NOTE

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Honeybees and the Law: Protecting Our Pollinators

ABSTRACT

Honeybees are a valuable asset to our agricultural systems and our wildlife. Populations are diminishing, and scientists are finding many reasons why. Now that science is providing answers, the law must provide protection. This Article provides an overview of the factors contributing to colony collapse disorder and proposes solutions

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involving the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Endangered Species Act (ESA), and livestock law. Protecting bees is essential to preserving American ecosystems and food supplies.

INTRODUCTION

Honeybees are in trouble. Simply reading the news will tell you that much. Bee die-offs have been happening all across the country, in both small and frighteningly large numbers. Ecologists, environmentalists, and beekeepers agree: honeybees are dying by the millions.[1] A study concluding in 1994 showed that already 98% of wild honeybee colonies had been eradicated from the face of the Earth.[2] From 1944 to 1980, hives dropped from six million colonies to three million.[3] In the winter of 2012 alone, hive loss averaged 45.1%.[4]

Put simply, the bees must be saved. This is not a call to save a species for its sentimental value; the need to protect the honeybee is a practical one. Humans rely on honeybees' pollination for a significant amount of food production.[5] We must take immediate action to stop the degradation of the species. Colony collapse disorder (CCD) describes the multifaceted disease currently killing honeybees.[6] CCD is a serious risk to our food source and way of life.[7] Without expeditious efforts, we will face the extinction of honeybees, and the United States will experience massive food shortages.[8]

Lawmakers must combat CCD by providing honeybees with much needed legal and regulatory protection. By protecting bees, we also defend our nation's food supply and preserve the American lifestyle. Lawmakers can protect honeybees in a number of ways. First, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) could

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1 *See Honey Bee Health and Colony Collapse Disorder*, U.S. DEP'T OF AGRIC. (Jan. 23, 2015), http://www.ars.usda.gov/News/docs.htm?docid=15572.

2 MICHAEL SCHACKER, A SPRING WITHOUT BEES: HOW COLONY COLLAPSE DISORDER HAS ENDANGERED OUR FOOD SUPPLY 13 (2008).

3 *Id.*

4 Saving America's Pollinators Act of 2013, H.R. 2692, 113th Cong. § 2(4) (2013).

5 *See* SCHACKER, *supra* note 2, at 3.

6 *Id.* at 15.

7 *Silence of the Bees: Impact of CCD on US Agriculture*, PUB. BROAD. SERV. (July 20, 2009), http://www.pbs.org/wnet/nature/episodes/silence-of-the-bees/impact-of-ccd-on-us-agriculture/37/.

8 Lucas A. Garibaldi et al., *Pollinator shortage and global crop yield*, 2(1) COMMUNICATIVE & INTEGRATIVE BIOLOGY 37, 37 (2009), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2649299/.

ban chemicals that are harmful to bees. Second, the Endangered Species Act (ESA) could add a few simple specifications tailored to honeybees' particular needs. Third, commercial beekeepers could receive more localized protection. Categorizing honeybees as livestock could add regulation to commercial beekeeping practices, and any entity responsible for the demise of a hive would be held to the same standards as an individual who kills a farmer's cow. Finally, local governments could promulgate regulations and laws to support honeybee recovery through bans, restrictions, and management plans. By giving legal protection to honeybees, it may be possible to conquer CCD and maintain ecosystems and food production nationwide.

I
COLONY COLLAPSE DISORDER

The United States has been home to *Apis mellifera*, the European honeybee, for hundreds of years.[9] The very first colonists brought European honeybees with them, and the bees very quickly made a home within North America.[10] Since then, wild bee colonies have thrived alongside colonies managed by beekeepers. Honeybees have taken up the mantle of other diminishing pollinators, such as the once common native bumblebee species, *Bombus franklini*, which may now be extinct.[11] Today, wild and managed hives play nearly identical roles ecologically. Bees of both kinds pollinate native plants. Such plants are the foundation for complex ecosystems across the country, which allow for the production of crops upon which our country has become dependent. Since colonial times, European honeybees have fully acclimated into the United States, and we now rely on them to pollinate a significant portion of our crops.[12]

Our reliance upon honeybees makes CCD a terrifying threat. After colony collapse, hives resemble ghost towns. Often a beekeeper discovers a hive collapse only by opening the hive and finding it completely abandoned.[13] Commonly with colony collapse, the bees

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9 *Apis mellifera*, ENCYCLOPEDIA OF LIFE (Dec. 8, 2013), http://eol.org/pages/1045608/overview.

10 *Id.*

11 *Red List of Bees: Native Bees in Decline*, THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION, http://www.xerces.org/pollinator-redlist/ (last visited Feb. 25, 2015).

12 *See* Saving America's Pollinators Act of 2013, *supra* note 5.

13 SCHACKER, *supra* note 2, at 15.

leave behind larvae and uneaten honey and pollen.[14] No dead bodies remain; they are just gone.[15] Predators, such as wax moths and small hive beetles, who are usually eager to invade a hive and steal honey and pollen, remain absent for weeks, as if something is warning them to stay away.[16] In 2010, some commercial beekeeping operations lost as many as 95% of their hives—and for the country as a whole, die-off rates exceeded the norm by 40%.[17] Needless to say, such a decline in hives puts a lot of economic pressure on commercial beekeepers. Increased collapse rates lead to increased replacement costs; the startup cost of a hive is far greater than the maintenance.[18] This could inflate the cost and reduce the profitability of beekeeping and in turn lead to commercial beekeeping operations across the country dying off as quickly as the honeybee. While loss of honeybees certainly provides economic hardship to those intimately involved, the devastation will be far more widespread.

Honeybees are necessary to agricultural production because their foraging activities result in plant pollination. Plant pollen contains the genetic material of the plant. Pollination refers to uniting the pollen of one plant with the pistil, the female structure, of another plant. This joining of genetic material is necessary for plants to produce fruits and seeds. The estimated value of pollinators' work is fourteen to twenty billion dollars each year.[19] The scarcer bees become, the more difficult it becomes for farms to meet consumer demands. Continuation of the current trend in honeybee decline will cause food prices to skyrocket, and foods such as blueberries and almonds would become delicacies available solely to America's upper class.[20] Countless agricultural jobs would be lost, as many farms would be unable to produce crops at profitable rates.[21] This means the quintessential American family farm could cease to exist. Millions of

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14 *Id.*

15 *Id.*

16 *Id* at 23.

17 *Id.* at 24.

18 Carl J. Wenning, *Getting Into Beekeeping: Counting the Costs*, ILL. ST. U. (2012), http://www2.phy.ilstu.edu/~wenning/HIBA/bkcourse/counting.pdf.

