Appendices

Appendix A. U.S. Environmental Protection Agency Pollinator Protection Plan

The Environmental Protection Agency (EPA) was directed to assess the effect of pesticides, including neonicotinoid insecticides, on the health of bees and other pollinators and to take appropriate actions to protect pollinators. As part of this process, EPA was directed to engage state and tribal agricultural and environmental agencies to develop pollinator protection plans. EPA was further directed to encourage the incorporation of pollinator protection and habitat planting activities into green infrastructure and Superfund projects and to expedite the review and registration of new products targeting pests harmful to pollinators.

Pollinator protection is among the EPA's top priorities. EPA recognizes that both bees and insect control are essential to the success of agriculture. While these two issues might seem inherently at odds, since insecticides are often toxic to bees, EPA is working to optimize bee health and insect control by reducing bees' exposure to pesticides without losing the ability to control pests in agriculture.

EPA's plan includes several key elements consisting of: 1) best available science to support protective decisions; 2) chemical-specific regulatory decisions that explicitly consider pollinator impacts in EPA's pesticide reevaluation and registration programs; 3) risk management that creates space between pesticides that are acutely toxic and bees; 4) expedited review of new Varroa mite control products; 5) incorporation of measures to encourage and enhance pollinator habitat at facilities and EPA-funded green infrastructure and Superfund remediation projects; 6) develop pollinator friendly landscapes at EPA-owned facilities, and 7) evaluation and mitigation of pesticide impacts on monarch butterflies. EPA will describe in detail how it will implement each of these seven elements.

In order to implement scientifically-supported mitigation for pollinators, EPA first undertook a multi-year effort, working with stakeholders across multiple communities and countries, to develop a scientific framework for assessing the risks that pesticides pose to pollinators. Having completed a rigorous external peer review of its scientific methodology for assessing the impacts of pesticides on pollinators, EPA is now in a position to implement this methodology into its risk assessment and risk management programs. In the sections that follow, efforts initiated by EPA which are responsive to the White House directive are described along with metrics for evaluating the progress of these efforts. As EPA actions are subject to public review and comment, stakeholder engagement has been a consistent part of EPA's pesticide regulatory process; where appropriate, opportunities for public/private partnerships are identified.

Best Available Science to Support Protective Decisions

New harmonized risk assessment guidance for pollinators (including implementation and outreach of guidance for Tier 1 data requirements)

In June 2014, the EPA, working in collaboration with Health Canada's Pest Management Regulatory Agency (PMRA) and the California Department of Pesticide Regulation (CDPR), released a harmonized

guidance document on assessing the risk of pesticides to bees (USEPA 2014). The guidance is based on a conceptual framework outlined in a white paper presented to a Federal Insecticide, Fungicide and Rodenticide Act Scientific Advisory Panel (FIFRA SAP) in 2012; the framework discussed in the white paper and reflected in the harmonized guidance document is consistent with the European and Mediterranean Plant Protection Organization (EPPO 2010) scheme and the 2014 European Food Safety Authority (EFSA 2013) guidance as well as the Society of Environmental Toxicology and Chemistry (SETAC) global Pellston Workshop held in 2011 (Fischer and Moriarty 2014).

The guidance describes a tiered process beginning with a conservative screen (Tier 1) using laboratory-based acute and chronic toxicity studies of individual adult and larval honey bees coupled with model or default exposure values to derive risk estimates referred to as risk quotients (RQ), *i.e.*, exposure ÷ toxicity=risk). Depending on the results of the screening-level assessment, more refined estimates of exposure (*i.e.*, measured rather than estimated values) can be used to determine whether risk estimates can be refined below regulatory trigger levels (Levels of Concern). If risk estimates exceed levels of concern, higher tier studies may be required; these studies consist of semi-field tunnel or feeding studies with whole colonies at Tier 2 where exposure conditions are relatively controlled to full-field studies with whole colonies at Tier 3 where bees are free foraging and application conditions are as close to actual use conditions as possible.

Throughout the tiered process, risk assessors consider whether mitigation measures (*e.g.*, reduced application rates, timing of application, number of applications) are sufficient to reduce exposure to a level that risk estimates are below thresholds for concern. In Tier 2 and Tier 3, whole colony responses are evaluated to determine whether effects from exposure are transient and whether the colony appears to recover from such impacts.

In addition to the initial vetting of the risk assessment process through EPA's Federal Advisory Committee FIFRA Scientific Advisory Panel, the finalized guidance document is publically available on the EPA website. Also, multiple presentations have been given by EPA on the risk assessment process at professional meetings both domestically and internationally. EPA has also provided webinars and presentations to multiple stakeholder group meetings to ensure that the public is aware of the new guidance.

Metrics: EPA will track the number of pesticides for which the acute and chronic laboratory-based studies of honey bee adults and larvae are submitted in support of the registration and registration review programs. EPA's goal is to ensure that such enhanced science-based information is available to support key regulatory outcomes in its registration review and registration programs for new and existing chemicals. Also, for those chemicals for which risk managers need additional refinements, the number of colony-level studies at either the semi-field or full-field scale serve as a measure of the Agency's ability to refine estimates of potential risk to colonies as a whole and to develop more effective label language to mitigate potential risks.

Partnerships

In developing the harmonized risk assessment guidance, EPA has utilized its long-standing partnership with Health Canada's Pest Management Regulatory Agency as well as the California Department of

Pesticide Regulation. EPA is also effectively partnering with other regulatory authorities through the OECD in conducting global reviews of pesticides following the harmonized risk assessment guidance which is closely aligned with that developed by the European Food Safety Authority.

- EPA will continue to make use of its Federal advisory committee, *i.e.*, the FIFRA Scientific Advisory Panel, to review risk assessment methods as they evolve.
- As risk assessment serves as a foundation for label language, EPA will continue to partner with another of its Federal advisory committees, *i.e.*, the Pesticide Program Dialogue Committee (PPDC), to receive input on regulatory policy.

