PETITION BEFORE THE
UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

January 12, 2010

THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION 4828 SE Hawthorne Blvd. Portland, OR 97217 **Et al.,** *Petitioners,* **TOM VILSACK** Secretary, United States Department of Agriculture 1400 Independence Ave., S.W. Washington, DC 20250-1300 **CINDY SMITH** Administrator, Animal and Plant Health Inspection Service 4700 River Road Riverdale, MD 20737-1234 **REBECCA BECH** Deputy Administrator, Animal and Plant Health Inspection Service Plant Protection and Quarantine 1400 Independence Ave., S.W., Room 302E Washington, DC 20250 *Respondents*	)	Docket No.

PETITION FOR RULEMAKING

PETITION SEEKING REGULATION OF BUMBLE BEE MOVEMENT

Pursuant to the Right to Petition Government Clause contained within the Administrative Procedure Act,[1] the Plant Protection Act,[2] the Honeybee Act,[3] the Animal Health Protection Act,[4] the United States Department of Agriculture Reorganization Act,[5] and the United States Department of Agricultures' regulations,[6] the undersigned submit this citizen petition for rulemaking requesting the Secretary take action to regulate the movement of bumble bees. Specifically, petitioners request the Secretary to undertake the following actions:

1. **APHIS should use its authority under the Plant Protection Act ("PPA") to regulate the interstate movement of bumble bee adults, nests, and previously used nest materials ("BBANPUNM"). Specifically, APHIS should promulgate rules prohibiting the movement of BBANPUNM outside their native ranges; and APHIS should regulate interstate movement of bumble bee pollinators within their native ranges by requiring all permit applicants to show that BBANPUNM are certified disease free prior to movement. Finally, APHIS should consider using the courtesy permit system to regulate interstate movement of BBANPUNM to prevent dissemination of plant pests while regulations implementing the above are promulgated.**

2. **APHIS should use its authority under the Honeybee Act ("HBA"), combined with its authority under the PPA to regulate movement of BBANPUNM. Specifically, APHIS should: promulgate rules under the HBA and the PPA to prevent interstate movement of bumble bee pollinators into states with species sensitive to the plant pests disseminated by BBANPUNM; define bumble bee pollinators outside their native ranges as "Restricted Organisms" under 7 CFR 322.13; and create regulations that help stop the spread of disease that results from interstate movement of BBANPUNM.**

3. **APHIS should also consider regulating movement of BBANPUNM under the Animal Health Protection Act similarly to how it would regulate BBANPUNM under the PPA.**

4. **APHIS should work closely with states and scientists to ensure cooperation and the use of the best available information in the regulation of bumble bee pollinators.**

---

[1] Administrative Procedure Act, 5 U.S.C. § 553(e) (2006).
[2] Plant Protection Act, 7 U.S.C. §§ 7701 *et seq* (2006).
[3] Honeybee Act, 7 U.S.C. §§ 281 *et seq* (2006).
[4] Animal Health Protection Act, 7 U.S.C. §§ 8301 *et seq* (2006).
[5] United States Department of Agriculture Reorganization Act, 7 U.S.C. § 450 (2006).
[6] Petitions, 7 C.F.R. § 1.28 (2009), ("Petitions by interested persons in accordance with 5 U.S.C. 553(e) for the issuance, amendment or repeal of a rule may be filed with the official that issued or is authorized to issue the rule. All such petitions will be given prompt consideration and petitioners will be notified promptly of the disposition made of their petitions.").

PETITIONERS

The Xerces Society is a nonprofit organization that uses advocacy, education, and applied research to conserve invertebrates. For over three decades, the Society has been at the forefront of invertebrate conservation, harnessing the knowledge of scientists and the enthusiasm of citizens to implement conservation programs. The mission of the Xerces Society is to protect wildlife through the conservation of invertebrates and their habitat. The Xerces Society actively works to conserve bumble bees on public and private land. The Xerces Society has more than 4,000 members; including scientists, gardeners, farmers, and land managers who are dedicated to conserving and enhancing bumble bee and other native bee populations on the land they own or manage. These individuals depend on healthy populations of wild bumble bees and other native bees to pollinate the flowering plants and crops that they grow, manage, and study. Petitioner Xerces Society is located at 4828 SE Hawthorne Blvd., Portland, Oregon 97215.

Defenders of Wildlife is dedicated to the protection of all native animals and plants in their natural communities. With more than 1 million members and activists, Defenders of Wildlife is a leading advocate for innovative solutions to safeguard our wildlife heritage for generations to come. For more information, visit www.defenders.org. Petitioner Defenders of Wildlife is located at 1130 17th St. NW, Washington DC 20036-4604.

Since 1970, Natural Resources Defense Council (NRDC) has been a strong advocate for, and defender of, the earth's natural resources and public health. Over these nearly four decades-which have been a critical time in the development of the modern environmental movement-NRDC has been a powerful catalyst for change and improvement of environmental policy in this country and internationally. Today, NRDC represents more than 1.3 million members and online activists and retains a staff of 400 attorneys, scientists, and resource specialists, as well as experts in publishing and communications, in six offices-New York, Washington D.C, San Francisco, Los Angeles, Beijing and Chicago. Petitioner NRDC is located at 1200 New York Ave. NW, Suite 400, Washington, DC 20005.

Robbin Thorp, Professor Emeritus of Entomology, University of California, Davis, is the lead author of the Bumble Bees and Cuckoo Bumble Bees of California and a leading expert on the bumble bees of North America. He retired in 1994 after thirty years of teaching, research, and mentoring graduate students in the study of native bee taxonomy and ecology. He continues

to conduct research on pollination biology and ecology, systematics, biodiversity and conservation of bees. Dr. Thorp also has several years of experience tracking the distribution and decline of Franklin's Bumble Bee and the western Bumble Bee in California and Oregon. Petitioner Robbin Thorp is located at Department of Entomology, University of California, One Shields Avenue, Davis, California 95616-8584.

STATEMENT OF GROUNDS

Pollinators are essential to our environment. The ecological services they provide are necessary for the reproduction of 60-90% percent of the world's flowering plants[7] including more than two-thirds of the world's crop species,[8] as well as forage plants such as alfalfa and clover that provide feed for the animals that give us dairy and meat products.[9] Calculated by volume, roughly one third of global crop production comes from crops that are dependent on pollination by animals.[10] The economic value of native bee pollinators (not including honey bees) in the U.S. is estimated at $3 billion per year.[11]

Bumble bees are excellent crop pollinators and serve as an insurance policy for farmers when honey bees are in short supply. In recent years the demand for commercially reared bumble bees (*Bombus* species) has increased due to heightened awareness of the benefits of bumble bee pollinators and the development of new rearing techniques.[12] The outbreak of Colony Collapse Disorder (CCD) in nonnative honey bees, the rise in cost of honey bee hives, and the media that CCD has generated are also likely contributing to the increased interest in using bumble bees and other native bees as agricultural pollinators.

---

[7] C. Kremen *et al*., Pollination and Other Ecosystem Services Produced by Mobile Organisms: a Conceptual Framework for the Effects of Land –use Change, Ecology Letters, 10(4): 299-314 (2007).
[8] A.M. Klein *et al*., Importance of Pollinators in Changing Landscapes for World Crops, Proceedings of the Royal Society B-Biological Sciences, 274(1608), 303-313 (2006).
[9] R.W. Richards & P.G. Kevan, Aspects of Bee Biodiversity, Crop Pollination, and Conservation in Canada, in Pollinating Bees: The Conservation Link Between Agriculture and Nature 77-94 (P.G. Kevan &V.L. Fonseca eds., 2002).
[10] A.M. Klein *et al*., Importance of Pollinators in Changing Landscapes for World Crops, Proceedings of the Royal Society B-Biological Sciences, 274(1608), 303-313 (2006).
[11] J.E. Losey & M. Vaughan, The Economic Value of Ecological Services Provided by Insects, Bioscience, 56:311-23 (2006).
[12] H.W. Velthius & A. van Doorn, A Century in Advances in Bumblebee Domestication and the Economic and Environmental Aspects of its Commercialization for Pollination, Apidologie 37: 421-451 (2006).

In addition to their importance to agriculture, bee pollinators are keystone species in most terrestrial ecosystems, necessary not only for plant reproduction, but for forming the basis of an energy rich food web that extends throughout trophic levels.[13] Fruits and seeds derived from bee pollination are a major part of the diet of many birds[14] and mammals ranging from red-backed voles to grizzly bears.

