands found on refuges and other water resources are so important for wildlife.¹⁹⁰

The toxic impacts of glyphosate aquatic communities are well known.¹⁹¹

[H]erbicides containing glyphosate have direct toxicological effects on non-target periphyton and phytoplankton communities in freshwater ecosystems, as well as indirect effects via the eutrophication potential of glyphosate degradation. These communities constitute the basis of food webs in these ecosystems, and so it would appear that glyphosate can potentially impact the overall functioning of freshwater ecosystems. This potential impact is reinforced by the fact that this compound is also known to be toxic for fish . . .¹⁹²

While glyphosate application may occur away from water bodies, studies show that glyphosate-based herbicides from GE crop systems will inevitably end up in water. In 2002, the U.S. Geographical Survey (USGS) began a monitoring program for glyphosate and its main degradation product in Midwestern streams; ultimately detecting glyphosate in more than *one-third* of the streams sampled in 2002.¹⁹³ In follow up studies focusing on small waters, the same researchers determined:

Vernal pools are sensitive environments that provide critical habitat for many species, including amphibians. These small water bodies are not always protected by pesticide label requirements for no-spray buffer zones, and the occurrence of pesticides in them is poorly documented.¹⁹⁴

Aquatic organisms such as amphibians should be given management priority on NWRs because they are experiencing rapid rates of population decline, with natural habitat loss as a

¹⁹⁰ *Id.* at 21.

¹⁹¹ See, e.g., Che Salmah Md Rawi et al., *Effects of Herbicides on Odonata Communities in a Rice Agroecosystem*, Toxicology & Envtl. Chemistry (May 2012), available at http://www.academia.edu/755835/Effects_of_herbicides_on_Odonata_communities_in_a_rice_agroecosystem.

¹⁹² Aurélie Villeneuve et al., *Herbicide Contamination of Freshwater Ecosystems: Impacts on Microbial Communities*, Pesticides-Formulations, Effects, Fate 285–312, 302 (2011).

¹⁹³ USGS, *Toxic Substances Hydrology Program, Glyphosate Herbicide Found in Many Midwestern Streams, Antibiotics Not Common*, <http://toxics.usgs.gov/highlights/glyphosate02.html> (last visited Feb. 5, 2014).

¹⁹⁴ William A. Battaglin et al., *The Occurrence of Glyphosate, Atrazine, and Other Pesticides in Vernal Pools and Adjacent Streams in Washington, DC, Maryland, Iowa, and Wyoming, 2005–2006 abstract*, 15 Environ. Monit. Assess. 281–307 (2009), available at www.researchgate.net.

major cause of their decline.¹⁹⁵ In addition, many refuges house vast wetland complexes with intricate hydrologic connections. Increased use of herbicides is especially dangerous in these types of ecosystems because this hydrologic connectivity can facilitate herbicide travel well beyond the intended zones of application. In addition, commercial formulations of glyphosate often contain additional chemicals (surfactants) added to increase its effectiveness, which may create further risks to aquatic species if applied near water. For instance, Roundup contains the surfactant polyethoxylated tallowamine (POEA), which has been linked to high mortality rates of aquatic organisms.¹⁹⁶

With much of their natural habitat gone or dwindling, amphibians are forced to utilize land and water surrounded by farming operations. Yet this temporary respite amounts to a Trojan horse for these amphibians, since Roundup Ready crop systems await. Current application rates of glyphosate can be highly lethal to many species of amphibians.¹⁹⁷ Studies show that certain amphibian populations exposed to low, field-relevant usage rates of Roundup experience much higher mortality than unexposed amphibians.¹⁹⁸ Such impacts could only increase along with the dramatically increased use of glyphosate associated with Roundup Ready crops. Amphibians are especially susceptible to toxic impacts resulting from glyphosate exposure due to the fact that their preferred breeding habitat is often in shallow vernal pools that can contain higher pesticide concentrations than other water bodies.¹⁹⁹ Thus utilization of GE crops results in increased herbicides use and subsequent harm to the core ecosystem protection purposes of the NWR system.

iv. GE Crops Adversely Impact Threatened and Endangered Refuge Species

Many species listed as threatened and endangered under the ESA can be found in NWRs.²⁰⁰ The Refuge System is intended to provide safe havens for imperiled wildlife and is

¹⁹⁵ Samuel A. Cushman, *Effects of Habitat Loss and Fragmentation on Amphibians, A Review and Prospectus*, 128 Biol. Cons. 233, 231 (2006), available at http://www.fs.fed.us/rm/pubs_other/rmrs_2006_cushman_s001.pdf.

¹⁹⁶ Rick A Relyea, *The Lethal Impact of Roundup on Aquatic and Terrestrial Amphibians*, 15 Ecol. Appl. 1118–24, 1122 (2005), available at http://usf.usfca.edu/fac_staff/dever/roundup_paper.pdf.

¹⁹⁷Id.; Rick A. Relyea, *The Impact of Insecticides and Herbicides on the Biodiversity and Productivity of Aquatic Communities*, 15 Ecol. Appl. 618, 625 (2005), available at <http://www.whyy.org/91FM/ybyg/relyea2005.pdf>.

¹⁹⁸ Id.

¹⁹⁹ William A. Battaglin et al., *The Occurrence of Glyphosate, Atrazine, and Other Pesticides in Vernal Pools and Adjacent Streams in Washington, DC, Maryland, Iowa, and Wyoming, 2005–2006* abstract, 15 Environ. Monit. Assess. 281–307 (2009), available at www.researchgate.net.

²⁰⁰ The following listed species can be found in just the Midwest region: Higgins Eye Pearlmussel (*Lampsilis higginsii*); Hungfords Crawling Water Beatle (*Brychius hungerfordi*); Illinois Cave Amphipod (*Gammarus acheronides*); Orange-footed Pimpleback Pearlmussel (*Plethobasius copperianus*); Ozark Cavefish (*Amblyopsis rosea*); Pink mucket pearlmussel (*Lampsilis abrupta*); Purple Catspaw Pearlmussel (*Epioblasma obliquata obliquata*); Niangua Darter (*Etheostoma nianguae*); Neosho Madtom (*Nocturus placidus*); Lake Erie Water Snake (*Nerodia sipedon insularum*); Northern Riffleshell (*Epioblasma torulosa rangiana*); Rough Rabbitsfoot (*Quadrula cylindrica strigillata*); Rough Pigtoe (*Pleurobema plenum*); Scaleshell Mussel (*Leptidea leptodon*); Sheepnose

often considered by FWS to be a crucial component of species recovery plans, but the very ability of these species to seek refuge in the Refuge system is threatened by GE crops. In a recent speech, FWS Director Dan Ashe discussed the relationship between NWRs and the ESA.

National wildlife refuges are an important part of the ESA's success. Fifty-eight refuges were specifically established to protect listed species; 248 refuges are home to more than 280 endangered or threatened species Without the National Wildlife Refuge System, many endangered species would not be making the recoveries they are The Refuge System will play a key role as we seek to accelerate species recovery and foster innovative conservation approaches.²⁰¹

GE crops pose threats to listed species because they result in increased pesticide use and have caused the rapid development of habitat destroying superweeds, and because transgenic contamination can result in the crowding out of native habitat types. Numerous studies document the harm caused by glyphosate to threatened and endangered plants and animals. In 1996, FWS identified seventy-four endangered plant species believed to be at risk as a result of glyphosate use,²⁰² including the California red-legged frog²⁰³ and the Houston toad.²⁰⁴

Despite the critical importance of NWRs in recovering listed species, FWS has allowed GE crops to be grown on refuges containing threatened and endangered species. Shockingly, FWS has never engaged in the formal consultation required under section 7 of the ESA to make a threshold determination on the specific impacts of GE crops on listed species in NWRs and to obtain incidental take coverage where GE crops might result in the taking of listed species.

One species threatened by herbicide-tolerant crops is the endangered pallid sturgeon, a species found on two Midwest region NWRs where GE crops have been grown: Big Muddy and Swan Lake.²⁰⁵ This prehistoric creature is one of the largest fish in North America, growing up to five feet long, and is known for its unique, dinosaur-like appearance. The Midwest Region has failed to properly consider the impacts of GE crops, particularly increased glyphosate use, on pallid sturgeon by simply pointing out that listed species primarily utilize natural habitat and not

Mussel (*Plethobasus cyphyus*); Winged Mapleleaf (*Quadrula fragosa*); Spectaclecase Mussel (*Cumberlandia monodonta*); Topeka Shiner (*Notropis topeka*); and the White Catspaw Pearlmussel (*Epioblasma obliquata perobliqua*).

²⁰¹ U.S. FWS, *From the Director: Partners, Vision, and the Endangered Species Act*, (Dec. 30, 2012), http://www.fws.gov/refuges/RefugeUpdate/JanFeb_2013/from_the_director.html (last visited Feb. 5, 2014).

²⁰² Stephen Nottingham, *Genescapes: The Ecology of Genetic Engineering* (2002).

²⁰³ *Risk of Glyphosate Use to Federally Threatened California Red-Legged Frog* (Oct. 17, 2008), available at <http://www.epa.gov/espp/litstatus/effects/redleg-frog/glyphosate/determination.pdf>.

²⁰⁴ U.S. EPA, *R.E.D. Facts: Glyphosate 5* (Sept. 1993), available at <http://www.epa.gov/opprrd1/REDs/factsheets/0178fact.pdf>

²⁰⁵ U.S. FWS, *Species Profile for Pallid Sturgeon*, <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E06X> (last visited Jan. 30, 2014).

fields.²⁰⁶ This observation ignores the many studies showing that glyphosate use increases with the utilization of GE crops and this glyphosate does find its way to waterways,²⁰⁷ resulting in harm to aquatic species.²⁰⁸ Gambling with harm to this endangered species runs counter to Director Ashe's statement that NWRs should play a key role in fostering listed species recovery.