Development and regulatory implementation of toxicity testing guidelines for honey bees

EPA is currently implementing the risk assessment process by identifying data gaps for new chemicals submitted for registration, as well as older chemicals undergoing Registration Review. Based on the most recent harmonized risk assessment process (USEPA 2014), EPA has begun to receive the suite of laboratory-based Tier 1 acute and chronic studies for individual adult and larval bees, and EPA is finalizing testing guidance to supersede the 2011 interim study guidance (USEPA 2011). EPA is starting to require new chemicals, as well as chemicals entering the Registration Review process, to have the recommended suite of exposure and effect data for bees. EPA recognizes that the new data requirements (*i.e.*, full suite of laboratory-based studies and depending on their outcome, semi- and full-field studies of whole colonies) imposed across the large number of chemicals that have completed the Registration Review process places a logistical challenge to registrants tasked with completing these studies as well as on contract labs which actually conduct these studies. Therefore, EPA is prioritizing for testing those pesticides with the highest likelihood of both exposure and toxicity. The likelihood of exposure is based on published articles (Mullin *et al*. 2010; Stoner and Eitzer 2013; APHIS 2012) reporting the frequency and magnitude of pesticides residues in honey bee colonies as well as the extent to which a compound may be applied to pollinator-attractive crops. The likelihood of toxicity is based on available acute toxicity data. Acutely toxic chemicals that have been frequently detected at elevated levels in pollen carried by forager bees would be assigned high priority for testing.

Well in advance of issuing the final harmonized guidance (USEPA 2014) on assessing the risks of pesticides to bees, EPA issued an interim guidance (USEPA 2011) in 2011 for risk assessors on exposure and effect data to consider when evaluating the potential for adverse effects to bees. These data reflect the understanding that the honey bee colony represents a complex superorganism consisting of bees in different stages of development and genders, each with different functions within the colony and with differing routes of exposure to pesticides. EPA has routinely required honey bee studies, including acute contact toxicity with individual adult bees (USEPA 2012a), toxicity of residues on foliage with individual adult bees (USEPA 2012b), and field pollinator studies with whole colonies (USEPA 2012c), all of which are specified in the Code of Federal Regulations (CFR 2014) as part of the suite of data used by EPA to characterize the potential exposure and effects of pesticides on non-target organisms. However, to more completely characterize potential exposure to and effects from pesticides, additional studies are now required to support the tiered risk assessment process for bees. Depending on the results of EPA's tiered pollinator risk assessment process, exposure studies including semi- and full-field studies examining

uptake and decline of residues in plants (particularly in nectar and pollen) may be required. Additional effect studies include some which already have guidelines developed by OECD, including the OECD acute adult oral toxicity (OECD Test Guideline 213; OECD 1998a) and the acute larval toxicity (OECD Test Guideline 237; OECD 1998b) required at Tier 1, as well as semi-field testing with whole colonies (OECD Guidance 75; OECD 2007) used to meet Tier 2 testing requirements. Studies for which formal guidelines/guidance documents do not yet exist include: chronic toxicity testing with adult bees and chronic toxicity testing with bee larvae. For those studies which do not have formal guidelines in the United States or Europe, EPA has been working with its regulatory counterparts in the OECD to develop standardized testing methods. Draft OECD guidance has been developed for a 21-day chronic toxicity test with honey bee larvae that extends through emergence of the adult bee (OECD 2014); this method is currently undergoing ring testing in Europe and the United States. While limited guidance exists for Tier 2 testing with whole colonies, higher-tier testing with whole colonies under full-field conditions will not likely have specific guidelines since these studies are intended to address specific uncertainties identified in lower tier tests.

EPA acknowledges the uncertainty regarding the extent to which honey bees may be a reasonable surrogate for wild insect pollinators and we are working with our regulatory counterparts through the OECD to ensure the development of standardized testing methods that will enable EPA to address this uncertainty. Protocols for acute toxicity tests with bumble bees (*Bombus terrestris*) have been developed and will be considered by OECD member countries as formal guidelines in 2015. Work is also underway through the International Commission on Plant-Pollinator Relationships (ICPPR) to develop additional tests with solitary bees and other insect pollinators; progress on these efforts was discussed at the 12th International Symposium of the ICPPR Bee Protection Group on Hazards of Pesticides to Bees, held in Ghent, Belgium in September 2014. EPA is also collaborating with private organizations (*e.g.*, the Pollinator Partnership, Project Apis m, the Honey Bee Health Coalition, *etc*.) as well as commodity groups (*e.g.*, Almond Board, Cotton Council, Minor Crop Food Alliance, Horticulture Institute, the American Seed Trade Association) and university researchers (*e.g.*, Minnesota State University, Michigan State University, University of Maryland, Ohio State University, *etc*.) in generating data and developing mitigation to address uncertainties related to potential exposure to and effects from pesticides.

Metrics: The extent to which new tools are being utilized for assessing exposure to (*e.g.*, residue studies in pollen/nectar) and effects from pesticides (*e.g.*, laboratory-based studies of individual bees and colony-level studies) will be evident in the number of studies submitted using newly developed standardized protocols (test guideline/guidance) and the extent to which these studies have been codified in the testing requirements identified in the Code of Federal Regulations and/or through the OECD. EPA will require additional pollinator data to inform the tiered risk assessment process for all new and existing pesticides where the potential for exposure to bees is possible (*e.g.*, outdoor use patterns). An additional metric will be the extent to which standardized protocols are developed and implemented for evaluating potential risks to non-*Apis* bees; these studies will be critical for determining the extent to which honey bees serve as reasonable surrogates for non-*Apis* bees.

Partnerships

EPA will continue to effectively partner with its regulatory counterparts through the OECD to ensure the development of effective studies for measuring exposure to and effects from pesticides. EPA is also collaborating with the ICPPR to prioritize the development of standardized exposure and toxicity tests with both honey bees and other pollinating insects for consideration by the OECD.

To ensure appropriate data are available and to reduce unnecessary animal testing, EPA will partner where appropriate with the regulated industry to explore strategies where bridging data may be generated for chemical classes and where limit testing may help reduce the extent to which testing may be required.

Chemical-specific Regulatory Decisions

Re-evaluating the neonicotinoids

The guidance for assessing the risk of pesticides to bees identifies specific protection goals and associated assessment endpoints that are used as metrics in evaluating the potential for adverse effects from exposure to a particular pesticide. Assessment endpoints for bees do not differ substantially from those for other taxa and include impaired growth, survival, and reproduction, since these are known to affect whole organisms as well as populations and communities. Effects to individual bees must be considered in the context of whether similar effects are observed at the whole colony level. With respect to neonicotinoid insecticides, there is a wide range of sensitivities exhibited by bees to these compounds. The cyano-substituted neonicotinoid (*i.e.*, acetamiprid) is classified as practically non-toxic to honey bees on an acute contact exposure basis; whereas, the nitroguanidine-substituted neonicotinoids (*i.e.*, imidacloprid, thiamethoxam, clothianidin and dinotefuran) are classified as very highly toxic to honey bees.