19 BRYAN L. MCDONALD, FOOD SECURITY 110 (2010).

20 SCHACKER, *supra* note 2, at 25.

21 Peter G. Kevan & Truman P. Phillips, *The Economic Impacts of Pollinator Declines: An Approach to Assessing the Consequences*, 5(1): 8 CONSERVATION ECOLOGY (2001), *available at* http://www.ecologyandsociety.org/vol5/iss1/art8/.

people across the country will struggle to meet their basic nutritional needs.[22]

The rapid rate of decline necessitates a hard look at the costs should CCD drive honeybees to extinction. One third of food production in the United States depends on honeybee pollination.[23] Without honeybees for pollination, production of the following crops will be severely impacted and likely cease: soybeans, apples, nuts, broccoli, avocados, asparagus, celery, squash and cucumbers, citrus fruit, peaches, kiwi, cherries, blueberries, cranberries, strawberries, cantaloupe, and other melons.[24] Honeybees pollinate clover that is fed to dairy cows and contribute to the pollination of corn that is fed to meat animals such as cattle, pigs, and chickens.[25] Commercial beekeeping operations travel the country to large farms to help pollinate monoculture crops such as corn and soybeans.[26] In 2011, the United States harvested eighty-four million acres of corn, equaling 32% of the world's corn crop.[27] Nearly seventy-four million acres of soybean crops were also harvested, making up 50% of the world's soybean production.[28] Losing production of these crops would be catastrophic to the United States economy, to agricultural workers, and most importantly, to world food supplies.

Honeybees play a large role in natural ecosystems as well. In addition to crops, honeybees pollinate native plants. Approximately 130,000 flowering wild plants rely on pollinators such as honeybees to produce seeds.[29] The elimination of these pollinators would mean disaster for a wide range of plants, creating havoc in nearly every existing food web. The honeybee may also prove to be an indicator species—that is, showing the first signs of a problem large enough to affect many other species as well. In an ecosystem, as an indicator

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22 NATIONAL ACADEMIES PRESS, STATUS OF POLLINATORS IN NORTH AMERICA, 105 (2007), *available at* http://www.nap.edu/openbook.php?record_id=11761.

23 PUB. BROAD. SERV., *supra* note 8. The two thirds of food not reliant on honeybee pollination is made up of grains, which are self-pollinated and wind-pollinated, other self-pollinating crops like potatoes, and fish, which are fed a largely grain-based diet. *Id.*

24 *Id.*

25 *Native Pollinators*, NATURAL RESOURCES CONSERVATION SERVICE 1 (May 2007), *available at* http://plants.usda.gov/pollinators/Native_Pollinators.pdf.

26 SCHACKER, *supra* note 2, at 22.

27 *Major Crops Grown in the United States*, ENVTL. PROT. AGENCY (last updated Apr. 11, 2013), http://www.epa.gov/oecaagct/ag101/cropmajor.html.

28 *Id.*

29 SCHACKER, *supra* note 2, at 28.

species begins to struggle other species will often show signs of distress shortly thereafter.

With so much depending upon the survival of honeybees, scientists have been working tirelessly to determine the major cause of CCD.[30] The search began around 2004 when it became clear that a grave problem was threatening honeybees.[31] Currently there is no definite cause of CCD, though one study investigated sixty-one possible variables.[32] Factors thought to affect CCD can be sorted into four general categories: pathogens, parasites, management stressors, and environmental stressors.[33] Of these factors, management and environmental stressors can be best mitigated by legal and regulatory protective measures. To fully understand the impacts of CCD, however, it is important to be familiar with every facet of the syndrome.

A. Pathogens

Like all animals, honeybees are vulnerable to a number of pathogens, some of which can prove deadly. Two pathogens affecting honeybees are *Nosema ceranae*[34] and the Deformed Wing Virus (DWV).[35] *Nosema ceranae* is a pathogen that increases the honeybee's metabolism by feeding off the nutrients in a honeybee's stomach.[36] As a result, the honeybee must work harder and spend more time feeding than would a healthy honeybee.[37] The pathogen harms the honeybee by robbing nutrients, which then causes stress due to the honeybee needing to feed more often.[38] A stressed honeybee is then more susceptible to other health issues.[39]

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30 *Id.*

31 *Id.* at 15.

32 Dennis van Engelsdorp et al., *Colony Collapse Disorder: A Descriptive Study*, PLOS ONE (Aug. 3, 2009), http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0006481&representation=PDF.

33 *Honey Bees and Colony Collapse Disorder*, U.S. DEP'T OF AGRIC. (Sept. 6, 2013), http://www.ars.usda.gov/News/docs.htm?docid=15572.

34 Christopher Mayack & Dhruba Naug, *Energetic Stress in the Honeybee Apis Mellifera from Nosema Ceranae Infection*, 100 J. INVERTEBRATE PATHOLOGY 185, 185 (2009).

35 Benjamin Dainat et al., *Dead or Alive: Deformed Wing Virus and Varroa Destructor Reduce the Life Span of Winter Honeybees*, 78 APPLIED & ENVTL. MICROBIOLOGY 981 (2012).

36 Mayack & Naug, *supra* note 33, at 185.

37 *Id.*

38 *Id.*

39 *Id.*

DWV, as its name suggests, disrupts larval development and causes deformed, stubby wings, which makes the bees unable to fly.[40] Larvae are infected while still in the comb and emerge with abnormal body shapes and coloring—and can become paralyzed shortly thereafter.[41] DWV can infect honeybees either while the larvae are developing or through transmission by the queen.[42] One study showed a strong correlation between DWV-infected bees and a hive's inability to survive the winter.[43]

Some experts speculate about the increased prevalence of African honeybees in the United States as a factor in CCD.[44] Thus far, African honeybees are immune to CCD, leading some to believe that African honeybees may have introduced a pathogen affecting native and European honeybees.[45] African honeybees tend to be more successful in hot climates, and many beekeepers in southern states have supplemented or replaced native or European honeybee colonies with African bees to strengthen the hives.[46] If African honeybees are immune to a pathogen, but are carriers of the pathogen, this plan to bolster pollination through supplementation may have backfired.

B. Parasites

The two parasites thought to be the most related to CCD are the *Varroa destructor* mite[47] and *Aethina tumida*, the small hive beetle.[48] The *Varroa destructor* mite was discovered in Wisconsin honeybee colonies in 1987, and quickly spread to most states.[49] The mite is visible to the naked eye and is usually attached to the abdomen of a honeybee.[50] The mite itself weakens the honeybee's immune system

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40 JAMES YOUNG, DEFORMED WING VIRUS (DWV), Oregon State University (last visited Feb. 24, 2015), *available at* http://www.science.oregonstate.edu/bpp/insect_clinic/diseases/Deformed%20Wing%20Virus.pdf.