Another species imperiled by GE crops on NWRs is the threatened Eastern Prairie Fringed orchid, a nocturnally fragrant white orchid found on the Leopold WMD, Cedar Point, and Ottawa National Wildlife Refuges.²⁰⁹ This delicate and rare orchid can live in tallgrass prairies, meadows, old fields, and ditches, and is imperiled due to habitat loss through conversion of habitat to cropland and also due to pesticides.²¹⁰ Growing GE crops leads to increased herbicide use that can kill this orchid or the hawkmoth it requires for pollination services, and the proliferation of superweeds could further crowd it out of its increasingly limited habitat. Allowing GE crops in the refuges it relies on is antithetical to both the mission of NWRs to conserve species and Director Ashe's management direction.

FWS's obligation to conserve species and prevent jeopardy to these and other listed species under the ESA,²¹¹ combined with its obligation under the Refuge Act to conserve, manage, and restore their habitat,²¹² require the agency to determine that GE crops should be banned from NWRs.

v. GE Crops Adversely Affect Wildlife, Including Monarch Butterflies

FWS must ban GE crops from refuges not just because of their impacts to federally listed species but also because the rampant pesticide use associated with GE crops harms myriad other species. For example, the monarch butterfly, perhaps the most iconic and beloved of all invertebrates, is currently in steep decline. Monarch experts have opined that this can be attributed to several factors, one of which is the widespread use of the herbicides, especially

²⁰⁶ Geertson, 2007 WL 518624, at *17.

²⁰⁷ See, e.g., Che Salmah Md Rawi et al., *Effects of Herbicides on Odonata Communities in a Rice Agroecosystem*, Toxicology & Envtl. Chemistry (May 2012), available at http://www.academia.edu/755835/Effects_of_herbicides_on_Odonata_communities_in_a_rice_agroecosystem.

²⁰⁸ See Villeneuve et al., *supra* note 192.

²⁰⁹ U.S. FWS, Species Profile for Eastern Prairie Fringed Orchid,

<http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2GG> (last visited Jan. 30 2014).

²¹⁰ U.S. FWS, *Prairie Fringed Orchids: Fact Sheet*, <http://www.fws.gov/midwest/endangered/plants/prairief.html> (last visited Jan. 30, 2014).

²¹¹ 16 U.S.C. § 1536(a)(1)(2).

²¹² *Id.* § 668dd(a)(2).

glyphosate, on GE crops in the Midwestern U.S.²¹³

Glyphosate is very effective at killing milkweed, the essential food of monarchs. Monarch butterflies lay their eggs only on plants in the Apocynaceae (dogbane family) in the milkweed subfamily Asclepiadoideae, genus *Asclepias* (L.) and related genera. Without milkweed, monarch butterflies cannot survive. While *Asclepias syriaca* can survive the tilling that was formerly used to control weeds in most soybean and corn fields, it is unable to endure repeated application of glyphosate.²¹⁴ The ubiquitous use of herbicide-resistant GE crops has resulted in a steep decline in milkweed.²¹⁵ Glyphosate is used on milkweed in a significant portion of the monarch's range, threatening to destroy, modify, and curtail the habitat relied upon by monarchs. Modeling of herbicide use on milkweed has shown that "herbicide has a large effect and a reduction of herbicidal spraying is needed to stabilize the monarch butterfly population."²¹⁶

One study found that about 50 percent of Iowa corn and soybean fields had low densities of common milkweed in 1999 but only 8 percent of fields had any milkweed present in 2009.²¹⁷ It noted that "widespread adoption of glyphosate resistant corn and soybean cultivars and the reliance on post-emergence applications of glyphosate for weed control in crop fields likely has contributed to the decline in common milkweed in agricultural fields."²¹⁸ Another study that looked directly at the impacts of glyphosate use on GE crops on monarch populations in the Midwest found a 58 percent decline in milkweeds on the Midwestern landscape and an 81 percent decline in monarch production between 1999 and 2010, taking this correlation to "strongly suggest that a loss of agricultural milkweeds is a major contributor to the decline in the monarch population."²¹⁹ It also noted that "the loss of milkweeds in agricultural fields is particularly devastating for the monarch population because agricultural milkweeds are more heavily used than non-agricultural milkweeds."²²⁰ The study concluded that given the

²¹³ Richard Fausset, *Mexico Monarch Butterfly Population Smallest in Years, Study Says*, L.A. Times, March 13, 2013, available at <http://www.latimes.com/news/nationworld/world/la-fg-mexico-butterflies-20130314,0,1884525.story>.

²¹⁴ Comm'n for Envtl. Cooperation, *North American Monarch Conservation Plan* 23 (2008), <http://www.fs.fed.us/wildflowers/pollinators/monarchbutterfly/news/documents/Monarch-Monarca-Monarque.pdf>.

²¹⁵ John Pleasant & Karen Oberhauser, *Milkweed Loss in Agricultural Fields Because of Herbicide Use: Effect on the Monarch Butterfly Population*, 6 Insect Conservation & Diversity 135–144 (2013), available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1752-4598.2012.00196.x/abstract;jsessionid=1D49376988DA9F3ECEFB61AB619E38BD.f02t04>.

²¹⁶ Messan et. al., *Short and Long Range Population Dynamics of the Monarch Butterfly* 27 (Aug. 1, 2011).

²¹⁷ Robert G. Hartzler, *Reduction in Common Milkweed (*Asclepias Syriaca*) Occurrence in Iowa Croplands from 1999–2009*, 29 Crop Prot. 1542–44 (2010).

²¹⁸ *Id.*

²¹⁹ Pleasant & Oberhauser, *supra* note 215.

²²⁰ *Id.* at 8.

“established dominance of glyphosate-tolerant plants and widespread use of glyphosate herbicide, the virtual disappearance of milkweeds for agricultural fields is inevitable. Thus, the resource base for monarchs in the Midwest will be permanently reduced.”²²¹ Additional research has shown that monarchs produce almost four times more offspring per milkweed plant in Midwest corn and soybean fields than in non-agricultural areas, making agricultural milkweed a more valuable habitat.²²² The links between glyphosate use associated with GE crops, subsequent milkweed reductions, and monarch decline has been extensively documented.

Some researchers have focused on the “migratory phenomenon,” asking whether rapidly decreasing monarch populations mean this remarkable spectacle is at risk. They have found that the loss of primary breeding habitat, resulting from the increased use of herbicide-tolerant GE crops, in the corn belt of the Midwestern U.S. is one of three main factors contributing to decreasing monarch numbers, concluding that “better stewardship is needed” for the continuation of this “endangered biological phenomenon.”²²³ The many studies on this subject make a strong case that the present and threatened destruction of milkweed habitat, particularly within Midwest agricultural fields, is a very significant problem for North American migratory monarch populations.

FWS has been an important player in monarch conservation, providing expertise and resources to a broad array of domestic and international bodies in order to promote habitat conservation, native milkweed seed breeding and planting, educational efforts with children, and an array of other activities.²²⁴ FWS’s International Affairs office has been engaged in migratory monarch protection efforts through its Wildlife Without Borders-Mexico program since 1995.²²⁵ d For FWS to invest so substantially in protecting this iconic butterfly both nationally and internationally while allowing GE crops and associated glyphosate use to harm milkweed supplies on NWRs is simply bad policy.

Monarchs provide just one example of the unanticipated adverse impacts that GE crops can have on non-target wildlife species. The examples of impacts to other species are too numerous to list. To protect monarchs, and the many other species adversely impacted by

²²¹ *Id.* at 9.

²²² Pleasants JM, Oberhauser KS, *Milkweed loss in agricultural fields because of herbicide use: effect on the monarch butterfly population*. Insect Conservation and Diversity 6:135–144 (2012).; and Oberhauser KS, et. al., *Temporal and spatial overlap between monarch larvae and corn pollen*. Proceedings of the National Academy of Sciences 98:11913–11918 (2001).

²²³ Brower et. al., *Decline of Monarch Butterflies Overwintering in Mexico: Is the Migratory Phenomenon at Risk?*, 5 Insect Conservation & Diversity (2012).

²²⁴ See, e.g., Friends of Quivira, *Monarch Mania*, http://www.friendsofquivira.org/monarch_mania.html (last visited Feb. 5, 2014).

²²⁵ U.S. FWS, *International Affairs, Monarch Butterfly*, <http://www.fws.gov/international/animals/monarch-butterfly.html> (last visited Feb. 5, 2014).

glyphosate, FWS must ban GE crops on refuge lands.

3. GE Crops are not Essential to Accomplish Refuge Purposes

Considering the vast body of evidence demonstrating that GE crops cause significant harm to wildlife and ecosystems, a determination that such crops are “essential to accomplish refuge purposes” is legally and scientifically unjustifiable and would be arbitrary and capricious. The court in *Delaware Audubon Society* held that permitting GE crops on the Prime Hook NWR contradicted FWS’s own biologist’s scientific opinion that GE crops are harmful to wildlife and the ecosystem and therefore permitting these GE crops violated the agency’s own policy.²²⁶ FWS cannot show that GE crops are essential for refuge managers to achieve refuge purposes.

4. GE Crops Must be Banned from NWRs

For all the reasons discussed above, we strongly urge FWS to take immediate action to ban GE crops from NWRs. FWS plainly has authority to take this action under the Refuge Act, and indeed allowing GE crops is contrary to the very purposes of the refuge system. Further, GE crops are fundamentally incompatible with refuge purposes, because of the significant environmental harms caused by their use, including, *inter alia*, transgenic contamination, the proliferation of superweeds, increased herbicide use, and harms to both ESA listed and non-listed conservation priority species. In addition, allowing GE crops on refuges violates FWS’s Policy on Biological Integrity, Diversity, and Environmental Health because of specific ways that GE crops harm refuge values make it impossible for growing GE crops to be essential for the achievement of refuge purposes. For all these reasons, FWS should take immediate action to ban GE crops from NWRs.