Consistent with the risk assessment process identified in the harmonized guidance document, EPA has been working with PMRA and CDPR to ensure that there are sufficient data to characterize exposure to and effects from these compounds both at the level of the individual bee and at the whole colony level. In addition to the laboratory-based studies on honey bee adults and larvae, EPA is reviewing multiple field-based studies at the whole colony level. The overall data will provide acute (median lethal doses for 50% of the bees tested; LD_{50}) and chronic toxicity estimates (hypothesis-based no-observed adverse effect levels; NOAEL) on individual bees. These data are compared to estimated exposure levels through contact or through ingestion of contaminated pollen and/or nectar to calculate screening level risk quotient (RQ) values. Risk estimates will be further refined through measured residue levels in pollen and nectar from specific crops selected based on their attractiveness to pollinators as well as crops having a large percentage of acreage treated. While the nitroguanidine neonicotinoids have multiple studies conducted at the semi- and full-field level, additional studies have been required by EPA to address specific uncertainties. Consistent with the process used for evaluating risk to other non-target organisms, the assessment of potential risk to bees will also include other lines of evidence beyond toxicity studies submitted by the regulated community in response to data requirements. These other lines of evidence include bee kill incident data and studies that are reported in the open literature and which meet the Agency standards for acceptability (USEPA 2014b). Information collected at the various tiers will be evaluated for their robustness in terms of whether effects observed under laboratory conditions are consistent with what is observed at the whole colony level under increasingly realistic use conditions and whether colony-level effects are transient and the cover appears to be able to recover.

The neonicotinoids will be re-evaluated according to the following schedule:

2015

- Initial set of risk assessments for imidacloprid issued for public comment
  - This initial pollinator risk assessment for imidacloprid will include an evaluation of available information including Tier 1 and Tier 2 pollinator toxicity studies, submitted pollen/nectar residue data from application-specific use patterns (*i.e.*, blueberry, canola, citrus, corn, cotton, cucurbit, potato, and strawberry), and additional open literature data. A bridging strategy will be used to determine the extent to which the existing data can be used to inform further evaluation of imidacloprid use patterns where the studies are not yet available.

2016

- Remainder of risk assessments for imidacloprid issued for public comment
- Initial set of risk assessments for clothianidin, dinotefuran, and thiamethoxam issued for public comment

2017

- Remainder of risk assessments issued for clothianidin, dinotefuran, and thiamethoxam

New Use Policy for Nitroguanidine Neonicotinoid Pesticides

At this time, EPA has a number of pending new use requests that involve the nitroguanidine neonicotinoid pesticide class. The pesticides thiamethoxam, clothianidin, imidacloprid, and dinotefuran are included in this class. Such registration requests have been submitted by each chemical's manufacturer and seek EPA's approval for label expansions to add a new crop site or application method to an existing label(s) for these pesticides. However, EPA is taking the position that without the studies identified above in the re-evaluation section, it would not be possible to satisfy the standard for new registration under FIFRA. This pesticide class is differentiated by its unique hazard database for bees, its disposition in the environment, and frequent association with adverse effects incidents, in the United States and elsewhere.

As part of EPA's ongoing effort to protect pollinators, the Agency has sent letters to registrants of neonicotinoid pesticides with outdoor uses informing them that EPA will likely not be in a position to approve most applications for new uses of these chemicals until new bee data have been submitted and pollinator risk assessments are complete. The letters reiterate that the EPA has required new bee safety studies for its ongoing registration review process for the neonicotinoid pesticides, and that the Agency must complete its new pollinator risk assessments, which are based, in part, on the new data, before it will likely be able to make regulatory decisions on imidacloprid, clothianidin, thiamethoxam, and dinotefuran that would expand the current uses of these pesticides.

Metrics: This initiative is complementary to the re-evaluation initiative for the neonicotinoid pesticide class. The approach and appropriate metric for this outcome relates to EPA's capacity to observe the schedules and objectives outlined above for re-evaluation.

Partnerships

EPA and Health Canada PMRA are designing a similar and consistent position on this issue. The approach is being taken as a commitment under the Regulatory Cooperation Council, a high level bi-lateral partnership with the Canadian government. Other key stakeholders and partners in this initiative are the USDA and state lead agencies.

Assessing other pesticides for their potential impacts on pollinators

The scientific issues concerning the role of pesticides in pollinator declines are complex, and EPA is determined to ensure that its regulatory positions are based on a strong foundation of science. Building upon the multi-year effort described above that has enabled the Agency to develop and adopt a scientifically sound framework for evaluating the potential effects of pesticides on pollinators in collaboration with other regulatory authorities, EPA is now poised to incorporate this new science into our regulatory decision-making process for pesticides. Moving forward, EPA will utilize these scientific approaches in evaluating all applications for new active ingredients as well as conducting periodic reviews of active ingredients as part of the registration review program. During 2015, EPA currently anticipates releasing the registration review risk assessments identified in **Table A1** for public comment:

Table A1. Registration review preliminary risk assessments open for public comments during 2015.

Aldicarb	Flurprimidol	Pronamide (Propyzamide)
Atrazine	Foramsulfuron	Propazine
Azoxystrobin	Fosamine ammonium	Propoxur
Bifenazate	Glyphosate	Prosulfuron
Boric Acid	Halosulfuron	Rimsulfuron
Carfentrazone-ethyl	Hexazinone	Simazine
Chlorimuron	Hymexazol	Sodium acifluorfen
Chlorpyrifos	Imazasulfuron	Spinetoram
Chlorpyrifos-methyl	Imidacloprid	Spinosad
Chlorsulfuron	Iodosulfuron-methyl-sodium	Streptomycin
Copper	Linuron	Sulfometuron-methyl
Cyclanilide	Malathion	Sulfosulfuron
Diazinon	Mesosulfuron-methyl	Tebufenozide
Dipropyl isocinchomeronate	Methoxyfenozide	Thidiazuron
Diquat Dibromide	Metsulfuron	Thifensulfuron
Ethephon	Nicosulfuron	Triasulfuron
Ethalfluralin	Orthosulfamuron	Tribenuron methyl
Ethofenprox	Oxamyl	Trifloxysulfuron-sodium
Flazasulfuron	Primisulfuron-methyl	Triflusulfuron-methyl
Flufenacet		

Following public comment on these risk assessments, EPA will revise these assessments (as necessary) and subsequently open public comment periods on proposed mitigation decisions.