41 *Id.*

42 *Id.*

43 Dainat et al, *supra* note 34, at 985.

44 SCHACKER, *supra* note 2, at 20.

45 *Id.*

46 *Id.*

47 Roy M. Francis et al., *Varroa-Virus Interaction in Collapsing Honey Bee Colonies*, PLOS ONE (Mar. 19, 2013), http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0057540&representation=PDF.

48 James D. Ellis & Amanda Ellis, *Small Hive Beetle*, U. OF FLORIDA (June 2013), http://entnemdept.ufl.edu/creatures/misc/bees/small_hive_beetle.htm.

49 SCHACKER, *supra* note 2, at 35.

50 *Id.*

and decreases its lifespan.[51] A large part of the danger of the mite, however, is that it carries pathogens such as those previously discussed.[52] While the mite itself causes relatively minor damage to a single honeybee, it can introduce disease to the entire colony.[53]

In attempt to prevent CCD, many beekeepers treat or preemptively treat their hives with chemicals to kill the mites.[54] While chemicals may work for a while, the beekeeping community struggles to find a long-term solution.[55] Beekeepers use treatments placed inside the hive, which range from organic remedies to bee-friendly pesticides to antibiotics.[56] The use of chemicals has created an arms race, wherein mites become resistant to a particular remedy, and beekeepers must continually try new methods.[57] Additionally, mite treatments are toxic, and misapplication of a treatment can prove harmful both to the target mites as well as to the bees.[58]

The small hive beetle, *Aethina tumida*, was first identified in Florida in 1998.[59] Small hive beetles sneak into a honeybee hive through cracks and slowly take over by reproducing and eating honey, pollen, and honeybee larvae.[60] Destruction of the hive's resources often forces the honeybees to relocate.[61] Generally, though, a small hive beetle infestation cannot solely wipe out a colony. Healthy hives can withstand minor small hive beetle invasions, while weaker colonies can be driven out within weeks.[62] As with *Varroa destructor*, some beekeepers use chemicals to keep small hive beetles out of their

51 YOUNG, *supra* note 39, at 981.

52 SCHACKER, *supra* note 2, at 35.

53 FRANCIS, *supra* note 46, at 6.

54 SCHACKER, *supra* note 2, at 36.

55 Wm. Michael Hood, *Varroa Mite Control in South Carolina*, CLEMSON COOPERATIVE EXTENSION (last visited Mar. 29, 2015), http://www.clemson.edu /extension/beekeepers/factsheets/varroa_mite_control_in_sc.html.

56 SCHACKER, *supra* note 2, at 36.

57 *Id.*

58 Nick Collins, *Honey Bee Treatment Applied in Wrong Way*, THE TELEGRAPH (Sept. 4, 2013), http://www.telegraph.co.uk/news/earth/wildlife/10285919/Honey-bee-treat ment -applied-in-wrong-way.html.

59 Ellis & Ellis, *supra* note 47.

60 *Id.*

61 *Id.*

62 *Id.*

hives.[63] Other beekeepers use a more organic method: they squish them.[64]

C. Management Stressors

Even while honeybee populations decrease, crop production in the United States continues to increase. This has led to increased demand for traveling commercial honeybee operations. Honeybees usually travel a maximum of two and a half miles from their hive in search of pollen. To ensure the honeybees reach the desired crops, many beekeepers take their hives on the road. Honeybees have the impressive ability to find their way back to their hive even if its location changes. However, they are not immune to the stress of travel. Pollinating just an acre of seed crops requires around 7,200 bees, or approximately three hives.[65] With seemingly endless spans of monoculture crops across the country, millions of bees are charged with pollinating a significant portion of the entire domestic food supply of the United States. The crops themselves may be sprayed with a variety of chemicals, and commercial beekeepers must simply trust that nothing harmful will be applied while the bees are visiting.[66] Hives are packed onto trucks and driven around the country. A bump on the road could cause structural damage to the inside of a hive, and any perceived threat could send a whole hive of bees into panic. Traveling also makes them susceptible to toxins and pathogens from all over the country, and the close packing of the hives make transmission of disease from hive to hive much more likely.[67] Stress from travel further decreases a hive's ability to combat pests and disease.[68]

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63 Jon Zawislak, *Managing Small Hive Beetles*, U. OF ARK. DIVISION OF AGRIC. (last visited Feb. 20, 2015), *available at* http://www.uaex.edu/publications/PDF /FSA-7075.pdf.

64 Wm. Michael Hood, *Small Hive Beetle IPM*, CLEMSON COOPERATIVE EXTENSION (June 2010), http://www.clemson.edu/extension/beekeepers/publications/small_hive_bettle_ipm.html.

65 Joseph Ditzler, *Bees: Stressed and Overworked*, THE BULLETIN (Feb. 9, 2014), http://www.bendbulletin.com/home/1758974-151/bees-stressed-and-overworked.

66 *Id.*

67 Marla Spivak & Gary Reuter, *Why are Honey Bees Collapsing?*, U. OF MINN. BEE LAB (Mar. 23, 2007), http://www.beelab.umn.edu/Research /Publications/Whyarehoney beescollapsing/index.htm.

68 David Tenenbaum, *As Honeybee Colonies Collapse, Can Native Bees Handle Pollination?*, U. OF WISCONSIN-MADISON NEWS (Apr. 13, 2010), http://www.news.wisc.edu/17948.

Another potential management stressor is the wide variation in beekeeping techniques used by both commercial and backyard beekeepers across the nation. No two beekeepers do things exactly the same way. Beekeeping practices vary in many aspects, such as feeding, chemical use, amount of honey extracted, season of extraction, frequency of hive checkups, and many more. With little consistency, it is difficult to tell if any of these management practices are doing more harm than good. Beekeeping laws and regulations would establish uniform beekeeping practices. It would be difficult, however, for scientists and beekeepers to determine which practices are best. Furthermore, agreeing on best beekeeping methods would not solve all of the conceivable problems stemming from the new laws and regulations. Regulating beekeeping practices would lead to more consistent beekeeping on a larger scale, but it would potentially discourage hobby and small-scale beekeepers. The goal is to encourage the survival of bees, not impose inflexible restrictions on those trying to help them.

D. Environmental Stressors

Honeybees face many environmental stressors, including pesticide use, poor nutrition, pollution, climate change, and loss of biodiversity. By far, the easiest of these factors to control under the law is the use of pesticides, which potentially poses the greatest threat to honeybee hives. Pesticide use can be categorized as either contact or systemic.[69] Contact pesticides are sprayed on the surface of the plant and kill the targeted pest on contact.[70] Agricultural use of contact pesticides harmful to bees is often stopped when crops bloom.[71] This seasonal cessation minimizes harm to foraging honeybees. While lingering chemicals could still affect honeybees, contact pesticides are not the most concerning category of pesticides.