II. FWS SHOULD TAKE IMMEDIATE ACTION TO PROHIBIT THE USE OF NEONICONICIDS ON NATIONAL WILDLIFE REFUGES

A. FWS Has Authority to Ban the Use of Neonicotinoids on NWRs

1. Legal Authority Under the Refuge Act

FWS has authority to promulgate regulations to enact the purposes of the Refuge Act.²²⁷ The Refuge Act states that the agency is required to “ensure that the biological integrity, diversity, and environmental health of the [National Wildlife Refuge] System are maintained . . . [and] to contribute to the conservation of the ecosystems of the United States.”²²⁸ As discussed in detail above and below, neonicotinoids threaten biological integrity, diversity, and environmental health, and significantly contribute to harming ecosystems. FWS is both allowed

²²⁶ 612 F. Supp. 2d at 446.

²²⁷ 16 U.S.C. § 668dd(b)(5).

²²⁸ *Id.* § 668dd(4)(B)-(C).

to and compelled to promulgate regulations that fulfill the mission of the refuge system by banning neonicotinoids.

2. Examples of European and Domestic Neonicotinoid Bans

Recognizing the threat of neonicotinoids to bees, the European Commission enacted a two-year ban on three neonicotinoids, effective on December 1, 2013.²²⁹ This ban was fought by global chemical industry giants such as Bayer CropScience and Syngenta, but ultimately moved through the Commission because of clear showing that neonicotinoids cause bee die offs and this is a major threat to both the agricultural economy and regional food supply.²³⁰ This ban also provides scientists more time to study bee die-offs and allows bee populations to recover from years of neonicotinoid use.²³¹

Prior to the application of this ban throughout the European Union, many individual European nations enacted bans on neonicotinoids in recognition of the grave dangers they pose to pollinators and ecosystems. In response to bee kills that clearly resulted from clothianidin and thiamethoxam use, Italy's Ministry of Health suspended neonicotinoid authorizations in 2009, and it continued the suspension in 2012.²³² Following the 2009 suspension, and for the first time since 1999, Italy's neonicotinoid-free corn sowing reportedly resulted in *no cases* of widespread bee mortality in apiaries near the crops.²³³ In addition, researchers have found no evidence of the neonicotinoid ban causing economic harm to Italian farmers, who have not seen serious pest attacks or decreased yields since the neonicotinoid ban was implemented.²³⁴

In Germany, the neonicotinoid clothianidin was approved in 2004. Four years after clothianidin was first approved in Germany, authorities observed a massive bee kill that wiped out two-thirds of honeybees in the Baden-Württemberg region resulting from the planting of

²²⁹ David Jolly, *Europe Bans Pesticides Thought Harmful to Bees*, N. Y. Times, April 29, 2013, available at http://www.nytimes.com/2013/04/30/business/global/30iht-eubees30.html?_r=0.

²³⁰ *Id.*

²³¹ *Id.*

²³² Walker, *supra* note 54.

²³³ Bees "Restored to Health" in Italy After This Spring's Neonicotinoid-Free Maize Sowing (June 26, 2009), available at www.youris.com/Environment/Bees/Bees_restored_to_health_in_Italy_after_this_springs_neonicotinoidfree_maize_sowing.kl. The European Food Safety Authority thoroughly assessed the research on the Italian ban in 2012. See *Assessment of the Scientific Information from the Italian Project "APENET" Investigating Effects on Honeybees of Coated Maize Seeds with Some Neonicotinoids and Fipronil*, European Food Safety Auth. J. (2012), available at www.efsa.europa.eu/it/efsajournal/pub/2792.htm.

²³⁴ Walker, *supra* note 54; see also CRA-API-The Honey Bee and Silkworm Research Unit of the Agricultural Research Council, Apenet, *Effects of Coated Maize Seed on Honey Bees* (2009).

corn seeds treated with clothianidin.²³⁵ Within two weeks, Germany had banned clothianidin seed treatment on corn and several other crops.²³⁶

French authorities have instituted progressively more restrictive regulations on neonicotinoid treatments. In 1999, approximately one-third of French honey bees died following widespread use of Bayer's imidacloprid.²³⁷ French authorities promptly banned its use as seed dressing for sunflowers and later on corn.²³⁸ In 2008, having observed the substantial adverse impacts from neonicotinoids, France flatly rejected Bayer's application to register clothianidin.²³⁹ Slovenia has also banned the use of both clothianidin and imidacloprid.²⁴⁰

Regulatory authorities within the U.S. have started to take action to curb the use of neonicotinoids. For example, in response to 50,000 bumble bees dying in a parking lot outside of Portland, Oregon resulting from neonicotinoid spraying,²⁴¹ the Oregon Department of Agriculture instituted a temporary ban on neonicotinoid use in Oregon.²⁴² Disappointingly, federal regulatory authorities in the U.S. have generally failed to follow the example of federal authorities in Europe. FWS should take this opportunity to show leadership and protect the species it is tasked with conserving and recovering by banning neonicotinoids on NWRs.

B. Use of Neonicotinoids is Improper Under the NWRA

1. Refuge Act Purposes and Insects

The use of neonicotinoids is fundamentally at odds with the very mission of the Refuge System, which is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the U.S. for the benefit of present and future generations of Americans."²⁴³ This mission is focused on the protection of fish, wildlife, plants, and habitats, but the insects

²³⁵ *Clothianidin & CCD: Fact Sheet*, Pesticide Action Network, N. Am. & Beyond Pesticides, <http://beyondpesticides.org/pollinators/Backgrounder.pdf> (last visited Feb. 10, 2014).

²³⁶ Alison Benjamin, *Pesticides: Germany Bans Chemicals Linked to Honeybee Devastation*, Guardian (May 23, 2008), available at www.guardian.co.uk/environment/2008/may/23/wildlife.endangeredspecies.

²³⁷ *Clothianidin & CCD: Fact Sheet*, Pesticide Action Network, N. Am. & Beyond Pesticides, <http://beyondpesticides.org/pollinators/Backgrounder.pdf> (last visited Feb. 10, 2014).

²³⁸ *Id.*

²³⁹ *Id.*

²⁴⁰ See Vicky Kindemba, *The Impact of Neonicotinoid Insecticides on Bumblebees, Honey Bees and Other Non-Target Invertebrates*, Bug Life 24 (2009).

²⁴¹ Elizabeth Case, *Bee Deaths a Result of Pesticide Safari; Count Upped to 50,000 Dead Insects*, Oregonian, July 8, 2013, available http://www.oregonlive.com/environment/index.ssf/2013/06/pesticide_confirmed_in_bee_dea.html

²⁴² ODA Restricts Use of Certain Dinotefuran Pesticides, Or. Dep't of Agric. (June 27, 2013), available at <http://www.oregon.gov/ODA/Pages/news/130627dinotefuran.aspx>.

²⁴³ 16 U.S.C. § 668dd(a)(2).

killed by neonicotinoids are essential for all these ecosystem components to survive and thrive. This obvious biological fact should not be lost on FWS as it contemplates this Petition and the fact that neonicotinoids are likely currently being used on thousands of acres of refuge land without proper consideration or oversight. These toxic insecticides have no place on the public lands set aside by Congress to further the conservation mission of NWRs.

2. Neonicotinoids Cause Substantial Harm, Especially to Pollinators

A substantial and increasing body of scientific literature addresses the levels of neonicotinoids in the environment and the subsequent harms caused by this new and potent class of insecticides. Numerous published studies have assessed the effects of these compounds on an array of invertebrates.²⁴⁴ Studies have confirmed that neonicotinoids interact with common bee pathogens and parasites, making them more vulnerable to the deadly effects of both.²⁴⁵ Over the past decade, the proliferation of neonicotinoids has coincided with mass honey-bee population die-offs, or a phenomenon that has come to be known as Colony Collapse Disorder (CCD).²⁴⁶ Use of neonicotinoids appears to be worsening the rapid decline of bees, through both acute and chronic exposures.²⁴⁷

When bees are exposed to even extremely small levels of the neonicotinoid compounds, weakened immunity, paralysis, and death may result.²⁴⁸ Thus, each spring beekeepers and honey producers are faced with watching their bees suffer and die when neonicotinoid-treated seeds are planted across America. Worse, the harmful impacts of neonicotinoids are not limited to honey bees, they also impact bumble bees and other native bees, as well as other beneficial insects,²⁴⁹ including threatened and endangered species listed under the ESA, as discussed in greater detail below.

It is a little known fact that neonicotinoid seed treatments are used so extensively that today this toxic and persistent class of insecticide is getting broadcast over the soil of almost all

²⁴⁴ See, e.g., Jennifer Hopwood et al., *Beyond the Birds and the Bees: Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Invertebrates*, Xerces Soc'y for Invertebrate Conservation (2013), available at http://www.xerces.org/wp-content/uploads/2013/09/XercesSociety_CBCneonics_sep2013.pdf; Krupke et al., *supra* note 55; Tapparo et al., *supra* note 55; P.R. Whitehorn et al., *Neonicotinoid Pesticide Reduces Bumble Bee Colony Growth and Queen Production*, 336 Sci. 351–52 (2012).

²⁴⁵ Jeffery S. Pettis et al., *Pesticide Exposure in Honey Bees Results in Increased Levels of the Gut Pathogen Nosema*, 99 Die Naturwissenschaften, 153, 153–58 (2012); see also Hopwood et al., *Are Neonicotinoids Killing Bees?*, *supra* note 59, at 13.