In natural ecosystems, a number of native plants require pollination by native bees in order to reproduce.[15] Numerous studies have demonstrated that plants that do not receive adequate pollination produce fewer seeds, fail to set fruit, have fewer progeny, and can potentially go extinct.[16] In fact, a decline in the abundance of certain plants has been observed in Britain and the Netherlands where multiple bee species have gone extinct.[17]

Despite the recognized importance of pollination services provided by bumble bees and other native bee pollinators, a growing body of evidence suggests that bee pollinators are in decline. A 1998 report by Allen-Wardell *et al*,[18] found that there was evidence of declines in both managed and wild pollinators. More recently, in 2007 the National Academy of Science's National Research Council reported that long term population trends in several wild bumble bee

---

[13] C.A. Kearns and J.D. Thomson, The Natural History of Bumblebees 130 (1998). See also D.P. Vazques & D. Simberloff, Changes in Interaction Biodiversity Induced by an Introduced Ungulate, Ecology Letters, 6: 10077-1083 (2003).

[14] D.M. Buehler *et al*., Food Supply and Parental Feeding Rates of Hooded Warblers in Forest Fragments, The Wilson Bulletin, 114(1):122-127 (2002).

[15] S.A. Cunningham, Depressed Pollination in Habitat Fragments Causes Low Fruit Set, Proceedings of the Royal Society of London B, 267: 1149-1152 (2000). See also O. Jennersten. Pollination in *Dianthus deltoides* (Caryophyllaceae): Effects of Habitat Fragmentation on Visitation and Seed Set, Conservation Biology, 2(4): 359-366 (1988). See also S.D. Sipes & V.J. Tepedino, Reproductive Biology of the Rare Orchid, *Spiranthes Diluvialis*: Breeding System, Pollination, and Implications for Conservation, Conservation Biology, 9(4): 29-938 (1995). See also E.A. Sugden, Pollinators of *Astragalus monoensis* Barneby (Fabaceae): New Host Records; Potential Impact of Sheep Grazing, Great Basin Naturalist 45: 299–312 (1985). See also V.J. Tepedino *et al*., The Need for "Extended Care" in Conservation: Examples from Studies of Rare Plants in the Western United States, Acta Horticulturae 437: 245-248 (1997). See also V.J. Tepedino *et al*. The reproductive biology and effective pollinators of the endangered beardtongue *Penstemon penlandii* (Scrophulariaceae), Plant Systematics and Evolution 219: 39-54 (1999). See also V.J. Tepedino & S.D. Sipes, Can a transplanted pollinator increase reproductive success in populations of the threatened orchid, *Spiranthes diluvialis*?, Ecological Restoration 18(2): 132-133 (2000).

[16] D. Goulson *et al*. Causes of rarity in bumblebees, Biological Conservation, 122(1): 1-8 (2005). See also C.A. Kearns *et al*. Endangered mutualisms: the conservation of plant–pollinator interactions, Annual Review of Ecology and Systematics 29: 83-112 (1998).

[17] J.C. Biesmeijer *et al*., Parallel Declines in Pollinators and Insect-Pollinated Plants in Britain and the Netherlands, *Science* 313(5785): 351-354 (2006).

[18] G. Allen-Wardell *et al*., The Potential Consequences of Pollinator Declines on the Conservation of Biodiversity and Stability of Food Crop Yields, Conservation Biology 12(1): 8-17 (1998).

species are demonstrably downward.[19] Scientific studies in southern Ontario, the eastern United States, Illinois, southern Oregon and northern California have illustrated dramatic declines in bumble bee species over approximately the past half century.[20]

General threats to bumble bee pollinators include: introduced disease from commercial bee rearing and movement, loss of habitat from increasing urbanization and expansion of intensive agriculture, widespread use of pesticides, introduction of competitive species, and parasites.[21]

The dramatic decline in North American bumble bees is most likely caused by introduced diseases from commercial bee rearing and movement.[22] In 2007, the National Research Council

---

[19] National Research Council of the National Academies, Status of Pollinators in North America, (2007).

[20] S.R. Colla & L. Packer, Evidence of the Decline of Eastern North American Bumble Bees, with Special Focus on *Bombus affinis* Cresson, Biodiversity and Conservation 17: 1379-1391 (2008). See also J.C. Grixti *et al*., Decline of Bumble Bees (*Bombus*) in the North American Midwest, Biological Conservation (2008). See also Q.S. McFrederick & G. LeBuhn. Are urban parks refuges for bumble bees *Bombus* spp. (Hymenoptera : Apidae)?, Biological Conservation 129: 372-382 (2006). See also R.W. Thorp. Franklin's Bumble Bee, *Bombus* (*Bombus*) *franklini* (Frison) (Hymenoptera: Apidae), Report on 2006-2007 Seasons (Submitted 10 March 2008). (On file with author). See also E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus* affinis (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[21] D.G. Alston & V.J. Tepedino, Direct and Indirect Effects of Insecticides on Native Bees in Grasshopper Integrated Pest Management User Handbook, United States Department of Agriculture Animal and Plant Health Inspection Services Technical Bulletin No. 1809, (G.L. Cuningham & M.W. Sampson, Tech. Coordinators, 2000). See also J.H. Cane & V.J. Tepedino, Causes and Extent of Declines Among Native North American Invertebrate Pollinators: Detection, Evidence and Consequences, Conservation Ecology 5(1):1 (2001). See also S.R. Colla *et al*., Plight of the Bumblebee: Pathogen Spillover from Commercial to Wild Populations, Biological Conservation 129: 461-467 (2006). See also N. Desneux *et al*., The Sublethal Effects of Pesticides on Beneficial Arthropods, Annual Review of Entomology, 52: 81-106 (2007). See also D. Goulson, Effects of Introduced Bees on Native Ecosystems, Annual Review of Ecology, Evolution and Systematics, 34: 1-26 (2007). See also F. Hendrickx *et al*., How Landscape Structure, Land-use Intensity and Habitat Diversity Affect Components of Total Arthropod Diversity in Agricultural Landscapes, Journal of Applied Ecology, 44(2): 340-351 (2007). See also C.A. Kearns *et al*., Endangered Mutualisms: The Conservation of Plant-Pollinator Interactions, Annual Review of Ecology and Systematics, 29: 83:112 (1998). See also M.C. Otterstatter & J.D. Thomson, Does Pathogen Spillover from Commercially Reared Bumble Bees Threaten Wild Pollinators?, available at http://www.plosone.org/doi/pone.0002771 (2008). See also C.A. Kearns & D.W. Inouye, Pollinators, Flowering Plants, and Conservation Biology, BioScience, 47(5): 297-307(1997). See also P.G. Kevan, Pollinators as Bioindicators of the State of the Environment: Species, Activity, and Diversity, Agriculture Ecosystems & Environment, 74(1-3): 373-393 (1999). See also C. Kremen, N.M. Williams & R.W. Thorp. Crop pollination from native bees at risk from agricultural intensification, Proceedings of the National Academy of Sciences of the United States of America, 99(26): 16812-16816 (2002). See also National Research Council of the National Academies, Status of Pollinators in North America, (2007). See also K.W. Richards & P.G. Kevan, Aspects of Bee Biodiversity, Crop Pollination, and Conservation in Canada, in Pollinating Bees: The Conservation Link Between Agriculture and Nature 77-94 (P.G. Kevan &V.L. Fonseca eds., 2002).

[22] E. Evans *et al.*, Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at

stated that a major cause of decline in native bumble bees appears to be recently introduced nonnative fungal and protozoan parasites, including *Nosema bombi* and *Crithidia bombi*.[23] These pests may have been introduced when colonies of North American bumble bees were reared in Europe then imported to the U.S. in the early 1990s for commercial greenhouse pollination.[24] These pathogens could have spread to wild populations of bumble bees as commercial bumble bees were transported throughout the U.S. for pollination of greenhouse tomatoes and a variety of other crops.[25]

Commercially reared bumble bees frequently harbor significantly more pathogens than their wild counterparts and their escape from greenhouses leads to infections in nearby wild native species.[26] One study demonstrated that commercial bumble bees in greenhouses regularly escape greenhouses; 73% of the pollen found on bumble bees within a greenhouse originated from plants outside of the greenhouse.[27] Bumble bee diseases can be spread from bee to bee at shared flowers.[28] The continued shipment of bumble bee pollinators to areas outside of their native ranges poses a grave threat to the wild populations of closely related bumble bee species. Without better regulation, we are likely to continue to see catastrophic declines, and possibly extinctions, of bumble bee pollinators.