Systemic pesticides are chemicals applied to the soil or as a seed coat that causes the plant to absorb it as it grows, thus making the

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69 *Terms of Environment: Glossary, Abbreviations, and Acronyms*, ENVTL. PROT. AGENCY 7, 28 (Sept. 1992), *available at* http://nepis.epa.gov/Exe/ZyPDF.cgi/200081E1.PDF?Dockey=200081E1.PDF.

70 *Id.*

71 D. Biddinger et al., *Pollinators and Pesticide Sprays during Bloom in Fruit Plantings*, PENN STATE COLLEGE OF AGRICULTURAL SCIENCES (Apr. 30, 2014), http://extension.psu.edu/plants/tree-fruit/news/2014/pollinators-and-pesticide-sprays-during-bloom-in-fruit-plantings.

plant tissue toxic to insects.[72] The most commonly used systemic pesticides belong to a group called neonicotinoids. Neonicotinoids are not new in this country—DDT is a neonicotinoid.[73] Neonicotinoids that are used today are imidacloprid (IMD), clothianidin, acetamiprid, thiacloprid, and thiamethoxam.[74] Systemically applied neonicotinoids work by incorporating throughout a plant's vascular system.[75] When an insect bites into the plant, the pesticides attack the insect's nervous system, prohibiting neurons from transmitting signals.[76] While DDT is no longer used as a pesticide, many companies include neonicotinoids in pesticides, claiming the pesticides are completely safe for honeybees when the chemicals have been applied correctly.[77] Studies, however, have increasingly shown that even sublethal doses of neonicotinoids impair the orientation abilities of a bee.[78] Inability to return to the hive almost always means death for a honeybee.[79] Pesticide companies have alleged that in conducting recent studies, researchers have treated bees with artificially high doses of neonicotinoids, thereby exaggerating their harmful effects.[80] However, one study showed that even when highly diluted, the pesticide partially blocks an insect's immune system.[81] Honeybees are essentially becoming intoxicated from consuming neonicotinoid-contaminated nectar.[82] When intoxicated, honeybees' ability to forage is diminished, and they cannot navigate back to the hive.[83] Those who

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72 ENVTL. PROT. AGENCY, supra note 67.

73 SCHACKER, *supra* note 2, at 52.

74 *Chemicals Implicated*, BEYOND PESTICIDES (last visited Feb. 27, 2015), http://www.beyondpesticides.org/pollinators/chemicals.php.

75 *Id.*

76 SCHACKER, *supra* note 2, at 52.

77 *Neonicotinoids*, BAYER BEE CARE (last visited Feb. 27, 2015), http://beecare.bayer.com/agriculture/neonicotinoids.

78 Mickael Henry et al., *A Common Pesticide Decreases Foraging Success and Survival in Honey Bees*, 336 SCIENCE 348 (2012).

79 *Id.*

80 *Response to Lu Study on Neonicotinoids and Honey Bees*, BAYER CROP SCIENCE UNITED STATES (May 12, 2014), https://www.bayercropscience.us/news/press-releases/2014/05122014-bee-care-harvard-statement.

81 Simon Hadlington, *Neonicotinoids Let Virus Thrive in Bees*, ROYAL SOCIETY OF CHEMISTRY (Oct. 21, 2013), http://www.rsc.org/chemistryworld/2013/10/neonicotinoids-let-virus-thrive-bees-colony-collapse-disorder.

82 *Id.*

83 *What Is a Neonicotinoid?*, TEXAS A&M AGRILIFE EXTENSION (last visited Feb. 27, 2015), http://citybugs.tamu.edu/factsheets/ipm/what-is-a-neonicotinoid/.

do return bring substandard quantities of pollen to the hive, resulting in slow starvation.[84]

Suspecting that it was harming honeybees, France banned the use of GAUCHO, an IMD-containing insecticide, on sunflowers in 2000.[85] CCD did not stop, which was no surprise since many other crops were being treated with GAUCHO and because the use of other pesticides containing IMD continued.[86] In 2004, France extended the ban to include IMD use on corn and an additional pesticide called fipronil.[87] In 2005, French beekeepers reported that loss to CCD had stopped.[88] Not slowed, not abated—stopped.

In 2008 German beekeepers in Baden-Württemberg reported that nearly two-thirds of their bees died after an application of a pesticide called Poncho, which also goes by the chemical name clothianidin.[89] The massive die-off was due to an error in application that caused the pesticide to become airborne rather than coat the seeds as intended; the catastrophic effects of the misapplication was sufficient for Germany to ban the pesticide immediately.[90] Around the same time, the pesticide manufacturer attempted to register clothianidin in France, but French authorities promptly rejected the application.[91] In fact, European nations were so concerned by the effects of neonicotinoids that in 2013 the European Food Safety Authority (EFSA) conducted a study concluding that the use of several neonicotinoids "posed an unacceptable risk to bees."[92] A few months later, the European commission adopted a proposal to suspend the use of IMD, clothianidin, and thiamethoxam for two years.[93] In response to the ban, the U.S. EPA released the following statement:

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84 SCHACKER, *supra* note 2, at 56.

85 *Id.* at 67.

86 *Id.* at 72.

87 *Id.* at 76–77.

88 *Id.* at 78.

89 Alison Benjamin, *Pesticides: German Bans Chemicals Linked to Honeybee Devastation*, THE GUARDIAN (May 23, 2008), http://www.theguardian.com/environment/2008/may/23/wildlife.endangeredspecies.

90 *Id.*

91 *Id.*

92 Damian Carrington, *Bee-harming Pesticides Banned in Europe*, THE GUARDIAN Apr. 29, 2013, http://www.theguardian.com/environment/2013/apr/29/bee-harming-pesti cides-banned-europe.

93 *Colony Collapse Disorder: European Bans on Neonicotinoid Pesticides*, ENVTL. PROT. AGENCY, http://www.epa.gov/pesticides/about/intheworks/ccd-european-ban.html.