²⁴⁶ Walker, *supra* note 59, at Executive Summary.

²⁴⁷ Tapparo et al., *supra* note 54.

²⁴⁸ *Id.*

²⁴⁹ Jennifer Hopwood et al., *Beyond the Birds and the Bees: Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Invertebrates* at 6, Xerces Soc'y for Invertebrate Conservation (2013), available at http://www.xerces.org/wp-content/uploads/2013/09/XercesSociety_CBCneonics_sep2013.pdf.

of America's annual crop acreage—totaling over 200 million acres/year just from treated seeds.²⁵⁰ Almost all corn, wheat, canola, and cotton, along with a majority of soybean seeds are treated with neonicotinoids.²⁵¹ In addition to their widespread use as seed treatments, neonicotinoids are used as foliar sprays and for soil drenches. EPA's recent assessments admit the “terrestrial ecosystems potentially at risk” from neonicotinoid treated fields “include other cultivated fields, fencerows, hedgerows, meadows, fallow fields or grasslands, woodlands, riparian habitats, and other uncultivated areas.”²⁵²

The widespread ecosystem risk resulting from neonicotinoid use starts at the moment of seed planting.²⁵³ Seeds are generally sown with tractor-drawn planters using a forced air/vacuum system and a perforated disc to pick up individual seeds and drop them into the planting furrow at the selected spacing. Kernels treated with neonicotinoids do not flow readily and may stick to one another, causing uneven plant spacing. To overcome this, white talc powder is added to seed boxes to reduce friction and ensure smooth flow. Much of this talc then is exhausted across entire fields during planting, either down with the seed or behind the planter and into the air via an exhaust fan. Research sampling this waste talc after planting to determine whether this material was contaminated with pesticides abraded from treated seeds has shown that this waste talc contains significant quantities of neonicotinoids.²⁵⁴ During the spring planting period, the contaminated dust that arises from this soil may settle on flowers frequented by bees, or possibly on the insects themselves, and has been documented to cause mass die offs in many nations.²⁵⁵

The large areas being planted with neonicotinoid treated seeds, combined with the high persistence of these materials and the mobility of disturbed soil and talc dust, creates the potential for effects over an area that may exceed the boundaries of the production fields themselves.²⁵⁶

Additionally, and critically, neonicotinoid pesticides persist in the environment, increasing the risk of cumulative toxic loading effects, especially with repeated applications, in

²⁵⁰ Christian Krupke, *Dust in the Wind: Advances in Protecting Pollinators During Planting Season 3–4* (Univ. of Minn. Inst. of Ag Professionals 2013), available at <http://www.extension.umn.edu/agriculture/ag-professionals/cpm/2013/docs/UMN-Ext-CPM13-Krupke.pdf>.

²⁵¹ *Id.* at 4.

²⁵² Memorandum from EPA Environmental Fate and Effects Division, Revised Assessment for Clothianidin Registration of Prosper T400 Seed Treatment on Mustard Seed (Oilseed and Condiment) and Poncho/Votivo Seed Treatment on Cotton, PC Code 044309, EPA Environmental Fate and Effects Division 21 (Dec. 2, 2010).

²⁵³ Tapparo et al., *supra* note 54.

²⁵⁴ Girolami et al., *supra* note 55; Krupke et al., *supra* note 55; Tapparo et al., *supra* note 55.

²⁵⁵ Van der Sluijs et al., *supra* note 51, at 294–96.

²⁵⁶ Krupke et al., *supra* note 55.

both the short and long term.²⁵⁷ The neonicotinoid clothianidin is known to accumulate in the environment; indeed, soil from fields that had not been treated for two years still tested positive for clothianidin residues.²⁵⁸ Worse, bees will bring pollen containing neonicotinoid residues back to their hives, causing harm to the entire colony.

Soil collected from areas near our test site revealed that neonicotinoid insecticide residues were present in all samples tested, with clothianidin occurring in each field sampled. These results demonstrate that honey bees living and foraging near agricultural fields are exposed to neonicotinoids and other pesticides through multiple mechanisms throughout the spring and summer *We show that bees living in these environments will forage for maize pollen and transport pollen containing neonicotinoids to the hive.*²⁵⁹

This study showed a quantity of neonicotinoid residue found in and around corn fields that was in the range known to kill honey bees.²⁶⁰ Also, dead bees collected near treated fields contained clothianidin residues, whereas none of the apparently healthy, live bees sampled from the same locations had any detectable clothianidin.²⁶¹ Being persistent, and repeatedly spread each planting season, clothianidin dust and contamination from treated seeds creates an essentially perennial exposure situation for bees and other invertebrates. Label warnings and use directions are incapable of mitigating impacts because users know that state and federal enforcement actions against violators are exceedingly rare.

Neonicotinoids cause acute toxicity and lethal effects, with sub-lethal toxicity resulting in behavioral disruptions and cumulative and chronic effects.²⁶² Exposure to even small amounts of neonicotinoids can impair foraging success, brood and larval development, memory, and learning; cause damage to the central nervous system; and increase susceptibility to disease and other harmful impacts.²⁶³ Guttated water of seed-treated plants, which provides a source of water for bees, also can be a source of contamination and exposure.²⁶⁴ Corn seeds treated with

²⁵⁷ EPA Pesticide Fact Sheet: Clothianidin, Conditional Registration 2 (May 30, 2003), available at http://www.epa.gov/opp00001/chem_search/reg_actions/registration/fs_PC-044309_30-May-03.pdf; U.S. EPA, Office of Pesticide Programs, *Imidacloprid Summary Document for Registration Review, PC Code 129099* (2008).

²⁵⁸ Krupke et al., *supra* note 55.

²⁵⁹ *Id.* at 2 (emphasis added).

²⁶⁰ *Id.* at 5.

²⁶¹ *Id.* at 2.

²⁶² Van der Sluijs et al., *supra* note 51, at 296–97.

²⁶³ *Id.* at 299–300.

²⁶⁴ Eric Hoffmann & Steven Castle, *Imidacloprid in Melon Guttation Fluid: A Potential Mode of Exposure for Pest and Beneficial Organisms*, 105 J. Econ. Entomology 67, 70 (2012).

clothianidin can result in toxic concentrations up to 8,000 ng/ mL in the guttated fluid, and these concentrations can remain detectable over several weeks.²⁶⁵

Neonicotinoid use has significant impacts on non-target lands and non-target species. Non-target insects can be exposed to neonicotinoids through a broad array of non-intended exposure pathways in agricultural landscapes.²⁶⁶ Neonicotinoids used on crops can contaminate adjacent weeds and wildflowers.²⁶⁷ Not only does this harm honey bees, but it also can harm native pollinators such as bumble bees and solitary bees.²⁶⁸ Initial research shows that these native bees respond differently to neonicotinoids than honey bees,²⁶⁹ thus it is inappropriate to assume that the results of studies of neonicotinoid use on honey bees apply to other pollinator species. Laboratory studies have demonstrated that the neonicotinoids imidacloprid and clothianidin are “highly toxic to bumble bees.”²⁷⁰ Even sublethal exposure in bumble bees results in “reduced food consumption, reproduction, worker survival rates, and foraging activity.”²⁷¹ Neonicotinoids are also toxic to solitary native bees such as blue orchard and alfalfa leafcutter bees, with direct effects including increased mortality rate with direct contact.²⁷²

The role of neonicotinoids in bee deaths recently made national news when 50,000 bumble bees died in a parking lot outside of Portland, Oregon.²⁷³ This incident, the largest documented die-off of bumblebees, was caused by landscapers using the insecticide Safari, which contains the neonicotinoid dinotefuran as its main ingredient, to kill aphids on linden trees.²⁷⁴ Aphids can also be treated by spraying plants with soapy water.²⁷⁵ This tragic incident

²⁶⁵ Jana E. Reetz et al., *Neonicotinoid Insecticides Translocated in Guttated Droplets of Seed-Treated Maize and Wheat: A Threat to Honeybees?* 42 Apidologie 596, 601 (2011).

²⁶⁶ Jennifer Hopwood et al., *Beyond the Birds and the Bees: Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Invertebrates* at 6, Xerces Soc'y for Invertebrate Conservation (2013), available at http://www.xerces.org/wp-content/uploads/2013/09/XercesSociety_CBCneonics_sep2013.pdf;

²⁶⁷ Hopwood et al., *Are Neonicotinoids Killing Bees?*, *supra* note 59, at vi.

²⁶⁸ Christoph Sandrock et.al., *Sublethal Neonicotinoid Insecticide Exposure Reduces Solitary Bee Reproductive Success*, Agricultural & Forest Entomology, 2013, available at http://www.beyondpesticides.org/pollinators/documents/Sandrocketal2013_Sublethalneonicexposurereducessolitarybeereproductivesuccess_AgricForEnt.pdf; P.R. Whitehorn et al., *Neonicotinoid Pesticide Reduces Bumble Bee Colony Growth and Queen Production*, 336 Sci. 351–52 (2012).

²⁶⁹ Hopwood et al., *Are Neonicotinoids Killing Bees?*, *supra* note 59, at vi.

²⁷⁰ *Id.*

²⁷¹ *Id.*

²⁷² *Id.* at 15.

²⁷³ *Target Invertebrates*, Bug Life 24 (2009).

²⁷⁴ Elizabeth Case, *Bee Deaths a Result of Pesticide Safari; Count Upped to 50,000 Dead Insects*, Oregonian, July 8, 2013, available http://www.oregonlive.com/environment/index.ssf/2013/06/pesticide_confirmed_in_bee_dea.html.