ARGUMENT

---

http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[23] National Research Council of the National Academies, Status of Pollinators in North America, (2007).

[24] Id.

[25] E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[26] S.R. Colla *et al*., Plight of the Bumblebee: Pathogen Spillover from Commercial to Wild Populations, Biological Conservation, 129: 461-467 (2006). See also, M.C. Otterstatter & J.D. Thomson, Does Pathogen Spillover from Commercially Reared Bumble Bees Threaten Wild Pollinators?, available at http://www.plosone.org/doi/pone.0002771 (2008).

[27] R. Whittington *et al*., Plant-species identity of pollen collected by bumblebees placed in greenhouses for tomato pollination, Canadian Journal of Plant Science, 84, 599–602 (2004).

[28] P.S. Gorbunov. Endoparasitic flagellates of the genus *Crithidia* (Trypanosomatidae, Zoomastigophorea) from alimentary canal of bumblebees, Zoologichesky Zhurnal 66: 1775–1780 (1987). See also J.J. Lipa & O. Triggiani, *Crithidia bombi* sp n. A flagellated parasite of a bumble-bee *Bombus terrestris* L. (Hymenoptera, Apidae), Acta Protozoologica, 27: 287–290 (1988).

I. APHIS Should Use its Authority Under the Plant Protection Act to Regulate the Interstate Movement of Bumble Bee Adults, Nests, and Previously Used Nest Materials

The Plant Protection Act (PPA) evinces Congress' finding that the control and prevention of the spread of plant pests is necessary for the protection of agriculture, the environment, and the U.S. economy.[29] Under the PPA, the Secretary of Agriculture is given authority to facilitate "interstate commerce in agricultural products and other commodities that pose a risk of harboring plant pests or noxious weeds in ways that will reduce…the risk of dissemination of plant pests or noxious weeds."[30] The PPA authorizes the Secretary of Agriculture to promulgate regulations to prohibit or restrict the interstate movement of any plant pest if the Secretary determines the prohibition is necessary to prevent the dissemination of a plant pest within the U.S.[31]

Parasites and pathogens of bumble bee pollinators are indirect plant pests that should be regulated under the PPA.[32] The PPA broadly defines plant pests to include fungi, viruses, infectious agents and other pathogens, and any similar articles "that can directly or *indirectly* injure, cause damage to, or cause disease in any plant or plant product."[33] Articles such as pathogens and parasites that infect or attack bumble bees cause indirect injury to plants that rely on these bees for pollination.[34] Indirect plant pests that are pathogens of bumble bees include, but are not limited to: viruses (e.g. Deformed Wing Virus[35]), bacteria (e.g. *Spiroplasma* sp.), microsporidia (e.g. *Nosema bombi*), and protozoa (e.g. *Apicystis bombi* and *Crithidia bombi*).[36] Nematodes, internal mites (e.g. the tracheal mite *Locustacarus buchneri*), external mites, and the small hive beetle (*Aethnia tumida*) can also harm bumble bees, and thus can be considered

---

[29] 7 U.S.C. § 7701(1) (2006).
[30] Id. § 7701(3).
[31] Id. § 7712(a), (c).
[32] USDA Animal and Plant Health Inspection Services' R.V. Flanders, W.F. Wehling, & A.L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United State, *in* For Nonnative Crops, Whence Pollinators of the Future 99, 102 (K. Strickler & J.H. Cane eds., Entomological Society of America 2003).
[33] 7 U.S.C. § 7702(14).
[34] USDA Animal and Plant Health Inspection Services' R.V. Flanders, W.F. Wehling, & A.L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United State, *in* For Nonnative Crops, Whence Pollinators of the Future, 99, 102 (Karen Strickler & James H. Cane eds., Entomological Society of America 2003).
[35] E. Genersch *et al*., Detection of Deformed wing virus, a honey bee viral pathogen, in bumble bees (Bombus terrestris and Bombus pascuorum) with wing deformities, Journal of Invertebrate Pathology 91(1): 61-63 (2006).
[36] R.R. James, The Problem of Disease When Domesticating Bees, *in* Bee Pollination in Agricultural Systems, 126-127 (R.R. James & T.L. Pitts-Singer eds. Oxford University Press 2008).

indirect plant pests (see MacFarlane *et al*. 1995 for a list of additional pathogens of bumble bees[37]).

Healthy populations of native bees, including bumble bees, are essential for the reproduction of many commercial and native plants. The value of the pollination service that native bees provide to agriculture is estimated to be $3 billion per year in the United States alone.[38] For many crops, native bees (including bumble bees) are more effective pollinators than honey bees, or they can enhance pollination by honey bees. These crops include: hybrid sunflower,[39] watermelon,[40] squash,[41] raspberry,[42] tomato,[43] canola,[44] blueberry,[45] pepper,[46] and cranberry.[47] Bumble bees are favored over honey bees as pollinators in some crops because they can fly in cooler temperatures and at lower light levels than honey bees,[48] and they perform a behavior called buzz pollination. Buzz pollination is highly beneficial for the cross-pollination of tomatoes,[49] blueberries,[50] kiwifruit,[51] and potentially many other crops. Honey bees are unable to buzz pollinate flowers.

---

[37] R.P. Macfarlane, J.L. Lipa & H.J. Liu, Bumble bee pathogens and internal enemies, Bee World 76(3):130-148 (1995).
[38] J.E. Losey & M.Vaughan, The Economic Value of Ecological Services Provided by Insects, Bioscience 56: 311-323 (2006).
[39] S.S. Greenleaf & C. Kremen, Wild Bees Enhance Honey Bees' Pollination of Hybrid Sunflower, Proceedings of the National Academy of Sciences of the United States of America, 103(37): 13890-13895 (2006).
[40] R. Winfree *et al*., Wild bee pollinators provide the majority of crop visitation across land-use gradients in New Jersey and Pennsylvania, Journal of Applied Ecology, 45: 793-802 (2008). See also C. Kremen *et al*., Crop Pollination from Native Bees at Risk from Agricultural Intensification, Proceedings of the National Academy of Sciences of the United States of America, 99(26): 16812-16816 (2002).
[41] R.E. Shuler *et al*., Farming Practices Influence Wild Pollinator Populations on Squash and Pumpkin, Journal of Economic Entomology, 98(3): 790-795 (2005).
[42] P.G. Willmer *et al*., The Superiority of Bumblebees to Honeybees as Pollinators: Insect Visits to Raspberry Flowers, Ecological Entomology, 19: 271–284 (1994).
[43] S.S. Greenleaf & C. Kremen, Wild Bees Species Increase Tomato Production and Respond Differently to Surrounding Land Use in Northern California, Biological Conservation, 133(1): 81-87 (2006).
[44] L.A.Morandin & M.L.Winston, Pollinators Provide Economic Incentive to Preserve Natural Land in Agroecosystems, Agriculture Ecosystems & Environment, 116(3-4): 289-292 (2006).
[45] S.K. Javorek, K.E. MacKenzie & S.P. Vander Kloet, Comparative Pollination Effectiveness among Bees (Hymenoptera: Apoidea) on lowbush Blueberry (Ericaceae: *Vaccinium angustifolium*), Annals of the Entomological Society of America, 95(3): 345-351 (2002).
[46] A.R. Serrano & J.M. Guerra-Sanz, Quality fruit improvement in sweet pepper culture by bumblebee pollination, Scientia Horticulturae, 110(2)160-166 (2006).
[47] K.E. MacKenzie, The foraging behavior of honey bees (*Apis mellifera* L) and bumble bees (*Bombus* spp.) on cranberry (*Vaccinium-macrocarpon* AIT), Apidologie, 25(4): 375-383 (1994).
[48] A. de Ruiter, J. van der Eijnde & J. van der Steen, Bijen verbeteren zetting tomaat, Groenten en Fruit 43:46-47 (1988). See also J. van der Eijnde and A. de Ruijter, Pollination of glasshouse tomatoes by honeybees, Apidologie 20: 492-493 (1989).
[49] L. Morandin, Effect of bumble bee (Hymenoptera : Apidae) pollination intensity on the quality of greenhouse tomatoes, Journal of Economic Entomology, 94(1): 172 (2001).