> Based on currently available data, the EPA's scientific conclusions are similar to those expressed in the EFSA report with regard to the potential for acute effects and uncertainty about chronic risk. However, the EFSA report does not address risk management, which, under U.S. federal law, is a key component of the EPA's pesticide regulatory scheme.[94]

The EPA reached similar scientific conclusions, yet has not taken similar actions. Neonicotinoid use is widespread across the United States. Study after study shows that the danger to pollinators is very serious.[95] Studies coming from sources such as Harvard University, Purdue University, and the French National Institute for Agricultural Research[96] have prompted neonicotinoid producers like Bayer, Syngenta, and Monsanto to release their own studies.[97] Unsurprisingly, corporate-funded studies on the effect of neonicotinoids on CCD have been "inconclusive."[98]

In addition to pesticide exposure, environmental factors including malnutrition, pollution, and climate change also cause stress to honeybee colonies. Worker bees perform all of the foraging for a honeybee hive. They travel miles away to collect pollen and nectar to eat and to bring back to the hive. In many areas of the country honeybees are hard-pressed to find sufficient nutrition because native habitats are dwindling.[99] Malnutrition could weaken a healthy hive but likely would not independently cause its collapse. A hive already affected by a stressor, however, could more easily succumb.[100] Habitat loss affects wild honeybee colonies even more dramatically than commercially kept or backyard bees.[101] When habitat that has fed a hive for generations is destroyed, the honeybees must look elsewhere. A new food source means an altered diet, which causes

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94 *Id.*

95 *See* Deniza Gertsberg, *New Evidence Linking Systemic Pesticides to Bee Die Offs*, GMO J. (Apr. 25, 2012), http://gmo-journal.com/2012/04/25/new-evidence-linking-systemic-pesticides-to-bee-die-offs/.

96 *Id.*

97 Adam Russell, *Follow the Honey: 7 Ways Pesticide Companies are Spinning the Bee Crisis to Protect Profits*, FRIENDS OF THE EARTH (Apr. 28, 2014), http://www.foe.org/news/blog/2014-04-follow-the-honey-7-ways-pesticide-companies-are-spinning-bee-crisis.

98 *See* SCHACKER, *supra* note 2, at 104.

99 Dhruba Naug, *Nutritional Stress Due to Habitat Loss May Explain Recent Honeybee Colony Collapses*, 142 BIOLOGICAL CONSERVATION 2369, 2369 (2009).

100 *Id.*

101 Riccardo Bommarco et al., *Dispersal Capacity and Diet Breadth Modify the Response of Wild Bees to Habitat Loss*, 277 PROC. ROYAL SOC'Y B 2075, 2075 (2010).

nutritional stress.[102] A hive weakened by nutritional stress may collapse.

Pollution also adversely affects honeybees. Honeybees' bodies are covered in hairs designed to pick up small particles, such as pollen.[103] In addition to pollen, the tiny hairs unintentionally pick up various contaminants in the air.[104] The honeybees subsequently bring these toxic particles back to the hive, where one duty of home life is to fan the hive—thereby releasing the contaminated particles into the hive.[105] Thousands to tens of thousands of bees live in the hive, and each bee may make up to fifteen trips outside the hive each day, resulting in a stockpile of toxins within the hive.[106] Exposure to harmful chemicals in the air weakens the hive and makes it more susceptible to other factors. Toxic contaminants inside a hive may also drive honeybees away after too much accumulation.

With climate change, honeybees have become vulnerable to the effects of increasing temperatures. There is no denying that the impacts of climate change will reach the honeybee.[107] Climate change is caused by high levels of CO_2, resulting in, among other things, higher average temperatures and increased nitrogen deposition.[108] A recent study showed that increased temperatures, nitrogen deposition, and increased CO_2 each impact the plant-pollinator relationship.[109] In nature, these three factors have a cumulative impact on plants, making it difficult to predict the effects. The ultimate impact that climate change will have on honeybees depends on honeybees' ability to adapt to a new environment. Adaptation often relies upon the species' ability to activate the nervous or immune systems.[110] The effect of

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102 *Id.*

103 Monia Perugini et al., *Monitoring of Polycyclic Aromatic Hydrocarbons in Bees (Apis mellifera) and Honey in Urban Areas and Wildlife Reserves*, 57 J. AGRIC. & FOOD CHEMISTRY 7440, 7440 (2009).

104 *Id.*

105 *Id.*

106 *Id.*

107 Y. Le Conte & M. Navajas, *Climate Change: Impact on Honey Bee Populations and Diseases*, 27 REVUE SCIENTIFIQUE ET TECHNIQUE 499, 499 (2008).

108 Shelley E.R. Hoover et al., *Warming, CO_2, and Nitrogen Deposition Interactively Affect a Plant-Pollinator Mutualism*, 15 ECOLOGY LETTERS 227, 227 (2012).

109 *Id.*

110 RECOGNITION AND ALLEVIATION OF DISTRESS IN LABORATORY ANIMALS, NATIONAL RESEARCH COUNCIL (US) COMMITTEE ON RECOGNITION AND ALLEVIATION OF DISTRESS IN LABORATORY ANIMALS Ch. 2 (2008), *available at* http://www.ncbi.nlm.nih.gov/books/NBK4027/.

other stressors described in this paper may make adaptation too daunting a task for honeybees.

Increased CO_2 and nitrogen in the atmosphere alter the composition of plant nectar, resulting in a food source to which honeybees are not accustomed.[111] In fact, the study on climate change effects showed that a high level of nitrogen in nectar was associated with decreased longevity in the pollinator.[112] The three factors of climate change also alter the reproductive cycle of plants, resulting in different flowering times.[113] Nectar and pollen are generally produced earlier than they used to be, which may result in honeybees missing the opportunity to collect nectar and pollen from certain plants.[114] Higher average temperatures also shorten the season of available nectar in many plants, giving honeybees less time to collect.[115] Climate change modifies precipitation as well as temperature, causing plant distribution to shift when a new condition is unsuitable for existing plants.[116] Lastly, atmospheric alterations affect the physical composition of the plant itself.[117] This may cause lack of recognition for pollinators, depriving the pollinator of food and the plant of pollination. In slowly changing conditions, many animals can adapt to their new surroundings. However, the environment is changing too quickly for honeybees to adjust. Additionally, honeybees are dealing with a multitude of other stressors. The species has little hope of adapting to new climate conditions as it also battles pests and pesticides.

Lack of diversity in the honeybee gene pool may be another environmental stressor.[118] There are less than five hundred breeder queens producing the millions of queen bees that are shipped across the nation to supply commercial and hobby beekeepers alike.[119] In this way, honeybees are essentially another form of monoculture; each honeybee is nearly genetically identical.[120] Lack of diversity leaves honeybees more vulnerable to collapse because all hives will

111 *Id.*
112 *Id.* at 231.
113 *Id.*
114 *Id.*
115 *Id.*
116 Conte & Navajas, *supra* note 105, at 504.
117 Hoover et al, *supra* note 106, at 232.
118 SCHACKER, *supra* note 2, at 42.
119 *Id.*
120 *Id.*

be equally affected by harmful factors. Genetic diversity allows for adaptation—but with no genetic variation, change can only come from mutation, which is a much slower process. Lack of diversity is not a definitive factor, however, because hives with genetically diverse queens can still fall victim to CCD.[121]

II
PROTECTING THE HONEYBEE

The honeybee is in danger and deserves our time and attention to prevent even more widespread die-offs. There are laws already in place designed to protect certain species for varying reasons. Each of the laws has benefits and shortfalls. In order to provide the honeybee with adequate protection, lawmakers must make room for honeybees. With some tailoring, the Federal Insecticide, Fungicide, and Rodenticide Act, the Endangered Species Act, and livestock laws and regulations offer hope for saving honeybees.