²⁷⁵ *Id.*

has led the Oregon Department of Agriculture to institute a temporary ban on neonicotinoid use in Oregon.²⁷⁶

3. Neonicotinoid Use is Not Compatible with the Refuge Purposes

The conservation purposes of the refuge system are fundamentally undermined by FWS failing to address the use of neonicotinoids on NWRs. Healthy refuges require healthy pollinators. Pollinators such as bees provide essential ecosystem services, pollinating 75 percent of flowering plants and crops, but they are facing serious declines.²⁷⁷ The decline of pollinators, especially bees, has dramatic implications for refuge lands, and, as established above, the use of neonicotinoids is contributing to this decline. Banning neonicotinoids, including seeds treated with neonicotinoids, will help bring the refuge system back to its mission.

C. Neonicotinoids are Being Unlawfully Used in NWRs

1. Regulation of Agriculture and Pesticide Use in NWRs

i. Comprehensive Conservation Plans

Under the Refuge Act, a CCP “describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge.”²⁷⁸ Petitioners are not aware of any CCP that contains discussion evidencing a thorough analysis by the agency of neonicotinoid seed treatment in refuge agriculture. This type of farming has simply never been considered, and for good reason. CCPs focus on the achievement of refuge purposes, and those purposes are fundamentally inconsistent with farming with neonicotinoids. CCPs contemplating farming activities generally consider such activity as a mechanism for providing feed for migratory birds, not furthering harmful farming practices for the convenience of refuge farmers that actually harm migratory birds and other refuge species.²⁷⁹ The lack of discussion of agricultural neonicotinoid use in CCPs evidences that this practice has no place in NWRs.

ii. Compatibility Determinations

CDs are required to ensure that activities authorized on refuges are compatible with each refuge’s purposes. A compatible use is defined as a “wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially

²⁷⁶ *ODA Restricts Use of Certain Dinotefuran Pesticides*, *supra* note 242.

²⁷⁷ U.S. FWS, *Pollinators*, <http://www.fws.gov/pollinators/Index.html> (last updated Dec. 20, 2013).

²⁷⁸ 50 C.F.R. § 25.12.

²⁷⁹ See, e.g., Jennifer Hopwood et al., *Beyond the Birds and the Bees: Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Invertebrates*, Xerces Soc’y for Invertebrate Conservation (2013), available at http://www.xerces.org/wp-content/uploads/2013/09/XercesSociety_CBCneonics_sep2013.pdf

interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”²⁸⁰ If a use is found incompatible, then “the conflict shall be resolved in a manner that first protects the purposes of the refuge, and, to the extent practicable, that also achieves the mission of the System.”²⁸¹

FWS may not allow farming practices that deviate from traditional farming without separate CDs. This was shown in the context of growing GE crops, which is now an activity recognized as requiring a separate CD. So too, growing seeds treated with neonicotinoids is a distinct activity that must be looked at separately from other, more traditional, agricultural practices. FWS could not logically conclude that this incredibly destructive practice is a compatible use, so this incompatible use must be banned from NWRs.

FWS has failed to adequately consider the use of neonicotinoids in agriculture in CDs. If it did, it would find that, just as with GE crops, use of seeds treated with neonicotinoids is incompatible with both the mission of the refuge system as a whole and with the purposes of individual refuges as well because neonicotinoids are toxic to pollinators and other imperiled species refuges are designed to protect. Because the Refuge Act is unambiguous about the need for the wildlife protection to be protected against any incompatible uses,²⁸² FWS is obligated to prohibit the use of neonicotinoids on NWRs.

iii. Integrated Pest Management Policy and Pesticide Use Proposals

FWS’s Integrated Pest Management (IPM) policy establishes “policy, procedures, and responsibilities for pest management activities on and off . . . [FWS] lands.”²⁸³ It advocates for a sustainable approach to pest management that emphasizes the minimization of risks and “minimizing effects to non-target species and the environment . . .”²⁸⁴ FWS’s IPM policy instructs FWS to use “professional judgment and available science to select the lowest risk, most effective IPM method.”²⁸⁵ It requires FWS to, amongst other things, “[c]omplete necessary environmental documentation and procedures before conducting pest management activities,” such as Pesticide Use Proposals (PUPs), ESA consultation, and environmental analysis under NEPA.²⁸⁶ A PUP is intended to identify important considerations related to pesticide application (e.g., goals, objectives, IPM techniques, best management practices, pesticide application rates and methods, etc.). PUPs authorize the use of specific pesticide applications on refuges, but are

²⁸⁰ 16 U.S.C. § 668ee(1).

²⁸¹ *Id.* § 668dd(a)(4)(D).

²⁸² *Id.*

²⁸³ U.S. FWS, *Integrated Pest Management*, 569 FW 1, 1(A) (Aug. 3, 2010), available at <http://www.fws.gov/policy/569fw1.html>.

²⁸⁴ *Id.*

²⁸⁵ *Id.* at 1.4(F).

²⁸⁶ *Id.* at 1.4(H).

not NEPA documents and cannot be used to comply with NEPA's provisions.²⁸⁷ FWS's IPM policy instructs FWS to apply these principals in contracts, agreements, and activities such as cooperative farming.²⁸⁸

By allowing the use of neonicotinoids on NWRs, FWS is ignoring the requirements established in its own IPM policy. Neonicotinoids are widely used as a seed treatment, but FWS is not incorporating the widespread use of neonicotinoid treated seeds in PUPs, but rather is just ignoring this issue in its entirety. The prophylactic use of neonicotinoids "goes against the long established principles of [IPM], leading to environmental concerns."²⁸⁹ FWS must consider this widespread and often ignored use of insecticides under the framework of its IPM policy, and implement the criteria established in this policy in updated PUPs that ban neonicotinoid use.

iv. Cooperative Farming Agreements

Cooperative farming agreements are important mechanisms for establishing what is and is not allowable in specific refuge agricultural operations. However, these agreements are not proper vehicles for establishing refuge wide policy for a number of reasons. First, refuge managers cannot all be expected to be experts on the use and impacts of seed treatments. Second, refuge managers cannot all be expected to have expertise on the impacts of specific insecticides. Third, refuge managers should not have the burden of making these kinds of policy decisions. The action called for in this Petition is action that should be undertaken on a national scale in order to ensure that the conservation purposes of refuges are properly effectuated.

2. Use of Neonicotinoids in NWRs

FWS has acknowledged that pesticides can be generally dangerous.

By their very nature, most pesticides pose some risk of harm to humans, animals or the environment because they are designed to kill or adversely affect living organisms. Significant fish and bird kills have resulted from the legal application of pesticides, with millions of fish and birds estimated to die from pesticide exposure each year.²⁹⁰

Further, FWS has acknowledged that pesticides are one of the potential causes of pollinator species' declines and declines of other beneficial insects.²⁹¹ FWS has also acknowledged that

²⁸⁷ 40 C.F.R. § 1508.10.

²⁸⁸ U.S. FWS, *Integrated Pest Management*, 569 FW I, *supra* note 283, at 1.4(K).

²⁸⁹ Goulson, *supra* note 64.

²⁹⁰ U.S. FWS, *Environmental Quality, Pesticides and Wildlife*, <http://www.fws.gov/contaminants/Issues/Pesticides.cfm> (last updated Feb. 13, 2013). (citing Ted Williams, *Hard News on "Soft" Pesticides*, Audubon (1993); P. Pimental et al., *Environmental and Economic Costs of Pesticide Use*, 42 BioScience 750, 750–59 (1992)).

²⁹¹ *Id.*

pesticides harm the very resources it is charged with protecting. “The use of pesticides can negatively impact [FWS’s] trust resources, including fisheries resources, threatened and endangered species, migratory birds and their habitats.”²⁹² FWS has stated that “[i]n recent studies of major rivers and streams, one or more pesticides were detected more than ninety percent of the time in water, in more than eighty percent of fish sampled, and in thirty-three percent of major aquifers.”²⁹³ FWS has also noted that researchers have identified pesticides as a “potential cause of amphibian declines and deformities.”²⁹⁴

Despite this acknowledgement, FWS has allowed the widespread use of neonicotinoids, one of the most toxic of all pesticides, in NWRs. Almost all corn, wheat, canola, and cotton is treated, along with a majority of soybean.²⁹⁵ These crops are grown on NWRs; thus, on information and belief, farmers are planting mostly neonicotinoid-treated seeds in NWRs throughout the nation. Despite the overwhelming adoption of neonicotinoid treated seeds, the impacts of this incredibly toxic practice has not been properly analyzed by FWS. For example, neonicotinoids are not even represented on the Region 3 Pesticide Use Proposal Field Approval List, despite the fact that they are almost certainly used there.

The use of neonicotinoid treated seeds on refuges poses a significant threat to wildlife, especially pollinators, in and around NWRs. Refuge lands adjacent to cooperative farming agricultural fields are prime bee and native insect habitats. Due to the long persistence of these compounds and the uncontrollable drift of contaminated dust and soil, non-target insects could be adversely affected by neonicotinoids through multiple exposure pathways including residues in pollen and nectar, dust from treated seeds and soils, planter exhaust, untreated but contaminated non-crop plants adjacent to treated fields, contaminated puddles in fields and adjacent surface water, guttation droplets on both treated and untreated but contaminated plants, and residues from foliar uses.²⁹⁶

In addition, new research shows that neonicotinoids are “showing up in wetlands in concentrations at least three or four times higher than what has been deemed habitable for insects,” in some cases at concentrations *100* times or *more* higher than benchmarks for safe levels.²⁹⁷ Neonicotinoids are soluble in water and are mobile, raising additional concerns about contamination of water bodies. The neonicotinoid imidacloprid was found in eighty-nine percent of surface waters sampled in agricultural regions in California, indicating the ability of neonicotinoids to easily travel from application sites to neighboring environments, including

²⁹² U.S. FWS, *Environmental Quality, Pesticides and Wildlife*, <http://www.fws.gov/contaminants/Issues/Pesticides.cfm> (last updated Feb. 13, 2013).