In natural ecosystems, bumble bees and other native bees are essential for the reproduction of native plants, including a number of rare and endangered plant species.[52] A review of research addressing the reproductive requirements of twenty-six rare or endangered plant species in the western United States found that in order to set fruit most plants required pollination, usually by native bees.[53] The loss of bee pollinators results in a lack of seed or fruit set, fewer progeny, and potentially the extinction of a plant species.[54] In Britain and the Netherlands, where multiple bee species have gone extinct, researchers have observed parallel declines in plants reliant on those bee pollinators.[55] Scientists have also demonstrated that declines in pollinator populations can negatively impact plant reproduction. As pollinator numbers decline, pollen transfer between plants of the same species will also likely decline. This, in turn, may increase the percentage of seeds set through self-pollination which can reduce the genetic diversity of the offspring and result in an accumulation of deleterious traits due to inbreeding.[56] Another researcher identified a cycle in which a decrease in available floral resources can decrease the reproductive success of the associated pollinators, which would result in lower fecundity of the plant species and fewer available floral resources for the next generation of pollinators.[57] A number of other studies have demonstrated that the loss, absence or decline of bee pollinators is harmful to rare plants.[58]

---

[50] J.H. Cane *et al*., Pollination ecology of *Vaccinium stamineum* (Ericaceae: Vaccinioideae), American Journal of Botany, 72: 135-142 (1985).
[51] S.A. Corbet, H. Chapman & N. Saville, Vibratory pollen collection and flower form: bumble-bees on *Actinidia*, *Symphytum*, *Borago* and *Polyganum*, Functional Ecology, 2: 147-155 (1988).
[52] V.J. Tepedino *et al*., The Need for "Extended Care" in Conservation: Examples from Studies of Rare Plants in the Western United States, Acta Horticulturae, 437: 245-248 (1997).
[53] Id.
[54] C.A. Kearns *et al*. Endangered mutualisms: the conservation of plant–pollinator interactions, Annual Review of Ecology and Systematics, 29: 83-112 (1998), See also D. Goulson *et al*., Causes of rarity in bumblebees, Biological Conservation, 122(1): 1-8 (2005).
[55] J.C. Biesmeijer *et al*., Parallel Declines in Pollinators and Insect-Pollinated Plants in Britain and the Netherlands, Science, 313(5785): 351-354 (2006).
[56] C.A. Kearns & D.W. Inouye, Pollinators, Flowering Plants, and Conservation Biology, BioScience, 47(5): 297-307 (1997).
[57] P.G. Kevan, Pollinators as Bioindicators of the State of the Environment: Species, Activity, and Diversity. Agriculture Ecosystems & Environment, 74(1-3): 373-393 (1999).
[58] S.A. Cunningham, Depressed Pollination in Habitat Fragments Causes Low Fruit Set, Proceedings of the Royal Society of London B, 267: 1149-1152 (2000). See also O. Jennersten, Pollination in *Dianthus deltoides* (Caryophyllaceae): Effects of Habitat Fragmentation on Visitation and Seed Set, Conservation Biology, 2(4): 359-366 (1988). See also S.D. Sipes & V.J. Tepedino, Reproductive Biology of the Rare Orchid, *Spiranthes Diluvialis*: Breeding System, Pollination, and Implications for Conservation. Conservation Biology, 9(4): 29-938 (1995). See also E.A. Sugden, Pollinators of *Astragalus monoensis* Barneby (Fabaceae): New Host Records; Potential Impact of Sheep Grazing, Great Basin Naturalist 45: 299–312 (1985). See also V.J. Tepedino *et al*., The reproductive biology

Plant pests, in the form of diseases of bumble bee pollinators, can harm plants by reducing the amount of pollination available to those plants. For example, bumble bee colonies that are infected with the pathogen *Crithidia bombi* have lower fitness and queens show a reduced ability to found new colonies.[59] This pathogen can also reduce the survival and foraging efficiency of bumble bee workers.[60] Bumble bees that are infected by the microsporidium *Nosema bombi* frequently become sluggish and die early.[61] The above impacts of bumble bee diseases on bumble bees will reduce or eliminate the bee's ability to pollinate plants and therefore cause injury to plants that depend on bee pollination for survival.

The PPA protects plants from pests by prohibiting the interstate movement of plant pests unless the movement is authorized by a permit.[62] It is unlawful for any person to move plant pests interstate without a permit.[63] APHIS should act expeditiously to protect plants by regulating the movement of bumble bees in order to control the introduction and dissemination of the indirect plant pests which harm bumble bee pollinators. Bumble bee pollinators have tremendous economic and ecological value. We urge APHIS to use its authority to protect the pollination security of plants by regulating interstate movement of bumble bees in order to prevent the spread of disease from commercially reared bumble bees to wild bumble bees.

---

and effective pollinators of the endangered beardtongue *Penstemon penlandii* (Scrophulariaceae), Plant Systematics and Evolution 219: 39-54 (1999). See also V.J. Tepedino & S.D. Sipes, Can a transplanted pollinator increase reproductive success in populations of the threatened orchid, *Spiranthes diluvialis*?, Ecological Restoration, 18(2): 132-133 (2000).

[59] M.J.F. Brown, R. Schmid-Hempel & P. Schmid-Hempel, Strong context dependent virulence in a host-parasite system: reconciling genetic evidence with theory, Journal of Animal Ecology, 72: 994–1002 (2003).

[60] M.J.F. Brown, R. Loosli & P. Schmid-Hempel, Condition-dependent expression of virulence in a trypanosome infecting bumblebees, Oikos, 91: 421–427 (2000). See also M.C. Otterstatter *et al*. Effects of parasitic mites and protozoa on the flower constancy and foraging rate of bumble bees, Behavioral Ecology and Sociobiology, 58: 383–389 (2005). See also R.J. Gegear *et al*. Does infection by an intestinal parasite impair the ability of bumble bees to learn flower handling skills?, Animal Behaviour, 70: 209–215 (2005). See also R.J. Gegear *et al*., Bumblebee foragers infected by a gut parasite have an impaired ability to utilize floral information, Proceedings of the Royal Society of London Series B, 273: 1073–1078 (2006).

[61] L. Bailey & B.V. Ball, Honey Bee Pathology, second ed., Academic Press Inc., San Diego, CA. (1991). See also P. Schmid-Hempel & R. Loosli, A contribution to the knowledge of *Nosema* infections in bumble bees, *Bombus* spp., Apidologie, 29: 525–535 (1998).

[62] Movement of Plant Pests Regulated; Permits Required, 7 C.F.R. § 330.200.

[63] Id. Also note that because the PPA mandates the use of permits for interstate movement of plant pests, a person's failure to obtain a permit prior to transporting plant pests may also trigger the Lacey Act. Under the Lacey Act, it is "unlawful for any person-- **(1)** to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law;" or "**(2)** to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce **(A)** any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law…." 16 U.S.C. § 3372 (2006). Both civil and criminal penalties can apply to any person who violates the provisions of the Act. Id. §3373.

A. APHIS Should Promulgate Rules Prohibiting the Movement of Bumble Bee Adults, Nests, and Previously Used Nest Materials Outside Their Native Ranges

APHIS should regulate the movement of bumble bees to prevent the spread of indirect plant pests, parasites and pathogens of bumble bees. As the parasites and pathogens attack their bee hosts, the availability of pollination services that plants rely upon is reduced. Without healthy populations of bumble bees, many plant species will experience harm because they will be less able or entirely unable to reproduce. To prevent this harm to native and commercial plants, APHIS needs to take action to regulate the movement of indirect plant pests carried by bumble bees.

APHIS should promulgate regulations that prohibit the movement of bumble bees outside of their native ranges. APHIS' authority includes the power to prohibit the interstate movement of bumble bees, which carry plant pests, beyond their native ranges when such action is "necessary to prevent the introduction into or the dissemination within the United States of a plant pest…."[64] Preventing movement of bumble bees outside of their native ranges is necessary in order to prevent the dissemination of plant pests within the U.S. because bumble bees introduced into new areas can carry and spread new pathogens to wild bumble bees for which the wild species do not have resistance. By not allowing bumble bees to be moved to states outside of their native ranges, the spread of novel pathogens to wild populations of bumble bees will be reduced.