A. The Federal Insecticide, Fungicide, and Rodenticide Act

The Environmental Protection Agency (EPA) states that "[t]he objective of [the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)] is to provide federal control of pesticide distribution, sale and use."[122] The EPA is responsible for approving registration of all pesticides used in the United States.[123] To register a pesticide, the administrator must find that the:

> [The pesticide's] composition is such as to warrant the proposed claims for it; its labeling and other material required to be submitted comply with the requirements of [FIFRA]; it will perform its intended function without unreasonable adverse effects on the environment; [and] when used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable adverse effects on the environment.[124]

One factor of unreasonable adverse effect on the environment is defined as "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and

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121 *Id.*

122 *Federal Insecticide, Fungicide, and Rodenticide Act*, ENVTL. PROT. AGENCY (June 27, 2012), http://www.epa.gov/oecaagct/lfra.html.

123 *Id.*

124 *Id.*

benefits of the use of any pesticide. . . ."[125] The term "unreasonable risk" is subjective.[126] Furthermore, the EPA is permitted to take economic factors into account when choosing whether to register a pesticide.[127] This leaves the decision wide open to the influence of lobbying by pesticide manufacturers and the agriculture industry. As a result, the EPA decided the economic benefits of dangerous chemicals like IMD and other neonicotinoids currently registered in the United States outweigh the risks.[128]

The potentially more difficult issue regarding pesticide use is the use of neonicotinoids as systemic pesticides. Once a pesticide is registered, the EPA regulates its use as a contact pesticide.[129] Once a pesticide is applied to a seed as a seed treatment, however, the seed-pesticide unit becomes a device, under FIFRA.[130] A device is defined as "any instrument or contrivance (other than a firearm) which is intended for trapping, destroying, repelling, or mitigating any pest or any other form of plant or animal life . . . but not including equipment used for the application of pesticides when sold separately therefrom."[131] Devices do not require registration by the EPA.[132] A device is regulated only if a manufacturer makes a false claim about the device.[133] Devices that depend upon the performance of the user are not regulated at all.[134] The current system results in a game of liability hot potato. If there is definitive proof that seed-treated pesticides caused a die-off, the EPA avoids liability because it is only responsible for regulation of pesticides, not devices. The manufacturer blames the user for misuse of the device. The user might be fined, while billions of seeds continue to be treated with dangerous chemicals.

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125 Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136(bb)(1) (2014).

126 SCHACKER, *supra* note 2, at 149.

127 *Id.*

128 *Id.*

129 *Pesticides: Regulating Pesticides*, ENVTL. PROT AGENCY (Oct. 20, 2014), http://www.epa.gov/pesticides/regulating/index.htm.

130 *See Pesticide Registration Manual: Chapter 13–Devices*, ENVTL. PROT. AGENCY (last visited Feb. 21, 2015), http://www2.epa.gov/pesticide-registration/pesticide-registration-manual-chapter-13-devices.

131 7 U.S.C. § 136(h) (2014).

132 *Pesticide Devices: A Guide for Consumers*, ENVTL. PROT. AGENCY (Nov. 26, 2012), http://www.epa.gov/pesticides/factsheets/devices.htm.

133 *Id.*

134 *Id.*

With bees dying off rapidly and studies showing that neonicotinoids could be largely responsible, the EPA must recognize that the risks of these pesticides now outweigh all benefits. There are many other alternatives to neonicotinoids including other pesticides and organic farming methods.[135] Agriculture can survive without neonicotinoids but it cannot survive without honeybees.

The EPA must cancel the registration of neonicotinoids. The cancellation process requires the EPA to publish a notice of intent to cancel registration.[136] Those who feel they will be adversely affected by the cancellation have the opportunity to request hearings. After the hearings, the EPA makes the final determination about whether or not to cancel the pesticide's registration.[137] Although there is some red tape and associated costs in order to cancel registration, the time and energy spent on a cancellation is far less than what will be demanded if neonicotinoids kill off the honeybees. And the cost of finding alternative pest control methods pales in comparison to the social and financial costs of disastrous food shortages that will occur if honeybees go extinct. These inconveniences must be faced in order to save us from facing the consequences of the die-off of honeybees.

B. The Endangered Species Act

The Endangered Species Act (ESA) was passed for the following purpose:

> [T]o provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in [the Act].[138]

For a species to be protected under the ESA, it must first be listed. A species may be listed if it fulfills any of the following five factors: "(A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or

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135 *Integrated Pest Management (IPM) Principles*, ENVT. PROT. AGENCY (Aug. 5, 2014), http://www.epa.gov/opp00001/factsheets/ipm.htm.

136 *Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)*, ENVTL. PROT. AGENCY (June 27, 2012), http://www.epa.gov/oecaagct/lfra.html#Cancellation and Suspension of Pesticide Registrations.

137 *Id.*

138 16 U.S.C. § 1531(b) (2012).

predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence."[139] When a species is listed, its critical habitat is designated, which describes the specific geographic area essential to the species that should be protected along with the species itself.[140] Once listed and critical habitat designated, the ESA requires federal agencies not to make any decisions that would jeopardize the species.[141] The ESA also prohibits any taking of a listed species.[142] Under the ESA, "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."[143]

While hundreds of species are currently listed under the ESA, insects are considerably underrepresented.[144] Insects' rate of extinction is near equal to that of plants and vertebrates.[145] In fact, insects may be even more vulnerable to extinction because their small size and short life span make them more susceptible to environmental changes.[146] Despite their vulnerability, insects represent less than 3% of species protected under the ESA.[147] No species of bees, wasps, or ants are listed, despite the fact that these animals make up 19% of insect species in North America.[148] The bias against insects is a response to the lack of scientific data and public interest rather than the lack of importance.[149] Within the insect community, beetles and butterflies receive more of a spotlight than bees, wasps, and ants. The focus is driven largely by public interest. The public pushes for protection of aesthetically pleasing animals.[150] Additionally, negative public perception of stinging and biting insects might make it difficult to look past the unpleasant characteristics of the species to see their

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139 *Id.* § 1533(a)(1).

140 ENDANGERED SPECIES ACT: LAW, POLICY, AND PERSPECTIVES 3 (Donald C. Baur & Wm. Robert Irvin eds., 2d ed. 2006).

141 *Id.* at 4.

142 *Id.* at 5.

143 16 U.S.C. § 1532(19).

144 Ezequiel Lugo, *Insect Conservation Under the Endangered Species Act*, 25 UCLA J. ENVTL. L. & POL'Y 97, 101 (2007).

145 *Id.* at 100.