Also, new proposed active ingredient decisions during FY15 will be released for public comment and will be available at: http://iaspub.epa.gov/apex/pesticides/f?p=CHEMICALSEARCH:30.

Metrics: EPA will provide annual updates on the number of pesticide for which the new framework to assessing risks to bees has been incorporated.

Partnerships

EPA is continuing to partner with its other regulatory partners in North America through NAFTA as well as more globally through the NAFTA and global review process. EPA is also collaborating with private organizations (*e.g.*, Pollinator Partnership, Horticulture Research Institute *etc.*) and Land Grant Universities (*e.g.*, University of Minnesota, Ohio State University) to develop exposure and effects data on neonicotinoids that can be used to inform regulatory decisions.

Risk Management Measures

Pollinator protection plans

EPA is continuing its efforts to improve the clarity and effectiveness of labels. EPA recognizes that localized and more customized mitigation measures may be achieved through pollinator protection plans developed by states and tribes. Initially these efforts are directed at managed pollinators with the expectation that in being protective for managed bees, these plans will afford protection to other pollinators. These plans help to address concerns raised through the EPA's Advisory Committee (PPDC) and by other groups of stakeholders regarding the need for improved communication between growers/applicators and beekeepers with respect to pesticide applications. Therefore, a key element of the plans is to ensure appropriate stakeholder involvement and consensus building in the development of such plans. Plans would articulate means through which grower/applicators/beekeepers can quickly and effectively communicate pesticide applications in close proximity to managed colonies.

To establish the framework for these plans, EPA is working with state and tribal agencies through our existing partnerships with the State FIFRA Issues, Research, and Evaluation Group (SFIREG) and the Tribal Pesticide Program Council (TPPC). Several states, including California,[11,12] Colorado,[13] Florida,[14] Mississippi,[15] and North Dakota,[16] have already developed plans. These plans, developed in cooperation with a broad spectrum of agricultural interests (including beekeepers), provide a foundation upon which EPA has been collaborating with its state and tribal regulatory partners to identify the necessary elements

11. California Department of Food and Agriculture. 2014. Bee and Beehive Information. http://www.cdfa.ca.gov/plant/PE/interiorexclusion/bees.html
12. California Food and Agricultural Code Section 29040-29056 http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fac&group=29001-30000&file=29040-29056
13. Colorado Department of Agriculture. http://www.cepep.colostate.edu/Pollinator%20Protection/index.html
14. Florida Department of Agriculture and Consumer Services. 2014. Florida Bee Protection. http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Environmental-Services/Consumer-Resources/Florida-Bee-Protection
15. Mississippi Honeybee Stewardship Program. 2014 http://www.msfb.org/public_policy/Resource%20pdfs/Bee%20Brochure.pdf
16. North Dakota Department of Agriculture. 2014. North Dakota Pollinator Plant. A North Dakota Department of Agriculture Publication. http://www.nd.gov/ndda/files/resource/NorthDakotaPollinatorPlan2014.pdf

that the Agency will use to evaluate and approve managed pollinator protection plans developed by states/tribes.

Restricting the use of pesticides that are acutely toxic to bees

In parallel with working with our state and tribal partnerships in the development of locally-based pollinator protection plans, EPA has also been working to clarify and improve label language and restrictions for pesticides that are acutely toxic to bees. In 2013, EPA notified registrants of four neonicotinoid insecticides and several other insecticides of the Agency's decision to reduce potential acute exposure to these pesticides (USEPA 2013). The Agency is considering additional restrictions on a broader range of pesticide products to further reduce the likelihood of acute exposure and mortality to bees from the foliar application of acutely toxic compounds. Contracted pollination services result in a heightened risk potential where a large number of honey bee colonies are intentionally placed at a use site, and application of a toxic pesticide in this scenario is nearly certain to result in adverse effects to pollinators. Although the likely outcomes are counter-productive for both the beekeeper (loss of honey bee stock) and the grower (diminished pollination services), beekeepers and growers seem not to have consistently found ways to avoid such outcomes.[17] Consequently, EPA believes that strong regulatory measures should be in place on the contracted service scenario to mitigate these potential problems. Therefore, EPA will soon propose to prohibit the foliar application of acutely toxic products during bloom for sites with bees on-site under contract, unless the application is made in accordance with a government-declared public health response. This proposal will be released for public comment. For colonies not contracted to provide pollination services, EPA believes that state/tribal managed pollinator protection plans could provide effective means of mitigating potential acute exposures to foliarly applied pesticides at bloom as these plans serve as a means of accommodating both grower and beekeepers needs through cooperative agreements at the local level.

Metrics: As the intent of improved label language and the state/tribe managed pollinator protection plans is to develop mitigation measures to reduce the likelihood of acute pesticide exposure to managed bees, a reasonable metric of success is the number of labels that contain pollinator-specific mitigation measures. These measures would include advisory hazard statements (*e.g.*, pollinator protection boxes) as well as enforceable language in the directions for use sections of labels. Further measures of success will be in the number of states and tribes developing and adopting managed pollinator protection plans. One of the key elements of these plans is the need for each plan to identify metrics for measuring their effectiveness in reducing honey bee losses. Since each plan is intended to be contoured to meet the needs of the state or tribe, these metrics may differ across states / Indian country. This proposed change to how EPA regulates pesticides could impact as many as 50 pesticide active ingredients.

17. The Office of Pesticide Programs' Ecological Incident Information System and the Incident Data System contains multiple incident reports where honey bee colonies have were affected while providing pollination services (*e.g.,* incidents I026242-001; I026240-001; I026232-001; I026284-001; I027404).

Partnerships

EPA has made considerable use of its Federal advisory committee, *i.e.*, PPDC, to gauge stakeholder concerns regarding pesticide label language and the need for improved communication and cooperation between stakeholders.

In the development of the state managed pollinator plans EPA has reached out to the co-regulators through the State FIFRA Issues Research and Evaluation Group (SFIREG18), the Association of American Pesticide Control Officials (AAPCO), and the Tribal Pesticide Program Council (TPPC).