In the cases of the commonly moved bumble bee: *Bombus impatiens*, APHIS should define native range as the state line closest to the side of the 100th meridian where the bumble bee is native. This definition of native range allows APHIS to regulate interstate movement and is scientifically justified because the state line closest to the 100th meridian provides a close approximation for the native ranges for *Bombus impatiens*. *Bombus impatiens* should not be allowed west of the state line closest to the 100th meridian. By prohibiting the movement of bumble bees beyond the state line closest to the 100th meridian, APHIS can make significant headway towards preventing the future dissemination of plant pests across the United States.

APHIS, in the 1990s, recognized the substantial risk of introducing and disseminating plant pests through movement of bumble bees outside of their native ranges. APHIS attempted to control these risks by regulating the movement of bumble bees through a courtesy permit system.

[64] 7 C.F.R. § 330.102.

During this time APHIS conducted a risk assessment on the risks associated with movement of bumble bees across the 100th meridian. The risk assessment indicated that movement of eastern bumble bees west of the 100th Meridian could result in "the introduction of bumble bee pests and diseases into new areas, such as eastern species of parasitic nematodes into Western States."[65] Based on information gathered in the risk assessment, APHIS decided to prohibit the issuance of permits for the movement of western bumble bee species east of State boundaries closest to the 100th Meridian and vice versa.[66] Despite its findings regarding the spread of plant pests due to interstate movement of bumble bees that originally compelled regulation, and without scientific justification, APHIS ceased to regulate the interstate movement of bumble bees in 1998.[67] Recent declines in native populations of bumble bees, most likely due to disease from commercial bumble bees, have confirmed that APHIS was correct to be deeply concerned about the risks associated with the movement of bumble bees beyond their native ranges.[68] Based on the best available science, Petitioners have come to the same conclusion APHIS did when they conducted their risk assessment in the mid-1990s: movement of bumble bees beyond their native ranges should be prohibited in order to prevent the dissemination of plant pests.

Interstate movement of bumble bees outside their native ranges has already likely caused the introduction and dissemination of plant pests, namely diseases that have led to the rapid endangerment of three formerly common bumble bee pollinators, *Bombus affinis*, *Bombus occidentalis* and *Bombus terricola*, and the possible extinction of a fourth bumble bee, *Bombus franklini*. Dr. Robbin Thorp, professor emeritus at U.C. Davis and a leading bumble bee scientist, hypothesizes that the four species of declining native bumble bees contracted a disease from commercially reared native bumble bees that were moved extensively between states, and

---

[65] Letter from Secretary of Agriculture Mike Espy to U.S. Representative Sam Farr (June 1994) (on file with author).
[66] Id.
[67] USDA Animal and Plant Health Inspection Services' R.V. Flanders, W.F. Wehling, & A.L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United State, *in* For Nonnative Crops, Whence Pollinators of the Future 99, 104 (K. Strickler & J.H. Cane eds., Entomological Society of America 2003).
[68] E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008). See also M.C. Otterstatter & J.D. Thomson, Does Pathogen Spillover from Commercially Reared Bumble Bees Threaten Wild Pollinators?, available at http://www.plosone.org/doi/pone.0002771 (2008).

occasionally between countries.[69] In North America, two bumble bee species have been commercially reared for pollination of greenhouse tomatoes and other crops: *B. occidentalis*, which is native to western North America and *B. impatiens*, which is native to eastern North America.[70] Between 1992 and 1994, queens of *B. occidentalis* and *B. impatiens* were sent to European rearing facilities, where colonies were produced and then allowed by APHIS to be sent back to the U.S. for commercial distribution.[71] Dr. Thorp hypothesizes that while in European rearing facilities, these bumble bees acquired a selectively virulent strain of the pathogen *Nosema bombi* from the commercially reared European bumble bee *Bombus terrestris*.[72] Once *B. occidentalis* and *B. impatiens* returned to the U.S. and were transported between states, Dr. Thorp hypothesizes that this disease spread to wild populations of *B. occidentalis* and three additional closely related species of bumble bees: *B. franklini*, *B. affinis* and *B. terricola*.[73]

Until 1997, *B. occidentalis* was widely distributed across western North America and *B. impatiens* was widely used in eastern North America for crop pollination.[74] In 1997, outbreaks of *Nosema bombi* decimated *B. occidentalis* colonies in large scale commercial rearing facilities and producers became unable to raise this species.[75] Since *B. occidentalis* was no longer able to

---

[69] E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[70] H.W. Velthius & A. van Doorn, A Century in Advances in Bumblebee Domestication and the Economic and Environmental Aspects of its Commercialization for Pollination, Apidologie, 37: 421-451 (2006).

[71] USDA Animal and Plant Health Inspection Services' R.V. Flanders, W.F. Wehling, & A.L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United States, *in* For Nonnative Crops, Whence Pollinators of the Future 99, 104 (K. Strickler & J.H. Cane eds., Entomological Society of America 2003).

[72] E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[73] R.W. Thorp, Bumble Bees (Hymenoptera: Apidae): Commercial Use and Environmental Concerns, *in* For Nonnative Crops, Whence Pollinators of the Future, 21-40 (K. Strickler & J.H. Cane eds., Entomological Society of America 2003). See also R.W. Thorp. 2005. *Bombus franklini* Frison, 1921 Franklin's Bumble Bee (Hymenoptera: Apidae: Apinae: Bombini), *in* Red List of Pollinator Insects of North America CD-ROM Version 1, available at http://www.xerces.org/pollinator-redlist/ (M.D. Shepherd *et al*. eds., The Xerces Society for Invertebrate Conservation 2005). See also E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[74] H.W. Velthius & A. van Doorn, A Century in Advances in Bumblebee Domestication and the Economic and Environmental Aspects of its Commercialization for Pollination, Apidologie, 37: 421-451 (2006).

[75] USDA Animal and Plant Health Inspection Services' R.V. Flanders, W.F. Wehling, & A.L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United State, *in* For Nonnative Crops, Whence Pollinators of the Future 99, 104 (K. Strickler & J.H. Cane eds., Entomological Society of America 2003). See also

be reared, greenhouse tomato and cranberry growers in western states were left without a managed bumble bee pollinator. Perhaps in response to growing requests from western crop producers, and in contravention of the conclusions APHIS drew from its risk assessment, APHIS stopped regulating the interstate movement of bumble bees in 1998, leaving the matter up to individual state governments,[76] many of which have failed to impose meaningful regulations. To the best of the Petitioner's knowledge, Oregon is the only state that prohibits *B. impatiens* from entering the state. California prohibits *B. impatiens* from entering the state for open field pollination, but allows the species to be imported for greenhouse pollination. In both states, these regulations are not always enforced, and growers are not always aware of the regulations; a recent news story published by the Associated Press highlighted a strawberry grower in Oregon who purchased colonies of *B. impatiens* in 2007 for pollination.[77] As a result of APHIS' decision to stop regulating the interstate movement of bumble bees and the lack of regulation in most states, growers in western states regularly purchase *B. impatiens* colonies for crop pollination.[78]

Beginning in 1998, many biologists began to notice that wild populations of the formerly common and widespread bumble bees: *B. occidentalis*, *B. terricola*, *B. affinis* were rapidly disappearing.[79] *Bombus franklini*, which always had a restricted range, also began to decline precipitously around 1998 and now may be close to extinction.[80] The existing evidence strongly favors the hypothesis that disease spread by the interstate and international movement of commercially reared bumble bees is the most likely cause of this bumble bee decline. Perhaps the most compelling evidence includes: the catastrophic losses of commercially raised *B. occidentalis* to *N. bombi* infection and coincidental crash in wild populations, the speed and

---

H.W. Velthius & A. van Doorn, A Century in Advances in Bumblebee Domestication and the Economic and Environmental Aspects of its Commercialization for Pollination, Apidologie, 37: 421-451 (2006).

[76] USDA Animal and Plant Health Inspection Services' R.V. Flanders, W.F. Wehling, & A.L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United State, *in* For Nonnative Crops, Whence Pollinators of the Future 99, 104 (K. Strickler & J.H. Cane eds., Entomological Society of America 2003).