146 *Id.*

147 *Id.* at 101.

148 *Id.* at 110.

149 *Id.* at 111.

150 *See* HAL HERZOG, SOME WE LOVE, SOME WE HATE, SOME WE EAT: WHY IT'S SO HARD TO THINK STRAIGHT ABOUT ANIMALS 37–38 (2010).

importance to our way of life. This unspoken bias against insects is troubling, given that insects have great ecological, economical, and evolutionary value.[151]

In the case of the honeybee, there are troubling aspects to the ESA. First, while the bias against listing insects could prevent the honeybee from being considered, it fits the criteria for listing a species under the ESA. The first criterion states a species can be listed because of "the present or threatened destruction, modification, or curtailment of its habitat or range."[152] A honeybee's foraging ground is the area included in a two and a half mile radius around the hive. Development and deforestation are on the rise across the country. Since honeybees live in every one of the lower forty eight states, honeybee habitat is most certainly being destroyed.

A species can also be listed if it is subject to "overutilization for commercial, recreational, scientific, or educational purposes."[153] Honeybees are overworked. Pollinators are necessary to crop production, and honeybees are tasked with pollinating vast tracts of cropland. As honeybee hives collapse, the existing hives are stretched thin. Commercial beekeepers must take their hives long distances to meet the demand posed by increasing crop production. As hive numbers decrease, commercial beekeepers must take their hives longer distances, subjecting the bees to even more stress.

The third criterion for listing under the ESA is species that are subject to "disease or predation."[154] Honeybees are susceptible to a wide variety of pests that weaken hives and make them more vulnerable to collapse. The fourth listing factor is "the inadequacy of existing regulatory mechanisms."[155] If existing regulation was sufficient to protect the honeybee, there would be no need for this Article. Colonies are collapsing at a disturbing rate, making it clear that existing regulatory mechanisms are falling short.

Fulfilling each of the first four listing factors is more than enough to list the honeybee under the ESA. The fifth factor adds that a species may be listed if it is subject to "other natural or manmade factors affecting its continued existence."[156] The weight of the

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151 *See* Lugo, *supra* note 142, at 102.

152 16 U.S.C. § 1533(a)(1)(A) (2012).

153 *Id.* § 1533(a)(1)(B).

154 *Id.* § 1533(a)(1)(C).

155 *Id.* § 1533(a)(1)(D).

156 *Id.* § 1533(a)(1)(E).

consequences if we lose the honeybee is immense. We are not faced with losing a songbird that brings us joy. Rather, we are faced with losing the ability to feed the millions of people in this country. As such, it is important to consider every factor impacting the survival of these animals.

Practically speaking, listing honeybees under the ESA would be challenging. Considering the ESA's take provision, the taking of a honeybee is not like the taking of a Louisiana black bear. Honeybees are small and easy to kill. In fact, a honeybee attack on a person is fatal to the honeybee. Typically, endangered animals do not have much contact with humans. Often, their habitats exist far from people—which is why urban sprawl and land conversion is causing habitat loss and fragmentation.[157] Most endangered species are not accustomed to living alongside people. Honeybees, on the other hand, live in and travel frequently to areas of high human population density. As a result, they interact with people much more frequently than do most endangered species.

Honeybees' unique social structure would pose another challenge to listing the honeybee under the ESA. The collective hive needs protection, not the individual insect. The individual honeybee is not a crucial part of the health of a hive. The queen honeybee is the only individual that has any significant importance to the hive. She is the only egg-laying member of the hive, and she produces royal jelly to feed the larvae.[158] The queen is the only individual that matters to the other bees. Without a queen, the bees will almost certainly leave the hive.[159] This structure is a characteristic unique to bees and ants. Since no bees or ants have ever been listed under the ESA, listing would require a rule tailored very specifically to the honeybee. The queen should be protected along with the hive as a whole, but protecting individual worker bees would be excessive and unnecessary. Differentiating between the queen and worker bees would solve both problems of honeybees' frequent interaction with humans and the unique social structure of the hive. No one would be held liable for swatting a honeybee buzzing around a picnic or for inadvertently killing a honeybee by provoking it to sting. However,

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157 *Habitat Destruction*, WORLD ANIMAL FOUND. (last visited Feb. 21, 2015), http://www.worldanimalfoundation.net/f/HabitatDestruction.pdf.

158 Kathryn A. Peters, *Keeping Bees in the City? Disappearing Bees and the Explosion of Urban Agriculture Inspire Urbanites to Keep Honeybees: Why City Leaders Should Care and What They Should Do About It*, 17 DRAKE J. AGRIC. L. 597, 601 (2012).

159 *Id.* at 602.

with the hive and the queen listed, pesticide sprayers could still be held liable for the destruction of an entire hive.

Critical habitat determination would also be impractical for honeybees. If honeybee habitat were defined as the entire range of worker bee foraging, an exorbitant amount of land would be protected. What would likely follow is that agencies would recognize the unreasonableness of protecting honeybee habitat, and it would become common practice to neglect to consider the honeybee in agency decision-making. The honeybee's habitat conservation plan under the ESA should include operations within the hive's range that result in the release of air pollutants and/or spraying pesticides. If such pollutants and pesticides result in a colony collapse, those responsible could be held accountable, and it would not unnecessarily tie up other land within the range of the hive.

With much debate as to the most harmful factors of CCD, it admittedly would be difficult to prove a specific cause in the event of a hive collapse. Rather than waiting until scientific methods can make this determination with absolute certainty, we should take steps now to protect the honeybee as best we can. Entities that produce pollutants and use pesticides that harm honeybees should be held joint and severally liable for colony collapses. There is no precedent for this type of response to the taking of an endangered species. However, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act (CWA) already use this liability scheme to hold entities responsible for the dumping of hazardous materials and water pollution, respectively.[160] Each party involved is held responsible for the full cost of restoring the damaged area.[161] Adopting this same liability scheme would strongly encourage polluters and sprayers to investigate the effects of the chemicals before releasing them into the environment. Failure to do so would make guilty parties liable for the full cost of the remedy, including replacement of the hive and any

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160 *See* Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9607 (2012); Clean Water Act, 33 U.S.C. § 1319 (2012).

161 [J]oint and several liability: A concept which dictates that parties who contribute to a site's pollution are each liable as if they alone polluted that site. Under this concept any one party may be held liable for all cleanup costs. In such a case, this one party may be responsible for identifying others to share the liability.

Glossary, ENVTL. PROT. AGENCY (Aug. 9, 2011), http://www.epa.gov/superfund/programs/reforms/glossary.htm.

other resulting economic loss. Imposing strict liability is a necessary step given the urgency of the situation.