Reducing exposures during the planting of pesticide-treated seed

In 2008, an incident occurred in Germany where a large number of bee colonies were affected by drift of dust generated during the planting of maize seed treated with the neonicotinoid insecticide clothianidin (Pistorius *et al.* 2009). Although investigations by German authorities revealed that the seed had not been properly treated with sticking agents, the incident indicated that under certain environmental conditions, sufficient dust may be generated during seeding and subsequently drift to result in effects on bee colonies (Forster 2009). Research conducted by Krupke *et al.* (2012) and Tapparo *et al.* (2013) further documented the phenomenon of fugitive dust and its ability to move to areas where bees may be foraging. In 2012, numerous bee kill incidents were reported to Health Canada's PMRA; these incidents were investigated by PMRA and determined to result from drift of contaminated dust (Health Canada 2013). Although similar numbers of incidents have not been reported in the United States, in 2013, EPA convened a Pollinator Summit19 as part of the Agency's ongoing collaboration with beekeepers, growers, pesticide manufacturers and Federal and state agencies to manage risks to bees. The summit was intended to provide a forum for stakeholders to network and learn about current research, new technologies, best practices, and other stewardship activities to protect bees from unintended pesticide exposure, especially dust in agricultural planting operations in which pesticide-coated seeds are used. As part of that summit, stakeholders announced their guidance on seed treatment stewardship (ASTA 2013) and efforts underway to develop fluency agents that could reduce the extent to which dust is generated/released during the planting of treated seed. Also, the Pollinator Partnership sponsored the Corn Dust Research Consortium (Pollinator Partnership 2013) to fund research to reduce honey bee exposure to fugitive dust and to document the extent to which fluency agents are effective at reducing exposure.

In addition, industry has recognized the need to minimize potential exposures that may result when pesticide-treated seed is planted. As described above, under certain conditions, the seed coating can become abraded during planting, resulting in a release of pesticide residues. Since the release of the original guidance on seed treatment stewardship, EPA has been working with the American Seed Trade Association, equipment manufacturers, and pesticide registrants to explore additional mitigation measures, including broader adoption of best management practices, to further reduce the emissions of these pesticide residues during the planting process. These efforts have included the development of alternative lubricants used in pneumatic planters to reduce the extent of dust generated through the

18. The State FIFRA Issues Research and Evaluation Group (SFIREG) is comprised of state, Federal, tribal and Association representatives, and meets periodically to identify and discuss issues related to pesticides that affect the states/tribes.

19. USEPA. 2013. Pollinator Summit and Webinar – March 5, 2013. http://www.epa.gov/oppfead1/cb/csb_page/updates/2013/pollin-summit.html

abrasion of treated seed during planting (fugitive dust) as well as the development of more effective seed coatings to enhance the extent to which pesticides adhere to seeds. EPA has been working with the Pollinator Partnership's Corn Dust Research Consortium to examine the extent to which alternative lubricates reduce fugitive dust and has engaged the agricultural industry (agrichemical companies, planting equipment manufacturers, seed treaters *etc*.) to work cooperatively to develop measures to further mitigate exposure to pesticides during the planting of treated seed.

Metrics: Updated Seed Treatment Stewardship Guide released prior to the 2015 growing season.

Partnerships

- American Seed Trade Association (ASTA)
- Pollinator Partnership
- Corn Dust Research Consortium

Development of BMPs (educational and training materials for pesticide applicators, growers, and beekeepers based on collaboration with grower associations and SLAs)

Since pollinator declines in North America were highlighted by the National Research Council publication (NRC 2007) and the advent of Colony Collapse Disorder (vanEngelsdorp et al. 2009), EPA has been working with other Federal agencies, academia, non-governmental organizations and the regulated industry to understand and mitigate the potential role that pesticides may be playing in these declines. As the science has continued to advance and inform Agency efforts to develop appropriate label language to mitigate the likelihood of adverse effects on non-target organisms (e.g., pollinators) from exposure to pesticides, EPA has reached out to examine mitigation measures that extend beyond the label and include best management practices and integrated pest management programs. EPA serves in an ex officio capacity on advisory committees for the Honey Bee Health Coalition as well as the Pollinator Partnerships' Corn Dust Research Consortium to provide input on efforts to mitigate exposure to pesticides and to effectively increase stakeholder awareness of BMPs/IPM programs.

EPA has provided input on efforts by consortia to develop best management practices for the use of their products, *e.g.*, the Guide to Seed Treatment Stewardship (ASTA 2013).

Metrics: Development of BMP programs for pollinators related to crop pest control and management; development of a scope of work for research directed at understanding the communication and adoption of farm management techniques and BMPs; EPA is working with USDA to determine the extent to which BMPs are adopted/implemented by growers/beekeepers.

Partnerships

EPA is working with organizations such as the Pollinator Partnership, the Honey Bee Health Coalition, commodity groups (*e.g.*, Cotton Council, Minor Crop Alliance, Almond Board), and the agrochemical industry (*e.g.*, CropLife America, Responsible Industry for a Sustainable Environment) as well as individual chemical registrants to identify and promote BMPs which extend beyond the Federal label and can further reduce exposure to and adverse effects from pesticides.

EPA is continuing to partner with other Federal agencies to determine the effectiveness of BMPs and to encourage the dissemination of information through university extension and stewardship efforts of the regulated community. EPA has collaborated with USDA and nongovernment organizations to evaluate the extent to which BMPs are being implemented.

EPA is working with its regulatory counterparts through the OECD to identify measures that have proven effective for other member countries to mitigate exposure to and effects from pesticides.

Expedited Review of New Varroa Mite Control Products

Owing to the fact that many researchers believe that honeybee health has been significantly compromised by hive pests (USDA 2013), EPA is also committed to expediting its evaluation for any new pesticide products that may be used to help manage colony pests. Researchers have identified the Varroa mite (*Varroa destructor*) in particular as a significant parasite and challenge to maintaining healthy honeybee colonies (USDA 2013). In 2014, EPA approved all of the requested emergency exemption applications it received from the state agencies, for a product that is designed to help manage the mite and to increase the available options for combating resistance development in mite populations. In 2015, EPA registered a Varroa control product containing the active ingredient oxalic acid; this product was already registered in Canada. EPA is working with the regulated community, other Federal agencies, as well as the private sector to identify products that may be effective in-hive pest control measures. EPA is committed to expedite its review of mite control measure as they are developed.

Metrics: EPA will report the time required to evaluate proposed control measures as a means of gauging the Agency's progress. An increased number of Varroacide products available for use will also serve as a measure of the effectiveness of this effort. An increased variety of chemical control measures must however be integrated with other non-chemical control methods to ensure that these collective efforts reduce the extent to which Varroa resistance continues to develop.