²⁹³ *Id.* (citing R.J. Gilliom et al., *Pesticides in the Nation’s Streams and Ground Water, 1992–2001*, U.S. Geological Survey, Va. Circular 1291, available at <http://pubs.usgs.gov/circ/2005/1291/>).

²⁹⁴ *Id.*

²⁹⁵ Krupke et al., *supra* note 55.

²⁹⁶ See, e.g., *Id.*

²⁹⁷ Geoff Leo, *Pesticide “Contaminating” Prairie Wetlands: Research Suggests Pesticide May Be Linked to Insect, Bird Declines*, CBC News (Jan. 6, 2014), <http://www.cbc.ca/news/canada/saskatchewan/pesticide-contaminating-prairie-wetlands-scientist-1.2482082>.

nearby water bodies.²⁹⁸ Nearly twenty percent of the water samples tested exceeded the EPA benchmark for toxicity to aquatic invertebrates.²⁹⁹ Numerous other studies, including USGS survey data and state water quality reports, have indicated that neonicotinoid chemical traces are present at concentration levels high enough to have severe effects on aquatic invertebrates. According to one expert toxicologist reviewing the USGS report data, the levels of toxins present in the groundwater samples indicate serious biological effects on aquatic systems and unprecedented contamination levels.³⁰⁰

FWS's duty to conserve refuge species includes pollinators. In addition to providing habitat for honey bees, refuges provide habitat for thousands of imperiled native bee and pollinator species. Clothianidin and its parent compound thiamethoxam—the two most widely used neonicotinoids—are highly toxic to bee species such as the common Eastern bumble bee, alfalfa leafcutter bee, and blue orchard bee.³⁰¹ Native bumble bees such as rusty patched bumble bee, which has declined from an estimated 87 percent of its historic range;³⁰² Franklin's bumble bee, listed as critically imperiled by the International Union of Conservation of Nature;³⁰³ yellow-banded bumble bee, a species in steep decline;³⁰⁴ and Western bumble bee, now extirpated from most of its once vast native range,³⁰⁵ are all dangerously imperiled. Non-bee insects such as butterflies, ladybugs and lacewings, dragonflies, and hoverflies are also imperiled throughout the nation for a variety of reasons, including agricultural chemical use.³⁰⁶ Some of these species are facing severe declines comparable to, or worse than, those faced by honey bees. As FWS Director Dan Ashe recently stated, "No one wants to see a world without the benefits that pollinators provide. Without them, the ability of agricultural crops and wild plants to produce food products and seeds is jeopardized."³⁰⁷ Exposing these species to the additional threat of neonicotinoids in the refuges created for their conservation is inexcusable.

²⁹⁸ K. Starner & K.S. Goh, *Detections of the Neonicotinoid Insecticide Imidacloprid in Surface Waters of Three Agricultural Regions of California, USA, 2010–2011*, 88 Bulletin of Env'l. Contamination & Toxicology 316–21 (2012).

²⁹⁹ *Id.*

³⁰⁰ Mineau & Palmer, *supra* note 51, at 12.

³⁰¹ Hopwood et al., *Are Neonicotinoids Killing Bees?*, *supra* note 59.

³⁰² The Xerces Soc'y for Invertebrate Conservation, *Bumble Bees: Rusty Patched Bumble Bee* (*Bombus affinis*), <http://www.xerces.org/rusty-patched-bumble-bee/> (last visited Feb. 5, 2014).

³⁰³ The Xerces Soc'y for Invertebrate Conservation, *Bumble Bees: Franklin's Bumble Bee* (*Bombus franklini*), <http://www.xerces.org/franklins-bumble-bee/> (last visited Feb. 5, 2014).

³⁰⁴ The Xerces Soc'y for Invertebrate Conservation, *Bumble Bees: Yellowbanded Bumble Bee* (*Bombus terricola*), <http://www.xerces.org/yellow-banded-bumble-bee/> (last visited Feb. 5, 2014).

³⁰⁵ The Xerces Soc'y for Invertebrate Conservation, *Bumble Bees: Western Bumble Bee* (*Bombus occidentalis*), <http://www.xerces.org/western-bumble-bee/> (last visited Feb. 5, 2014).

³⁰⁶ Complaint, *Ctr. for Food Safety v. Jewell*, No. 13-2389 (N.D. Cal. Aug. 27, 2013).

³⁰⁷ U.S. FWS, Director's Corner, *Like Pumpkin Pie? At Thanksgiving We Need to Thank Pollinators*, <http://www.fws.gov/director/dan-ashe/index.cfm/2013/11/25/Like-Pumpkin-Pie-At-Thanksgiving-We-Need-to-Thank-Pollinators> (Nov. 25, 2013).

3. Neonicotinoid Use in NWRs is Unlawful

The use of neonicotinoids in agriculture, particularly as seed treatments, on NWRs has not been approved, nor has this use been properly analyzed on any refuge, so allowing neonicotinoid use on NWRs violates law and policy. Neonicotinoid use is antithetical to the core purposes of NWRs because neonicotinoids are so toxic, persistent, and harmful to the environment. Further, FWS has quietly allowed the planting of neonicotinoid treated seeds throughout the nation without undertaking the comprehensive analysis required by law. Refuge pesticide use must comply with federal laws including NEPA.³⁰⁸ By entering into annual Cooperative Farming Agreements and Pesticide Use Proposals, the various regions of FWS have performed major federal actions, and by issuing final CCPs, EAs, and FONSIs under NEPA, FWS has taken final agency actions under 5 U.S.C. § 704. However, FWS acted arbitrarily and capriciously, abused its discretion, and failed to act in accordance with NEPA and its implementing regulations in violation of 5 U.S.C. § 706 when it failed to consider the impacts of neonicotinoid treated seeds. FWS has failed to meet one of NEPA's core requirements because it has not taken a hard look at the environmental effects of neonicotinoid use in farming operations throughout the refuge system. For these reasons, neonicotinoid use is unlawful in NWRs.

D. Neonicotinoids Must be Banned from NWRs

For the reasons described above, we strongly urge FWS to take immediate action banning neonicotinoids from NWRs.

III. FWS SHOULD TAKE IMMEDIATE ACTION TO COMPLY WITH THE MANDATES OF THE ENDANGERED SPECIES ACT

A. FWS Should Ban GE Crops and Neonicotinoids to Comport with its Affirmative Conservation Duties Under the ESA

Section 7(a)(1) of the ESA imposes an affirmative obligation on every federal agency to utilize its authority to carry out programs for the conservation of listed species.³⁰⁹ Section 7(a)(1) "contains a clear statutory directive (it uses the word 'shall') requiring the federal agencies to consult and develop programs for the conservation of each of the endangered and threatened species listed pursuant to the statute."³¹⁰

An agency's affirmative conservation obligation under section 7(a)(1) is not to be conflated with its other obligations under section 7(a)(2), discussed in greater detail *infra*.

³⁰⁸ U.S. FWS, *Managing Invasive Plants: Concepts, Principles, and Practice*, <http://www.fws.gov/invasives/staffTrainingModule/methods/chemical/practice.html> (last updated Sept. 14, 2009).

³⁰⁹ 16 U.S.C § 1536(a).

³¹⁰ *Sierra Club v. Glickman*, 156 F.3d 606, 617 (5th Cir. 1998).

“[S]ection 7(a)(1) imposes a judicially reviewable obligation upon all agencies to carry out programs for the conservation of endangered and threatened species.”³¹¹ Agencies must “in fact carry out a program to conserve, and not an “insignificant” measure that does not, or is not reasonably likely to, conserve endangered or threatened species. To hold otherwise would turn the modest command of section 7(a)(1) into no command at all by allowing agencies to satisfy their obligations with what amounts to total inaction.”³¹²

As discussed throughout this Petition, GE crops and neonicotinoid use result in significant ecosystem damage. Threatened and endangered species fighting for their very existence are often canaries in the goldmine, in that they are often most significantly impacted by activities which harm their ecosystems, but NWRs were created to provide, quite literally, a refuge for these beleaguered species. As FWS Director Dan Ashe declared, the “Refuge System will play a key role as we seek to accelerate species recovery and foster innovative conservation approaches.”³¹³ Recognizing the key role of refuges in the protection and recovery of listed species, FWS can and should act under its affirmative authority under section 7(a)(1) of the ESA to institute a ban on GE crops and neonicotinoids in order to conserve listed species.

B. FWS Should Initiate Formal Programmatic Consultation for Agricultural Activities

The ESA directs federal agencies to insure that any actions they authorize, fund, or carry-out do not jeopardize the continued existence of an endangered or threatened species or adversely modify designated or proposed critical habitat.³¹⁴ If FWS does not act to expeditiously ban GE crops and neonicotinoid use on NWRs, in order to ensure compliance with section 7(a)(2), and to avoid unlawful take under section 9 of the ESA, FWS should conduct regional programmatic consultation for these activities on NWRs. The final products of these consultations will be an analysis that determines whether GE farming and neonicotinoid use may result in jeopardy to any endangered species, or adverse modification to any designated critical habitat. If no jeopardy is found, subsequent biological opinions and incidental take statements will ensure FWS’s compliance with our nation’s bedrock endangered species protection law.

The purpose of a programmatic consultation is to allow the agency to streamline its section 7 consultation process for activities that occur frequently. As noted above, GE crops are being grown and neonicotinoids are being used on a massive scale, so programmatic consultation is appropriate for these circumstances.