If the honeybee becomes listed under the ESA, beekeepers must be protected from liability under the § 9 take provision. It would be counterproductive to punish beekeepers for attempting to promote the health and success of the honeybee species. Except in the case of intentional destruction or gross negligence, beekeepers should be exempt from liability for colony collapse. Good faith efforts to support honeybees should not be punished.

Based on the various considerations discussed above, listing honeybees under the ESA would be possible with some specifications. However, because of the honeybee's unique social structure and habitat range, a typical listing would be impractical. Specifications tailored solely to the honeybee could make ESA protection more feasible.

C. Livestock Law

Another possibility for saving honeybees is to define them as livestock. If honeybees were considered livestock, they would also be considered personal property and would be subject to the same protection from harm given to any dairy cow. This could be beneficial when faced with the death of a hive. The categorization of honeybees as livestock would raise the same issues as listing under the ESA regarding the treatment of individuals versus the hive as a whole. However, the same distinction could succeed. Death of a single honeybee would result in no consequences, while collapse of an entire hive or death of a queen would be a punishable offense.

Designating honeybees as livestock would require defining the "range" of the livestock. The issue is trickier regarding large livestock animals such as cattle or pigs; thousands of honeybees can live comfortably in a box of only a few cubic feet. Additionally, the intent behind classifying honeybees as livestock would be to provide protection for commercial beekeepers. Requiring all beekeepers to have large tracts of land or submit complicated permits could discourage small hobby beekeepers, which is counter to the goal of boosting bee populations. Much of livestock law is based on state ordinances, and the same format would likely hold true for honeybees. Many states already regulate the number of hives a keeper

can keep.[162] Honeybee livestock regulations would have to apply to both commercial and hobby beekeepers, so as to not discourage either type of beekeeping. Additional ordinances could regulate special requirements for migratory beekeeping operations, pest treatments that are safe to use within hives, and any other issues the state deems necessary.

One shortfall of using livestock law for bees is that the law generally permits "common practice," regardless of the effect on the animals.[163] It would be a true failure to attempt to use livestock law to protect bees but instead to turn commercial honeybee farms into concentrated animal feeding operations (CAFOs). Commercial honeybee regulations would have to include specifications on how much space to give each hive, where they should be kept, winter protection, details on when to provide food and water to the hives, and how often to check within the hive. Such specifications could ensure that common practices become the norm without first determining that they are the best practices to maintain good health in the bee colonies.

Classifying honeybees as livestock could offer some protection for kept honeybees. However, it leaves wild honeybees to their own devices. Wild honeybees do not belong to anyone in particular. By listing honeybees as livestock, only bees that are personal property would be protected. Wild honeybee populations have suffered equally if not more than bees kept by beekeepers. Since wild honeybee hives have adapted to their various environments for hundreds of years, they are extremely well adapted to pollinating native ecosystems. The law should certainly not leave wild honeybees out of the equation.

The best solution to protect honeybees may be to utilize a combination of livestock law and the ESA. Commercial and hobby beehives could be regulated by livestock law and protected as personal property while wild honeybees would be covered by the ESA. This would give more leeway to beekeepers regarding beekeeping practices. Anything considered a normal practice by other

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162 *See, e.g.*, *Bee and Beehive Information*, CAL. DEP'T. OF FOOD & AGRIC. (2014), http://www.cdfa.ca.gov/plant/PE/interiorexclusion/bees.html; *Apiary Registration*, TENN. DEP'T. OF AGRIC., http://www.tn.gov/agriculture/regulatory/apiaryregistration.shtml; *Beekeeper Registration*, FLA. DEP'T. OF AGRIC. & CONSUMER SERVS., http://www.freshfromflorida.com/Divisions-Offices/Plant-Industry/Business-Services/Registrations-and-Certifications/Beekeeper-Registration; *Honey Bees*, GA. DEPT. OF AGRIC., http://agr.georgia.gov/honey-bees.aspx.

163 JONATHAN SAFRAN FOER, EATING ANIMALS 242 (2010).

beekeepers would be an acceptable method. Beekeepers would not have to worry about personal liability in the event of a hive collapse, even if the collapse was due to negligence. Keeping bees would likely be simpler under state ordinances than under federal ESA laws. More flexible regulations for beekeepers would prevent discouraging small-scale and hobby beekeepers from keeping hives. Perhaps most importantly, maintaining or increasing the number of hives nationwide would strengthen (and perhaps rebuild) the bee population.

Listing wild honeybees under the ESA would protect hives that are not privately owned and managed. This would prevent destruction of wild hives, which are extremely beneficial and sometimes necessary to local plant and wildlife. People would not be allowed to disturb or tear down wild hives found on their land. Polluters and pesticide sprayers would be held accountable for any damage to hives caused by their chemicals and would be responsible for the costs associated with repairing the damage. In this way, wild honeybees would be protected as sufficiently as domestic bees. Using a combination of livestock regulations and the ESA would extend honeybee protection from commercial hives to small hobby-hives to wild beehives.

The goal for new regulations to increase honeybee protection would be to minimize the effects of CCD. Regulating beehive management could unify the efforts of commercial and hobby beekeepers to eliminate pathogens and parasites, thereby increasing the effectiveness of the remedies. Migratory beekeeping operations would have limits imposed to maximize pollination while minimizing stress to the bees. Polluters and pesticide users would be liable for damage to personal property in the case of collapse in managed beehives and liable under the ESA for harm to wild honeybees and their habitat. Liability to polluters and pesticide users would encourage development and use of more environmentally friendly methods. Hopefully, the United States would then look at banning such practices altogether, resulting in a healthier environment in which honeybees could thrive.

CONCLUSION

Honeybee protection is possible if lawmakers take action now. Legal and regulatory changes would not be a drastic reaction considering the severity of the problem at hand. Great threats must be met by proportionate responses. When a problem this large looms overhead, lawmakers must prevent catastrophe by creating protective

laws for the honeybees. Although scientists have not been able to say definitively how to prevent CCD from decimating hives, we cannot wait for certainty any longer. Lawmakers must provide protection now. Banning harmful pesticides is an obvious first step the EPA must take. Taking neonicotinoid pesticides off the market will save bees from the poison and intoxication they experience by attempting to pollinate contaminated crops. With stronger immune response, hives would be able to defeat almost any other factor of CCD. Honeybee-specific listing and critical habitat regulations would allow thorough protection of wild honeybees under the ESA, despite their unique characteristics. Livestock regulations for commercially kept honeybees would help prevent negligence of hive management and promote widely accepted, uniform beekeeping practices. With the looming collapse of our country's food supplies and of countless ecosystems, we cannot afford a timid approach to honeybee protection. We cannot wait for more honeybees to die. Protection must start now for the survival of the honeybee and of our way of life.