Partnerships

EPA is working with USDA to evaluate the efficacy of Varroa control measures, and USDA has been willing to serve as the registrant of record in support of these products. The regulated community has also increased efforts to help identify candidate Varroa mite controls; in some cases, while the company may not wish to pursue the registration of these compounds, the companies have offered to provide these chemicals to those wishing to support the use as a Varroacide. EPA has also been engaged in discus-

sions with stakeholder coalitions (*e.g.*, the Honey Bee Health Coalition) to identify potential chemical candidates and develop best management practices as well as integrated pest management programs to offset resistance development.

Encourage and Enhance Pollinator Protection and Habitat Activities

In an effort to protect and expand pollinator communities at EPA-owned sites, EPA will first conduct pollinator assessments in FY15 to establish a baseline inventory of pollinator communities. In addition, existing landscaping contracts will be reviewed to determine targets of opportunity for performing those services in a more pollinator-friendly manner. Specifically, EPA will look to extract selected parts of GSA's draft Statement of Work on pollinator-friendly landscaping activities and integrate the information into EPA's landscaping contracts, as appropriate. Once the baseline inventory of pollinators is established, an action plan will be developed in FY16 to expand and strengthen pollinator communities at EPA-owned properties.

Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. The scale of green infrastructure ranges from urban installations to large tracts of undeveloped natural lands and includes rain gardens, green roofs, urban trees, wetlands, protected riparian areas, and forests—all of which can provide important habitat for pollinators.

Metrics: The EPA will have completed pollinator site assessments at its owned laboratories nationwide, including an inventory of flora types, a listing of observed pollinator types, and landscaping practices, resulting in the establishment of a comprehensive pollinator baseline. Additionally, the EPA will review existing landscaping contracts at our owned laboratories to look for opportunities to institute more pollinator friendly landscaping activities. The pollinator baseline will be used in tandem with master plans to drive future landscaping decisions that will further protect and expand pollinator communities at our owned laboratories. These activities will culminate in establishing targets of opportunity in FY 2016 and the out-years at EPA-owned laboratories that protect and expand pollinator communities in accordance with the President's June 20, 2014, Executive Memorandum on Pollinators.

EPA will also update its green infrastructure website to provide improved resources for pollinator protection, including links to resources for pollinator-friendly plants and the benefits of pollinator habitat conservation.

Partnerships

EPA is working with the Green Infrastructure Collaborative, which includes seven Federal agencies (EPA lead) and approximately 25 external stakeholder groups to help communities more easily implement green infrastructure. Green infrastructure options for the creation of pollinator habitat range from urban installations to large tracts of undeveloped natural lands, and include rain gardens, green roofs, urban trees, wetlands, protected riparian area, and forests.

Pollinator friendly native vegetation at Superfund cleanup sites

EPA works with states, communities, and responsible parties to assess and clean up contaminated sites. While EPA does not own Superfund sites, EPA will encourage the consideration of pollinator habitat as a part of the site remedy (e.g., landfill caps) and in site reuse, where appropriate. In 2009,

EPA issued Principles for Greener Cleanups that are intended to improve the decision making process for cleanup activities in a way that ensures the protection of human health and the environment and reduces environmental impacts on communities. These green remediation principles include consideration of five elements: energy use, air pollutant emissions, water use, materials management, and land management and ecosystems protection. Pollinator friendly native plantings can be incorporated as part of a site remedy such as in landfill coverings or the creation of pollinator habitat as part of site reuse to achieve these goals. An example of the creation of pollinator habitat to support site reuse is the Chemical Commodities, Incorporated Superfund site in Olathe, Kansas. This pollinator habitat was created by a responsible party following requests from the local community for greenspace. In response to this request, a plan was developed with input and assistance from the community, the Pollinator Partnership, Monarch Watch, and other organizations. This plan provided habitats for various pollinators as well as a walking trail and educational opportunities for visitors. EPA will expand opportunities for pollinator-friendly plantings in green remediation and green infrastructure activities, commencing with a renewed emphasis on pollinator-friendly planting opportunities in green remediation reference materials and policies.

Metrics: Acres of pollinator friendly habitat at Superfund remedial sites.

Evaluation and Mitigation of Pesticide Impacts on Monarch Butterflies

EPA is concerned about the dwindling population of monarch butterflies and intends to take a leading role to identify efforts that will protect the monarch by conserving milkweed, the plant upon which the monarch larvae depends. In particular, EPA has determined that the protection of milkweed is consistent with its responsibilities under FIFRA and that it will take actions, as part of its regulatory decisions and voluntary programs, to establish practices and requirements to protect critical milkweed resources. EPA will soon issue for public comment a draft framework outlining an approach it will take to protect monarch butterflies. Specifically, EPA has identified the types of information that may be important to identify actions that balance monarch protection and weed management. The approach and objectives outlined here will support and complement the actions and objectives of the Canada/Mexico/US Trilateral Committee. EPA is continuing to work with multiple Federal agencies (*e.g.*, USFS, FWS, USGS) to understand the habitat needs of the monarch relative to the insect's migratory patterns.

The efforts to conserve the milkweed plant from effects of herbicides may encompass a number of pesticidal compounds. Therefore, in contrast to a typical quantitative single-chemical analysis approach, EPA will rely upon both qualitative and quantitative analyses to weigh risks and benefits and identify actions to conserve the milkweed plant where it is important to monarch butterflies. EPA anticipates that a number of actions could be taken to protect monarch butterflies, ranging from changes to pesticide label instructions to spray drift buffers from critical milkweed resources to best management practices. These management practices may mirror and be complementary of other conservation efforts aimed at creating, conserving, or restoring wildlife habitat.

Metrics: Issuance for public comment of a draft framework outlining an approach to protect monarch butterflies that balances monarch protection and weed management by summer 2015.

Partnerships

Collaboration between partners of different sectors to adopt management practices in a coordinated manner not only at the field level, but at the landscape level and area-wide level as well, will be important for success. The National Fish and Wildlife Foundation Monarch Conservation Fund provides an example of a vehicle for Federal, state, and private stakeholders to work together to preserve and restore monarch habitat and to fund further research and protection measures for the monarch.

Appendix B. U.S. Department of Agriculture Pollinator Protection Plan

The U.S. Department Agriculture (USDA) strives to expand economic opportunity through innovation, helping rural America to thrive; to promote agriculture production sustainability that better nourishes Americans while also helping feed others throughout the world; and to preserve and conserve our Nation's natural resources through restored forests, improved watersheds, and healthy private working lands. The Department provides leadership based on sound public policy, the best available science, and efficient management.