[77] Associated Press, Plight of the Bumblebee, Grants Pass, OR, October 8, 2007. See caption for Photo 2: http://www.cbsnews.com/stories/2007/10/08/tech/main3341254.shtml (accessed 10/7/2009).

[78] USDA Animal and Plant Health Inspection Services' R. V. Flanders, W. F. Wehling, & A. L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United States, in For Nonnative Crops, Whence Pollinators of the Future 99 (K. Strickler & J. H. Cane eds., Entomological Society of America 2003).

[79] E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[80] R.W. Thorp. Franklin's Bumble Bee, *Bombus* (*Bombus*) *franklini* (Frison) (Hymenoptera: Apidae), Report on 2006-2007 Seasons (Submitted 10 March 2008). (On file with author). See also IUCN Red List available at http://www.iucnredlist.org/details/135295/0 (2009).

severity of the decline, the close relationship of the declining bumble bee species to the commercialized European bumble bee *B. terrestris*, the high probability that *B. occidentalis* shared a commercial rearing facility with *B. terrestris* in Europe in the early 1990s, and the discovery of *N. bombi* in wild North American bumble bees that is genetically identical to the European strain.[81] Habitat loss, pesticide use, pollution and climate change are often implicated in the decline of species. However, the fact that populations of many other bumble bee species with similar life histories have remained stable or increased over the same period of time that these four closely related bumble bee species have declined strongly suggests that a novel disease is the cause of these widespread losses.[82]

For these reasons, APHIS should use its power under the PPA to ban the movement of bumble bees beyond their native ranges in order to protect plants from indirect plant pests and the harm that can result from reductions in native bumble bee populations.

B. APHIS Should Regulate Interstate Movement of Bumble Bees within their Native Ranges By Requiring All Permit Applicants to Show that Bumble Bee Adults, Nests, and Previously Used Nest Materials Are Certified Disease Free Prior to Movement

APHIS also should utilize its permitting system to impose conditions requiring bumble bees to be certified disease free prior to interstate movement *within* their native ranges. The PPA prohibits the movement of any plant pest in interstate commerce unless the movement is authorized under a permit and in accordance with any regulations imposed to prevent the dissemination of plant pests.[83] Imposing a mandatory disease free certification requirement of applicants seeking permits for the interstate movement of bumble bees within their native ranges is a critical way to prevent the dissemination of plant pests. In addition to helping prevent the spread of plant pests through the requirement of disease free certification, a permit system will provide APHIS with the information it needs to monitor interstate movement of bumble bees so that it can more expeditiously take action to control any future dissemination of plant pests.

---

[81] Illinois Natural History Survey Reports, Diseases of Beneficial Insects, No. 392. p.8, available at http://www.inhs.uiuc.edu/inhsreports/2007/summer2007.pdf (2007).
[82] E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).
[83] 7 U.S.C. § 7711(a).

The permit scheme for moving bumble bees would follow the general scheme outlined in the PPA's regulations. Any person seeking to move bumble bees between states would first be required to apply for and obtain a permit.[84] The permit applicant would submit an application to APHIS' Plant Protection and Quarantine Programs.[85] The Deputy Administrator for APHIS-PPQ could then take steps which allow her to make a decision based on the best possible information, which may include consulting with experts and inspecting plant pest handling sites.[86] If the Deputy administrator approves an application, she has broad discretion to impose any conditions on the permit which she deems may be necessary to prevent the dissemination of plant pests.[87] The Deputy Administrator is required to deny applications when, in her opinion and based on a number of factors, the movement would involve a danger of disseminating the pest.[88] Through the use of this permit system, APHIS will obtain more control over the interstate movement of bumble bees and will be able to prevent the dissemination of plant pests.

It is appropriate for APHIS to impose a requirement that bumble bees be certified disease free prior to being moved interstate because of the risks associated with such movement. As noted in *supra* in Section A, APHIS should deny permits where the applicant seeks to move bumble bees beyond their native ranges because the danger of disseminating plant pests through such movement is too substantial, as APHIS has recognized in the past and as more recent studies have also indicated.[89] However, because the risks associated with interstate movement of bumble bees within their native ranges are less severe, all such permits need not be denied. The Deputy Administrator should require all bumble bees moved interstate within their native ranges to be certified disease free as a necessary permit condition which must be met prior to permitting interstate movement of bumble bees in order to prevent the dissemination of plant pests. Even when commercial bumble bees are moved within their native ranges, pathogen spillover between commercial bumble bees in greenhouses and wild bumble bees has been demonstrated.[90] Wild

---

[84] Id.
[85] Id.
[86] Consideration of Applications for Permits to Move Plant Pests, 7 C.F.R. 330.202.
[87] Action on Applications for Permits to Move Plant Pests; Form of and Conditions in Permits, 7. C.F.R. 330.303.
[88] Denial or Cancellation of Permits; Reconsiderations. 7 C.F.R. 204(a).
[89] Letter from Secretary of Agriculture Mike Espy to U.S. Representative Sam Farr (June 1994) (on file with author).
[90] S.R. Colla *et al*., Plight of the Bumblebee: Pathogen Spillover from Commercial to Wild Populations, Biological Conservation 129: 461-467 (2006). See also, M.C. Otterstatter & J.D. Thomson, Does Pathogen Spillover from Commercially Reared Bumble Bees Threaten Wild Pollinators?, available at http://www.plosone.org/doi/pone.0002771 (2008).

bumble bees near greenhouses that employ commercial bumble bees harbor much higher levels of the bumble bee pathogens *Crithidia bombi*, *Nosema bombi* and *Locustacarus buchneri* than wild bumble bees far from commercial greenhouses.[91] *C. bombi* reduces the ability of bumble bees to forage[92] and collect pollen,[93] and *L. buchneri* infection causes bees to become lethargic, and eventually they stop foraging.[94] These parasite-induced impacts on bee foraging may also negatively affect the reproductive success of plants that need bumble bees for pollination.[95] Even in cases where bumble bees are confined to greenhouses, the bees frequently escape; one study demonstrated that up to73% of the pollen collected from commercial bumble bees came from plants outside of the greenhouses.[96] Pathogens, especially protozoa, are transmitted from bee to bee at flowers.[97] In order to protect wild populations of bumble bees, it is imperative that APHIS ensures that bumble bees moved from state to state are free of bumble bee diseases.

The process for certifying bumble bees as free of plant pests must be scientifically rigorous and should require not only certification that bumble bees moved interstate are free of disease, but also the implementation of best management practices such as the use of mesh screens on greenhouses to prevent individual bumble bees from escaping and spreading pathogens to wild species. Bumble bees should also be certified as free of bumble bee diseases, such as viruses (e.g. Deformed Wing Virus), bacteria (e.g. *Spiroplasma* sp.), microsporidia (e.g. *Nosema bombi*), protozoa (e.g. *Apicystis bombi* and *Crithidia bombi*), nematodes, internal mites (e.g. the tracheal mite *Locustacarus buchneri*), external mites, and small hive beetle (*Aethina tumida*).

APHIS' proposed rule establishing requirements for interstate movement of fish species that originate from states and provinces regulated for viral hemorrhagic septicemia ("VHS")

---

[91] S.R. Colla *et al*., Plight of the Bumblebee: Pathogen Spillover from Commercial to Wild Populations, Biological Conservation 129: 461-467 (2006).
[92] M. Otterstatter *et al*., Effects of Parasitic Mites and Protozoa on the Flower Constancy and Foraging Rate of Bumble Bees, Behavioral Ecology and Sociobiology, 58: 383-389 (2005).
[93] J.A. Shykoff & P. Schmid Hempel, Incidence and effects of 4 parasites in natural populations of bumble bees in Switzerland, Apidologie 22(2): 117-125 (1991).
[94] R.W. Husband & R.N. Sinha, A revision of the genus *Locustacarus* with a key to genera of the family Podapolididae (Acarina), Annals of the Entomological Society of America 63(4): 1152-1162 (1970).
[95] M. Otterstatter *et al*., Effects of Parasitic Mites and Protozoa on the Flower Constancy and Foraging Rate of Bumble Bees, Behavioral Ecology and Sociobiology 58: 383-389 (2005).
[96] Whittington *et al*., Plant-Species Identity of Pollen Collected by Bumblebees Placed in Greenhouses for Tomato Pollination, Canadian Journal of Plant Science, 84: 599-602 (2004).
[97] P.S. Gorbunov. Endoparasitic flagellates of the genus *Crithidia* (Trypanosomatidae, Zoomastigophorea) from alimentary canal of bumblebees. Zoologichesky Zhurnal 66: 1775–1780 (1987). See also J.J. Lipa & O. Triggiani, *Crithidia bombi* sp n. A flagellated parasite of a bumble-bee *Bombus terrestris* L. (Hymenoptera, Apidae), Acta Protozoologica 27: 287–290 (1988).

provides useful guidance for what such a regulatory scheme would look like, even though it applies to a fish virus and was promulgated not under the PPA but under the Animal Health Protection Act.[98] Here APHIS allows the interstate movement of regulated fish only if they are from a facility that is free of the virus and are accompanied by an Interstate Certificate of Inspection (ICI), which is an official document issued by an accredited veterinarian or authority in the originating state that certifies that the fish being moved interstate is free of the VHS virus.[99] A similar system could be created so that bumble bees can only be moved if they are coming from a facility that is free of or has only low levels of bumble bee diseases, and accompanied by an ICI certificate that the bumble bees do not exceed a certain, pre-established threshold of bumble bee pathogens.