³¹¹ *Fla. Key Deer v. Paulison*, 522 F.3d 1133, 1146 (11th Cir. 2008).

³¹² *Id.* at 1147.

³¹³ U.S. FWS, *National Wildlife Refuge System* (Dec. 30, 2012), http://www.fws.gov/refuges/RefugeUpdate/JanFeb_2013/from_the_director.html.

³¹⁴ 16 U.S.C. § 1536(a)(2).

1. FWS's Requirements Under the Endangered Species Act

The ESA requires an action agency to consult with an expert agency to ensure that any action authorized by the agency is not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of the critical habitat of such species.³¹⁵ For each federal action, FWS must determine whether any listed or proposed species may be present in the area of the agency action.³¹⁶ If listed or proposed species may be present, FWS must prepare a “biological assessment” to determine whether the listed species may be affected by the proposed action.³¹⁷

If FWS determines that its proposed action may affect any listed species or critical habitat, it must engage in formal consultation. To complete formal consultation, FWS must provide EPA with a “biological opinion” explaining how the proposed action will affect the listed species or habitat.³¹⁸ Effects must be based on the direct, indirect, and cumulative effects of the action when added to the environmental baseline and other interrelated and interdependent actions.³¹⁹ To complete formal consultation, FWS must provide EPA with a “biological opinion” explaining how the proposed action will affect the listed species or habitat.³²⁰ FWS retains ongoing discretionary authority to modify the terms and conditions of its cooperative farming agreements, thus the agency’s continuing authority constitutes ongoing agency action.

If FWS concludes the proposed action will jeopardize the continued existence of a listed species, the biological opinion must outline “reasonable and prudent alternatives.”³²¹ If the biological opinion concludes the action is likely to adversely affect listed species but is not likely to result in jeopardy, FWS must provide an incidental “take” statement specifying the allowed taking, its impact, any “reasonable and prudent measures” that FWS considers necessary to minimize such impact, and also setting forth the “terms and conditions” that must be complied with to implement those measures.³²²

“Take” is defined broadly to include actions that “harass, harm, pursue, hunt, shoot, wound, [or] kill” a protected species, either through direct action or by degrading its habitat.³²³ The ESA prohibits the “take” of any species listed as endangered, a prohibition FWS has

³¹⁵ *Id.* § 1536(a)(2).

³¹⁶ *Id.* § 1536(c)(1); 50 C.F.R. § 402.12.

³¹⁷ 16 U.S.C. § 1536(c)(1); 50 C.F.R. § 402.12.

³¹⁸ 16 U.S.C. § 1536(b).

³¹⁹ 50 C.F.R. § 402.02.

³²⁰ 16 U.S.C. § 1536(b).

³²¹ *Id.* § 1536(b)(3)(A).

³²² *Id.* § 1536(b)(4).

³²³ *Id.* § 1532(19); 50 C.F.R. § 17.3.

extended by regulation to threatened species.³²⁴ However, take that complies with the terms and conditions specified in a biological opinion is not unlawful.³²⁵

During consultation with FWS, EPA is prohibited from making any irreversible or irretrievable commitment of resources with respect to the agency action that may foreclose the formulation or implementation of any reasonable and prudent alternative measures.³²⁶

2. Existing Analysis Fails to Adequately Consider Impacts of GE Crops

FWS has never properly consulted on the specific impacts of GE crops on NWRs. Growing GE crops presents a different set of issues than conventional agriculture that FWS has not given adequate region-wide consideration under the ESA. For example, growing GE crops results in increased use of glyphosate. Some of the ESA listed species specifically known to be harmed or put at further risk by glyphosate include the California red-legged frog, the Houston toad, and the Valley Elderberry Longhorn beetle. While some existing consultation documents may consider pesticide exposure for these species, they do not contemplate the impacts of this exposure compounded by the other threats associated with GE crops as superweed proliferation and transgenic contamination resulting in lost habitat on a regional scale. These impacts must be considered all together in order for FWS to adequately understand them and to comply with its obligations under the ESA.

3. Existing consultation documents do not contemplate the widespread use of neonicotinoid treated seeds or the impacts of neonicotinoid use.

Agriculture is the main contributor of toxic pollution on most refuges, and while biological opinions (BiOps) might consider the impacts of this pollution, they do not consider neonicotinoids as a major source. For example, the BiOp for Crab Orchard NWR states that “[u]se of insecticides is not allowed.”³²⁷ Later the BiOp clarifies that insecticides may be allowed. But “only insecticides proposed to be used are small quantities of commercially available insect sprays to control insect infestations as necessary in recreation areas and administrative sites.”³²⁸ Thus, the Crab Orchard BiOp does not even consider the impacts of neonicotinoid use on listed species in the refuge, despite the fact that neonicotinoids are almost certainly having some effect on these species. This is just one of many examples of a consultation document that states that insecticides are generally not allowed on a NWR. FWS

³²⁴ 16 U.S.C. § 1538(a)(1)(B); *see also id.* § 1533(d); 50 C.F.R. § 17.31.

³²⁵ 16 U.S.C. § 1536(o)(2).

³²⁶ *Id.* § 1536(d).

³²⁷ U.S. FWS, Programmatic Biological Opinion for the Crab Orchard National Wildlife Refuge, 2006 Comprehensive Biological Opinion (2006).

³²⁸ *Id.*

has not evaluated the impacts of widespread use of neonicotinoids as seed treatments on listed species, in violation of the ESA.

Many threatened and endangered species stand to be harmed by neonicotinoid use, including, for example, insectivorous bats such as the endangered Indiana bat. FWS has recognized that “[p]esticides and other chemical contaminants have been implicated in the declines of a number of North American insectivorous bat species.”³²⁹ A FWS biologist recently declared:

[O]ur biggest concern with neonicotinoid insecticides is for insectivorous bats . . .

. Many of the insects that Indiana bats feed on would be reduced or would carry residues that could accumulate in bat tissues. Research on lethal and sublethal impacts to bats from insecticides is lacking because most bat lifestyles are not easily maintained in captivity . . . The slightest metabolic alteration in these animals could alter hibernation ability and significantly alter hibernation behavior. As with the white-nose syndrome (caused by a recently introduced exotic fungus), anything that alters a bat's ability to hibernate properly can turn a sublethal irritation into widespread lethality. The endangered Indiana bat (*Myotis sodalis*), is a very common species here in Monroe County, Indiana, and given the unknown potential for sublethal effects, we would not want to encourage such high dose uses of insecticides. Many of the insects that Indiana bats feed on would be reduced or would carry residues that could accumulate in bat tissues.³³⁰

The Indiana bat is just one of many species that may be impacted by neonicotinoid use, but FWS has failed to carry out consultation considering these impacts under the ESA.

4. Failure to Consult Could Result in Unauthorized Take of Threatened and Endangered Species.

At least eighteen threatened or endangered insects, including beetles, butterflies, grasshoppers, and other taxa, are potentially directly affected by the use of the neonicotinoids clothianidin and thiamethoxam. These include, but are not limited to: American burying beetle (*Nicrophorus americanus*), Behren's fritillary (*Speyeria zerene behrensi*), Callippe silverspot (*Speyeria callippe callippe*), Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*), Fender's blue (*Icaricia icarioides fenderi*), Hine's emerald dragonfly (*Somatochlora hineana*), Karner blue (*Plebejus melissa samuelis*), Kern primrose sphinx moth (*Euproserpinus euterpe*), Lange's metalmark (*Apodemia mormo langei*), Mitchell's satyr butterfly (*Neonympha mitchellii mitchelli*), Myrtle's silverspot (*Speyeria zerene myrtleae*), Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*), Ohlone tiger beetle (*Cicindela ohlone*), Quino checkerspot butterfly (*Euphydryas editha quino*), Salt Creek tiger beetle

³²⁹ *Id.*

³³⁰ Sparks, U.S. FWS, *Addressing the Emerald Ash Borer Problem*, <http://www.fws.gov/midwest/insider3/Mar13Story8.htm> (last updated Mar. 26, 2013).

(*Cicindela nevadica lincolniana*), San Bruno elfin (*Callophrys mossii bayensis*), Schaus swallowtail (*Papilio aristodemus ponceanus*), and Zayante band-winged grasshopper (*Trimerotropis infantilis*). At least thirty-nine pollinator species are currently listed under the ESA,³³¹ and these species are especially susceptible to harm resulting from neonicotinoid use. The list of imperiled species further threatened by neonicotinoid use can be expected to continue to grow both as the body of research on the impacts of neonicotinoids develops and as more insect and pollinator species are added to the list of species protected under the ESA.

In addition, harmful direct, indirect, and cumulative effects on many other non-insect ESA listed species, including, but not limited to, birds, crustaceans, mollusks, fish, mammals, reptiles, and amphibians, are also foreseeable due to the known effects of clothianidin and thiamethoxam, and these species may be an important part of the food chain for listed species. Threatened and endangered species may be affected by direct consumption of clothianidin and thiamethoxam treated seeds and plant parts, as well as by food chain and ecosystem collapses associated with the vast mortality caused by these pesticides to aquatic and terrestrial invertebrates. FWS has not completed consultation that adequately access the impacts of neonicotinoid use on listed species or their designated critical habitat on NWRs, so it has no incidental take statements to cover the take of these species. Given the toxicity and persistence of neonicotinoids, the risk of take is high. Thus, this is a significant oversight which could result in the unauthorized take of listed species.