Working with its partner agencies, the USDA research, extension, and land management activities described below will help to meet the three goals of the pollinator initiative:

- Goal 1: Reduction in overwintering losses
- Goal 2: Increasing monarch butterfly numbers
- Goal 3: Habitat restoration

Pollinators are crucial members of ecosystems, from farmland to wilderness. Of the 240,000 flowering plant species, seventy-five percent rely on pollinators to reproduce. European honey bees (*Apis mellifera*) are particularly important pollinators for agriculture as they are responsible for $15 billion in increased crop value each year. Declines in honey bee colonies and the populations of some native pollinators have highlighted the need for research to understand the multiple interacting factors that affect pollinator health, including, but not limited to: habitat loss, pesticides, parasites, and pathogens.

USDA agencies are providing important leadership to ensure protections for pollinators either through research, education, and outreach, or providing technical assistance to land owners. USDA has a rich history in partnering with other Federal agencies and numerous stakeholders, recognizing that the collaborative effort is much more effective in achieving success.

The USDA Office of Pest Management Policy (OPMP) has been instrumental in working with USDA agencies and the EPA to focus attention on each of the stressors implicated in the decline in honey bee health. Recognizing the value of all farming systems and the importance of pest management tools in agricultural production, OPMP works with all stakeholders to ensure that these tools are available and used in a manner as directed by the label. Pollinators are critical to agricultural production, and pollination service contracts are critical to the economic viability of commercial beekeepers. The USDA is playing an important role in improving practices and communications between stakeholders to mitigate potential harms from pest management practices.The USDA is co-leading the creation of the Pollinator Research Action Plan and public education plans, the latter having an emphasis on steps that individuals and businesses can take to help address pollinator health.

Supporting Pollinators through Department Land and Facilities

Secretary Vilsack started the People's Garden Initiative with one garden at USDA Headquarters in 2009. Since then, thousands of USDA employees and partners have volunteered their time to expand the Initiative to over 2,116 gardens in all 50 States, four U.S. territories, and twelve foreign countries. In order to be named a People's Garden, a site must meet three criteria: provide a benefit to the community, be a collaborative effort, and incorporate sustainable practices. People's Gardens are located on Federally owned or leased property, at schools, faith-based centers. and other places within the community. Each of these gardens is built by the local community for a specific purpose, such as wildlife habitat, school-yard learning, food production, job training, erosion control, gathering space, beautification, and so forth.

Thanks to USDA's education and outreach efforts, all registered People's Gardens incorporate some type of pollinator-friendly land management practice. This was accomplished by engaging The People's Garden Initiative Partnership Forum, which represents a broad cross section of national organizations that support and promote gardening, community gardens, fresh and local produce, and child nutrition. USDA works to enlist their help and vision in promoting the concept of The People's Garden Initiative out into the communities where they work. Together they share knowledge and collaborate on efforts to help increase awareness and tackle challenges facing pollinators. The People's Garden will continue to distribute seed packets and promote USDA agencies, other Federal departments, and partners' research and publications, including how-to videos and webinars about gardening for pollinators and keeping bees online.[20]

The grounds of the USDA headquarters on the National Mall are being thoughtfully landscaped and redesigned as an "outdoor museum" of green infrastructure and sustainable gardening practices. The "People's Garden," as the project is known, is an addition to the Mall, the nation's most prominent green space. The plan for the expanded People's Garden was recently approved by the National Capital Planning Commission and, if funded, will be implemented over the next 15 years.

Currently, several pollinator gardens are planted in the existing People's Garden to support the two beehives on the roof of the Jamie L. Whitten Building. USDA set up the People's Garden Apiary "bee cam"[21] at the headquarters as an additional effort to increase public awareness about the reduction of bee populations, and to inform Americans about actions they can take to support the recovery of pollinator populations. The bee cam broadcasts continuous honey bee hive activity live over the Internet, and Twitter chats are hosted with the ARS beekeepers seasonally.

A 'Plant A Window Box for Pollinators' exhibit will be installed in the People's Garden at headquarters Spring 2015 to highlight the small steps each of us can take to increase forage, a food supply of nectar and pollen from blooming plants within flight range—for bees. The forage sources for honey bees are an important consideration for beekeepers.

The USDA is also committed to incorporating the guidance on pollinator-friendly practices developed by the Council on Environmental Quality and the General Services Administration.

20. http://www.usda.gov/wps/portal/usda/usdahome?navid=PEOPLES_GARDEN
21. www.usda.gov/beewatch

Metrics: USDA will document the number of Federally-owned or leased facilities where pollinator gardens have been established.

Partnerships

Since 2009, USDA agencies, other Federal departments, and partners have participated in USDA's Pollinator Festival on the National Mall during Pollinator Week in June. During this annual outreach event, youth and adults learn how to support and protect pollinators of all kinds. Visitors hear from experts, watch live bees, participate in pollinator-friendly activities, and see what efforts, big and small, can be taken in their own backyard to help pollinators.

The Department will continue to build local partnerships to develop additional People's Gardens, based on the needs of communities across the country.

Enhanced Research Strategy to Target Address Multiple Factors Contributing to Honey Bee and wild Pollinator Losses

USDA supports pollinator research within the Agricultural Research Service (ARS), National Institute of Food and Agriculture (NIFA), Economic Research Service (ERS), National Agricultural Statistics Service (NASS), U.S. Forest Service (USFS), Natural Resources Conservation Service (NRCS), and the Animal and Plant Health Inspection Service (APHIS). The Department also supports pollinator research with Federal and non-Federal partners. USDA pollinator research spans the breadth of issues thought to affect pollinator health, while also contributing to knowledge of basic pollinator genetics and biology for breeding purposes.

Colony Collapse Disorder and highly visible losses of wild pollinators, as well as the loss of monarch butterflies, brought pollinator health to the forefront, but many factors play a role in pollinator declines. Habitat loss, pests, pathogens, nutritional deficiencies, and pesticides influence pollinator health. It is due to the complex mix of factors that we are emphasizing longitudinal studies and meta-analyses in USDA research priorities. Managing for these factors requires natural and social science data collection to address knowledge gaps, development of native plants for restoration, improved understanding and use of genetic resources, and creation of decision support tools for land managers and beekeepers. USDA's ARS operates four honey bee and non-Apis bee research labs across the United States, and its NIFA funds a variety of pollinator research activities through grants programs.

APHIS monitors pests, diseases and parasites in honey bee colonies, coordinating a national survey of honey bee pests and diseases annually since 2009. This survey will continue in 2015. Pollen samples are also collected from hives for analysis of pesticide exposure within the hive. This nation-wide survey provides essential disease and pest base line information to help place current and future epidemiological studies in context. Coordination of this survey is in collaboration with the USDA ARS Bee Research Lab (BRL) and the University of Maryland (UMD).