APHIS should use its authority under the PPA to prohibit interstate movement of bumble bees beyond their native ranges by denying permits for this high risk activity. When bumble bees are moved between states within their native ranges, APHIS should require that they are free of diseases before they are moved.

C. APHIS Should Consider Using the Courtesy Permit System to Regulate Interstate Movement of Bumble Bee Adults, Nests, and Previously Used Nest Materials to Prevent Dissemination of Plant Pests While Regulations Implementing sections A and B are Promulgated.

APHIS should use courtesy permits to regulate the interstate movement of bumble bee pollinators as an interim measure to reduce the risk of plant pest dissemination between now and when APHIS promulgates final rules regulating the interstate movement of bumble bees as hosts of indirect plant pests and/or establishes a permitting system and mechanisms for certifying bumble bees as disease free. Because bumble bees are not yet regulated by the PPA, and because the plant pests carried by bumble bees are similar to other organisms regulated under the PPA, APHIS should consider using the courtesy permit system during this interim period to regulate interstate movement of plant pests carried by bumble bees. APHIS has, in the past, issued such

[98] See Viral Hemorrhagic Septicemia; Interstate Movement and Import Restrictions on Certain Live Fish Interim Rule, 73 FR 52173 (Sept. 9, 2008).
[99] Id.

permits for bumble bees.[100] APHIS stopped issuing courtesy permits for bumble bees in 1998.[101] Recent, devastating losses in wild native bumble bees underscores the need to immediately reinstate the courtesy permit system to ensure that bees that are being moved are disease free.

II. APHIS Should Use its Authority Under The Honeybee Act Together with its Authority under the Plant Protection Act to Regulate Movement of Bumble Bee Adults, Nests, and Previously Used Nest Materials

The Honeybee Act ("HBA") authorizes The Secretary of Agriculture "to prohibit or restrict the importation or entry of honeybees and honeybee semen into or through the United States in order to prevent the introduction and spread of diseases and parasites harmful to honeybees."[102] The Honeybee Act's Regulations ("Honeybee Regulations") are based on the combined authority of the HBA and PPA. The Honeybee Regulations do not apply only to honey bees. They prohibit the importation of all live adult bees or live brood and essential nest substrate except bumble bees of the species *Bombus impatiens* and *Bombus occidentalis,* alfalfa leafcutter bee (*Megachile rotundata),* blue orchard bees (*Osmia lignaria* sspp.) and horn faced bee (*Osmia cornifrons*) imported from Canada.[103]

The Honeybee Regulations should be expanded to regulate not just importation of non-honey bees but also the interstate movement of bumble bees. Such regulation is necessary to better protect all bumble bees and those who depend on their services. Honey bees and bumble bees do not share all of the same pests, but they do share a few pests which may be of concern. Deformed wing virus (DWV) and the microsporidia *Nosema ceranae* are examples of pathogens that have been documented in both honey bees and bumble bees.[104] The small hive beetle

---

[100] USDA Animal and Plant Health Inspection Services' R. V. Flanders, W. F. Wehling, & A. L. Craghead, Laws and Regulations on the Import, Movement and Release of Bees in the United State, *in* For Nonnative Crops, Whence Pollinators of the Future 103 (K. Strickler & J. H. Cane eds., Entomological Society of America 2003).

[101] Id. APHIS stopped issuing courtesy permits when it decided that it lacked jurisdiction over bumble bees. This determination was made prior to the passage of the 2000 Plant Protection Act, which clarified APHIS' authority by consolidating all or part of 10 laws pertaining to plant health into one comprehensive law, which grants APHIS the authority to regulate plants, plant products, certain biological control organisms, noxious weeds, and plant pests. APHIS' Plant Protection and Quarantine, The Plant Protection Act, (July 2002). http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_phproact.html (last visited 3/17/2009). The PPA on its own, and certainly combined with the Honeybee Act, discussed *infra,* establish APHIS' legal jurisdiction over the indirect plant pests carried by bee pollinators which are the subject of this petition.

[102] The Honeybee Act, 7 U.S.C. § 281(a).

[103] General Requirements, 7 C.F.R. 322.5(d) (2009).

[104] S. Plischuk *et al*. South American native bumble bees (Hymenoptera: Apidae) infected by *Nosema ceranae* (Microsporidia), an emerging pathogen of honeybees (*Apis mellifera*), Environmental Microbiology Reports 1(2):

(*Aethina tumida*) is an insect pest that can cause injury to both honey bee and bumble bee colonies.[105] It is possible that diseases that infect commercial bumble bees could spread to honey bees and cause them harm.

A. APHIS Should Promulgate Rules under the HBA and the PPA to Prevent Interstate Movement of Bumble Bees into all states falling outside of their native ranges

The Honeybee Regulations create general requirements for interstate movement of honey bees.[106] These regulations establish that Hawaii is considered a pest free area for certain honey bee pests and prohibit the interstate movement of honey bees into Hawaii in order to prevent the introduction of certain pests. [107] While bumble bees are not in Hawaii, these regulations set a precedent for prohibiting the interstate movement of a bee into a state in order to avoid the introduction of a pest. One pest of honey bees that also affects bumble bees is the small hive beetle (mentioned *supra*).[108]

By prohibiting interstate movement of honey bees into Hawaii, the Honeybee Regulations acknowledge the significant role interstate movement may play in the dissemination of pests which can greatly harm bee populations. APHIS should promulgate rules expanding the scope of the Honeybee Acts' Regulations beyond simply preventing interstate movement into Hawaii to more generally regulate interstate movement of bumble bees in order to prevent the spread of pests which threaten to significantly harm wild bumble bees. These regulations could mirror the scheme discussed *supra* where APHIS requires bumble bees moved interstate within their native ranges to be certified disease free and prohibits the interstate movement of bumble bees beyond their native ranges. This expansion in the scope of the regulations is appropriate in

---

131-135 (2009). See also Status Review at 32 E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[105] Status Review at 31. E. Evans *et al*., Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus *Bombus: Bombus affinis* (the rusty patched bumble bee), *B. terricola* (the yellowbanded bumble bee), and *B. occidentalis* (the western bumble bee), available at http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf (2008).

[106] General Requirements for Interstate Movement and Importation, 7 C.F.R. § 322.2(a).

[107] Id. § 322.2(a)(1)&(2).

[108] S. Spiewok & P. Neumann, Infestation of commercial bumblebee (*Bombus impatiens*) field colonies by small hive beetles (*Aethina tumida*), Ecological Entomology 31(6):623-628 (2006).

light of new scientific evidence which demonstrates the inherent risks associated with unregulated interstate movement of bumble bees.