C. If FWS does not Undertake Programmatic Consultation, it Should Reinitiate Consultation for all NWRs that Grow GE Crops and/or use Neonicotinoid Treated Seeds

While programmatic region-wide consultation would be the most efficient mechanism for complying with the mandates of the ESA until FWS bans this activity, on NWRs where GE crops and/or neonicotinoids are used in agricultural operations, FWS could also fulfill its obligations by requesting that implicated individual refuges reinitiate consultation. The ESA requires reinitiation of consultation where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

- (a) If the amount or extent of taking specific in the incidental take statement is exceeded;
- (b) New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered.
- (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or

³³¹ U.S. FWS, *Endangered Species Program, Pollinators Federally-Listed as Endangered or Threatened Species*, <http://www.fws.gov/pollinators/programs/endangered.html> (last updated Feb. 13, 2013).

(d) If a new species is listed or critical habitat designated that may be affected by the identified action.³³²

By allowing GE crops and neonicotinoid treated seeds to be grown on NWRs, FWS has triggered the requirement that formal consultation be reinitiated for NWRs that allow these activities.

1. FWS Retains Involvement and Control over Farming Activities on NWRs

While circumstances can vary from refuge to refuge, FWS has retained discretionary involvement and control in farming on NWRs because, amongst other actions, it enters into cooperative farming agreements and approves PUPs that directly guide farming practices on refuges. FWS also routinely issues and reissues documents that guide the nature of farming on refuges such as CCPs and CDs. This ongoing involvement satisfies the threshold requirement of the ESA's reinitiation regulation.

2. The Amount or Extent of Taking Allowed is Likely Exceeded as a Result of FWS Allowing GE crops and Neonicotinoid Use

Existing BiOps do not include adequate consideration of the mechanisms by which GE crops and neonicotinoids can harm listed species, particularly insectivorous species such as endangered Indiana bats, which eat half their body weight in insects every night.³³³ On refuges where seeds treated with neonicotinoids and herbicide tolerant crops are grown this could lead to significant exposure. Despite this almost certain and significant exposure, neonicotinoid use is not analyzed in ITSSs. Further, insecticide use is actually banned in order to protect refuge values on many refuges, such as the Crag Orchard NWR, discussed *supra*, which contains endangered Indiana bats. While additional research is needed, it is plain that FWS has not factored in the possibility that consumption of such insects may result in the bioaccumulation of toxic insecticide and herbicide in listed species sufficient to qualify as take under the ESA.

Further, GE crops and neonicotinoids do not merely affect insects. As mentioned above, harmful direct, indirect, and cumulative effects on many other non-insect ESA listed species such as crustaceans, mollusks, fish, mammals, reptiles, and amphibians, are foreseeable due both to the direct toxicity known effects of neonicotinoids and also due to indirect impacts such as food chain and ecosystem collapses. The seminal report *The Impact of the Nation's Most Widely Used Insecticides on Birds*, which was researched and written by the respected avian toxicologist Dr. Pierre Mineau, looked at key EPA risk assessment documents on neonicotinoids.³³⁴ It found

³³² 50 C.F.R. § 402.16(b).

³³³ U.S. FWS, *Endangered Species, Indiana Bat (Myotis Sodalis)*, <http://www.fws.gov/midwest/endangered/mammals/inba/inbafctsht.html>.

³³⁴ Mineau & Palmer, *supra* note 51.

high direct and indirect mortality risks to a broad suite of birds, as well aquatic invertebrates and ecosystems generally.³³⁵

*A single corn kernel coated with a neonicotinoid can kill a songbird. Even a tiny grain of wheat or canola treated with the oldest neonicotinoid, imidacloprid, can poison a bird. As little as 1/10th of a corn seed per day during egg-laying season is all that is needed to affect reproduction with any of the neonicotinoids registered to date.*³³⁶

Dr. Mineau stated that the observed acute threats to aquatic invertebrates from water contamination by neonicotinoids “may be totally unprecedented in the history of pesticide registration.”³³⁷ While research on the specific impacts on ESA listed non-insect species in the U.S. is sparse, studies show neonicotinoids indirectly decimated populations of insectivorous birds such as starlings, spotted flycatcher and snipe across wide swaths of Europe by killing off the large insects that made up their food supply and contaminating their water.³³⁸ The ESA requires FWS to look at whether authorized incidental take may be exceeded as a result of these indirect effects and where, as here, it almost certainly is being exceeded, to reinitiate consultation.

3. New Information on GE Crops and Neonicotinoids Reveals Affects not Previously Considered.

This Petition provides new information, not previously considered, on the impacts of GE crops, particularly in the context of transgenic contamination, superweeds, and increased herbicide use, on listed species at NWRs. In addition, FWS has not properly considered the effects of widespread use of neonicotinoid treated seeds in NWRs on listed species, so all information, including the information contained in this Petition and supporting documents, is new information not previously considered. This constitutes a large body of new information on impacts to listed species FWS has not yet properly considered. The ESA provides a mandate for the agency to reinitiate consultation to consider this important new information.

4. Allowing Farmers to Use GE crops and/or Neonicotinoid-treated Seeds Constitutes Action Later Modified to Cause Effects to Listed Species not Considered in Prior Consultation Documents

Very few existing consultation documents even consider the impacts of GE crops on listed species. In addition, on information and belief, no consultation documents contemplate

³³⁵ *Id.* at 5.

³³⁶ *Id.* at 3 (emphasis added).

³³⁷ *Id.* at 57.

³³⁸ Henk Tennekes, *The Systemic Insecticides: A Disaster in the Making* (2010), available at www.disasterinthemaking.com.

allowing substantial neonicotinoid use in NWR farming operations. This type of farming is a significant departure from the traditional agricultural practices authorized on NWRs, thus it constitutes action later modified to cause effects not considered in prior consultation documents and triggers the agency's duty to reinitiate consultation.

5. New Species and Critical Habitat Listings

FWS is publishing new species and critical habitat listings at a rapid rate due to a variety of factors. A 2011 legal settlement requires FWS to make initial or final listing decisions on 757 species by 2018.³³⁹ In addition, climate change, rapid development along coastlines, and increased domestic energy production have all pushed FWS to take measures to protect imperiled species under the ESA by designating critical habitat. In 2012, 33 species were listed and 39.7 million acres were as designated critical habitat,³⁴⁰ and in 2013, 55 species were listed, 750 thousand acres of new critical habitat were designated, and 29.7 million acres were proposed for critical habitat designation.³⁴¹ Existing consultation documents for NWRs not only do not adequately consider the impacts of GE crops and neonicotinoids on previously listed species, they also do not touch on the impacts of these agricultural practices on the many newly listed species and millions of acres of new critical habitat.

Thus, while an agency's duty to reinitiate consultation is triggered merely when the first and one of the four following factors are present, all five factors are implicated here. The ESA plainly requires FWS to reinitiate consultation on for refuges where GE crops are grown and/or neonicotinoids are being used. Thus, if FWS does not take immediate action to ban GE crops and neonicotinoids from NWRs, and it does not embark upon programmatic consultation to thoroughly analyze these impacts on a region-wide scale, then it must, at the very minimum, reinitiate consultation on all refuges that contain the agricultural practices at issue in this petition. Failure to do so would result in violations of both sections 7 and 9 of the ESA.

REQUESTED RELIEF

Petitioners ask FWS to carry out the following specific actions:

1. Rescind the Policy on Biological Integrity, Diversity, and Environmental Health (GMO Policy) and issue a new Policy declaring that farming with GE crops or neonicotinoids is not a compatible use of refuge lands.

³³⁹ Ctr. for Biological Diversity, *Landmark Agreement Moves 757 Species Toward Federal Protection* (July 12, 2011), http://www.biologicaldiversity.org/programs/biodiversity/species_agreement/.

³⁴⁰ Ctr. for Biological Diversity, *2012 Annual Report* 4, 8 (2012), http://www.biologicaldiversity.org/publications/reports/AnnualRpt2012_small.pdf.

³⁴¹ Ctr. for Biological Diversity, *Endangered Earth Online, 2013 in Review* (2013) <http://www.biologicaldiversity.org/publications/earthonline/endangered-earth-online-no701.html>.

2. Issue new regulations banning GE crops, neonicotinoid pesticides, and seeds or plants pre-treated or coated with neonicotinoid pesticides from all NWRs.

3. Ensure that all NWRs comply with the mandates of the ESA, particularly its consultation requirements and the prohibition against take, as these requirements relate to threatened and endangered species potentially affected by GE crops and neonicotinoids.

4. Adopt a monitoring program whereby FWS conducts field surveys of the areas where GE crops are planted. Provide the public with information regarding the location of these crops, acreage planted, the type of crop (e.g., Roundup Ready, *Bt*, etc.) and the types of pesticides (including herbicides) used, including the dates and amounts of application.

5. Conduct field surveys in 2014, 2015, and 2016 in the same areas to locate “volunteers,” i.e., new GE plants that germinate in the fields, and remove or destroy any such volunteers. Publicly report the quantity and location of any volunteers that are located and how they were removed or destroyed.

CERTIFICATION

The undersigned certifies that, to the best knowledge and belief of the undersigned, this Petition includes all information and views on which the petition relies, and that it includes representative data and information known to the Petitioners that are unfavorable to the Petition.

CONCLUSION

NWRs are a critical and cherished part of our national heritage. Petitioners urge FWS to act immediately to protect these areas and the natural resources they safeguard from the harms caused by GE crops and neonicotinoid use. In accordance with the APA, Petitioners request that FWS expeditiously answer this Petition.³⁴²

Dated: February 25, 2014

³⁴² 5 U.S.C. § 555(b) (“[W]ithin a reasonable time, each agency shall proceed to conclude a matter presented to it.”); *id.* § 706(1) (“The reviewing court shall . . . compel agency action unlawfully withheld or unreasonably delayed.”); *id.* § 555(e) (“Prompt notice shall be given of the denial in whole or in part of a written application, petition, or other request of an interested person made in connection with any agency proceeding.”).

Respectfully Submitted,



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