B. APHIS Should Promulgate Rules Which Define Bumble Bee Pollinators outside their native ranges as "Restricted Organisms" under 7 CFR 322.13 and Should Craft Regulations to Prevent the Spread of Disease Through Interstate Movement

If APHIS decides not to prohibit all interstate movement of bumble bees outside their native ranges, as defined by the state line closest to the 100th meridian, it should consider regulating the interstate movement of bumble bees similarly to how it regulates the importation of restricted organisms.[109] This would allow APHIS to regulate the interstate movement of bumble bees, especially beyond the 100th meridian line, through a comprehensive permit system.[110] By requiring a permit system such as the one employed to regulate the importation of restricted organisms, APHIS will be able to prevent the spread of disease and plant pests. In reviewing permit applications, APHIS should take the opportunity to consult with qualified scientists and the destination states to ensure that all possible consequences of interstate movement of bumble bees are carefully considered and all possible risks are averted if APHIS decides, based on the best available information, that such movement may safely be allowed.[111]

In creating a system for the interstate movement of all bumble bees that is similar to that used to regulate the importation of restricted organisms, APHIS should consider imposing requirements on facilities that move bumble bees interstate that are similar to the "Post Entry Handling" importation requirements currently in place for restricted organisms listed under the Honeybee Act.[112] These measures provide prudent mechanisms for controlling the risks from restricted organisms. By creating a similar system for bumble bees, APHIS can take important steps to protect bumble bees and the plants that rely on them.

III. APHIS Should Also Consider Using its Authority Under the Animal Health Protection Act, 7 USC 8301 *et seq* to Protect Bumble Bees

[109] See generally 7 C.F.R. § 322.13-21, Importation of Restricted Organisms.
[110] Id. § 322.14-15.
[111] See id. § 322.15(a), (b).
[112] See id. § 322.21.

APHIS may also use its authority under the Animal Health Protection Act ("AHPA"), in addition to the PPA and HBA, to promulgate regulations that protect bumble bees by regulating interstate movement of bumble bees. The AHPA is based in part on Congress' finding that "the health of animals is affected by the methods by which animals and articles are transported in interstate commerce,"[113] The AHPA also recognizes the importance of regulations.

> [R]egulation by the Secretary and cooperation by Secretary with foreign countries, states and other jurisdictions, or persons are necessary
> **(i)** to prevent and eliminate burdens on interstate commerce and foreign commerce;
> **(ii)** to regulate effectively interstate commerce and foreign commerce; and
> **(iii)** to protect the agriculture, environment, economy, and health and welfare of the people of the United States.[114]

Under the AHPA the Secretary may prohibit or restrict the importation, entry, or movement in interstate commerce of any animal, article, or means of conveyance upon determining that such a prohibition or restriction is "necessary to prevent the introduction into or dissemination within the United States of any pest or disease of livestock."[115] The AHPA defines livestock broadly to include all farm raised animals, and also defines pest broadly to include a protozoan, bacteria, fungus, virus or viroid, an infectious agent or other pathogen, an arthropod, parasite, vector, or any organism similar to or allied with any of the organisms described in this paragraph.[116]

APHIS should use its authority under the AHPA to regulate the importation and interstate movement of bumble bees in order to prevent the dissemination of pests that could harm bumble bees and bee rearing facilities. APHIS has construed the terms of the AHPA broadly, and has used its authority under the AHPA to prohibit or restrict the importation and interstate movement of fish species susceptible to viral hemorrhagic septicemia (VHS) in order to prevent the spread of VHS into aquaculture facilities.[117] Commercially reared bee pollinators, such as bumble bees can be considered livestock. They fall under the definition of farm raised animal because they are reared in facilities specially designed for their production. In the late 1990s, an outbreak of the

[113] 7 U.S.C. §8301(3).
[114] Id. at 8301(5)(b).
[115] 7 U.S.C. §8303 (a)(1), §8305(1) (2006).
[116] 7 U.S.C. §8302(10), §8302(13).
[117] Amended Federal Order Viral Hemorrhagic Septicemia (VHS), April 2, 2008, available at, http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/downloads/vhs_fed_order_amended.pdf

disease *Nosema bombi* raged through a large bee-rearing facility and decimated their rearing stock of *Bombus occidentalis*. Regulations that certify the health of bumble bees are necessary to protect bee livestock in the future.

Regulations under the AHPA should essentially be the same as those discussed *surpra* under the PPA, as the AHPA is substantively identical to the PPA.[118] Regulations prohibiting the movement of bumble bees beyond their native ranges are necessary in order to prevent the dissemination of pests to livestock. If APHIS decides not to simply prohibit the movement of bumble bees beyond their native ranges, then it should restrict such movement through a permitting system similar to that discussed *supra*. By either prohibiting movement or treating bumble bees as restricted organisms and requiring a VS 1-27 (Permit for Movement of Restricted Animals) that requires bumble bees to be certified as disease free, APHIS may be able to control the dissemination of bee livestock pests.

IV. APHIS Should Work Closely with States and Scientists to Ensure Cooperation and the Use of the Best Available Information in the Regulation of Bumble Bees

7 U.S.C. § 450 authorizes APHIS to enter into cooperative arrangements with State departments of agriculture and other similar agencies to assist in the administration and enforcement of regulations to control plant and animal diseases and pests and also to coordinate the administration of State and Federal laws.[119] By coordinating its efforts with states, APHIS can prevent the dissemination of plant and animal pests and achieve the purposes of this statute "[i]n order to avoid duplication of functions, facilities, and personnel, and to attain closer coordination and greater effectiveness and economy in administration" of laws and regulations to prevent the spread of plant and animal pests.[120]

Both Oregon and California have attempted to protect bumble bees by regulating the movement of *B. impatiens*. Under the PPA, no state may attempt to control plant pests by regulating their movement interstate unless those regulations are consistent with and do not exceed federal regulations or if there is a special need for regulation if the state demonstrates to the Secretary and the Secretary finds a special need for additional regulation.[121] However, California and Oregon may have accumulated valuable experience and expertise in regulating

[118] *See* Cactus Corner, LLC v. U.S. Dept of Agriculture, 450 F.3d 428, 433 (9th Cir. 2006).
[119] 7 U.S.C. 450.
[120] Id.
[121] 7 U.S.C. §7756(b).

bumble bees. The PPA authorizes the Secretary to cooperate with states to carry out its purposes,[122] so APHIS should work closely with states to ensure that regulation of bumble bees is extensive enough to protect bumble bees and prevent the dissemination of plant and animal pests.

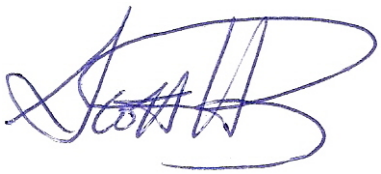
The PPA also authorizes the Secretary to cooperate with domestic and international organizations and associations and other persons to effectuate its purposes.[123] APHIS should work cooperatively with The Xerces Society for Invertebrate Conservation and bumble bee scientists in crafting regulations to protect bumble bees in order to ensure that its regulations are sufficiently comprehensive to ensure effective regulation of bumble bees.

CONCLUSION

In order to prevent the further decline of bumble bee populations and to protect the ecosystems and industries that require the services of bumble bees, Petitioner formally requests that USDA to use its authority under the statutes discussed above and promptly initiate rulemaking in order to effectively regulate the movement of bumble bees. In the interim, APHIS should reinstate its courtesy permit system under the PPA to prevent potentially catastrophic disease outbreaks.

As required by 7 C.F.R. § 1.28, Petitioners request that the agency promptly consider this petition and notify Petitioners promptly of any action the Secretary takes on this petition. Petitioners look forward to your response to each of the Requested Actions and request the opportunity to discuss these matters with you personally. For further information and discussion, please contact Scott Hoffman Black, Executive Director, Xerces Society, Tel.: 503.232.6639.

Respectfully submitted on behalf of the Petitioners,

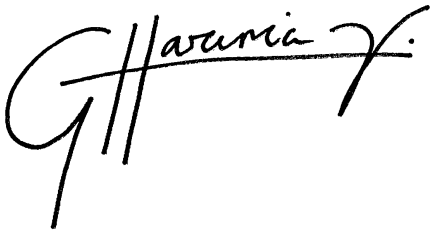


Scott Hoffman Black
Executive Director

[122] Id. at 7751(a).
[123] Id.

The Xerces Society for Invertebrate Conservation
4828 SE Hawthorne Blvd.
Portland, OR 97217

Rodger Schlickeisen
President
Defenders of Wildlife
1130 17th St. NW
Washington DC 20036-4604



Gabriela Chavarria, Ph.D.
Director, Science Center
Natural Resources Defense Council
1200 New York Ave. NW, Suite 400
Washington, DC 20005

Robbin Thorp, Ph.D.
Professor Emeritus
Department of Entomology
University of California
One Shields Avenue
Davis, CA 95616-8584