Beyond the national honey bee pests and diseases survey, APHIS is partnering with ARS and state cooperators to survey for viruses and other diseases, and exotic pests. APHIS is also collaborating with

ARS to survey for bumblebee diseases in order to determine if there are risks to moving them across the United States. APHIS and collaborators are working toward integrating these disease surveys with management practices.

APHIS has also received $1 million annually in appropriations since 2013 to work with other Federal and state agencies and the public to: manage, suppress, and eradicate Varroa mites, small hive beetles, and other pests and diseases; support research to breed pest resistant bees and queens; and support research to monitor for Varroa resistance to pesticides. Interactions between Varroa and viruses are also being investigated. APHIS is supporting the development of early detection methods for existing and emerging parasites and developing tools to rapidly identify honey bee pests and diseases and influences on honey bee health. The development of diagnostic tools for exotic bees includes a collaboration with ARS to develop methods for the rapid detection of viruses, and with other university scientists in the development of molecular based rapid screening tools of exotic honey bee pest and diseases including viruses, Africanized bees, Asian honey bees, and the cape bee.

The USFS, NRCS, and FSA conduct and fund monitoring and research to improve pollinator habitat. Additionally, the NASS surveys beekeepers to assess honey production, and the ERS analyzes data to quantify the social and economic impacts of pollinator health. Among many successes, USDA's bee labs have identified traits leading to Varroa mite-resistance and used this genetic information to breed mite-resistant honey bee stock, as well as developed easy to grow, pollinator-friendly pasture mixes that are compatible with almond production. USDA is committed to a research agenda that builds toward solutions for beekeepers and land managers and informs policy related to pollinator health. Moving forward, USDA's research agencies, in coordination with Federal partners, will focus on documenting current trends, understanding how factors affecting pollinator health interact with each other, and assessing which management techniques will have the biggest impact on promoting pollinator health.

Detailed information on this research portfolio and future research is included in the Pollinator Research Action Plan (PRAP 2015). The action plan assesses the current state of pollinator research across Federal Agencies, identifies knowledge gaps, and outlines priority actions for research. There is an emphasis on the need for research on interactions between multiple stressors affecting pollinator health, basic biology, and ecology for understudied wild pollinators, cost-effective restoration of pollinator habitat, and curation of specimens and genetic material.

Metrics: USDA's research and service agencies will prioritize research to increase understanding of pollinator health and development of management strategies to reverse losses in managed and wild pollinators. Our scientists will work closely with stakeholders to incorporate their needs in project work plans. Findings will be published rapidly, information will be shared through our outreach and extension partners, and we will develop new patents for emerging technologies using our Office of Technology Transfer. USDA will document the number of research findings that have been published as well as the number of new patents that have been granted.

APHIS collaborated with ARS and EPA to register oxalic acid as pesticide active ingredient to manage Varroa mites on honey bees in spring 2015.

Partnerships

USDA is engaged in a wide variety of partnerships in its research on pollinator health. Intramural researchers partner with beekeepers to ensure that technology and practices developed in the laboratory are applicable and transferrable to practitioners, as well as with commodity groups and private industry to carry out research that is relevant to the private sector. Through its extramural granting capacity, USDA partners with universities to address high priority research questions in pollinator health across the country, capitalizing on the diversity of expertise and knowledge of local and regional issues across U.S. universities. Additionally, the long-standing partnership with U.S. land-grant institutions through the Cooperative Extension System is a critical component of nation-wide information and technology transfer to stakeholders in pollinator health. USDA also provides funding and technical expertise to a variety of pollinator non-governmental organizations that coordinate research and produce outreach and educational materials for beekeepers and land managers (*e.g.* the Bee Informed Partnership, the Pollinator Partnership, 4-H, extension efforts supported through the Smith-Lever Act section 3(d), and Agriculture in the Classroom).

Ensuring continuing and sufficient supplies of honey bees to pollinate crops is critical to America's fruit, nut, and vegetable producers, and the USDA OPMP is engaged in numerous public/private partnerships in addressing this goal. OPMP staff are serving on the boards and/or task forces of several stakeholder groups (American Association of Pest Control Officials (AAPCO), Honey Bee Health Coalition (HBHC), Pollinator Partnership (P2), Machine Manufacturers Association, and EPA-Office of Pesticide Programs) and have been involved in the conduct of three national Summits since 2012 addressing honey bee health, Varroa mite management, and honey bee forage and nutrition. Efforts being addressed through these collaborations include: development of State Managed-Pollinator Plans for all 50 States, Varroa mite management, mitigating potential risk associated with agricultural use of pesticides, improved quality of and access to forage plantings, improved stakeholder communications, improved pesticide incidence reporting, addressing concerns with pesticide abrasion and drift associated with pesticide treated corn seed with the Machine Manufacturers Association and EPA-OPP, and with providing input to EPA on pollinator protection as affected by pesticide labeling through the EPA Pesticide Program Dialogue Committee, Pollinator Labeling Work Group.

Milestones

The collaboration with AAPCO and EPA will result in state-level managed pollinator plans. Currently, five states are implementing plans and twenty states are drafting plans.

- USDA is also working with the HBHC on: development of a best management practices guide for management of Varroa mite, expected to be completed in 2015; evaluating new Varroacides during 2015; expediting registration of Varroacides identified as efficacious (in partnership with EPA); and development of a "Quick Guide to Reporting a Pesticide-Related Bee Kill Incident" to be completed in 2015.
- USDA worked with P2 in the production of a report on best management practices to protect pollinators in four cropping systems: almond, apple, melon, and corn, entitled, "Securing

Pollinator Health and Crop Protection: Communication and Adoption of Farm Management Techniques in Four Crops"

- On Feb 17, 2015, John Deere Parts Marketing announced to its U.S. dealers the availability of Bayer Fluency Agent designed to reduce the amount of the total dust and active ingredient in vacuum system exhaust when planting neonicotinoid insecticide-treated corn seed.

Supporting Pollinators through Conservation Programs and Technical Assistance

The USDA is working as a team to utilize conservation programs under multiple agencies and across Departments to help pollinators thrive. Combined, these efforts will help increase quality pollinator habitat across the United States and contribute substantially to crop pollination on farms.

USDA is working with multiple stakeholders, including the Pollinator Partnership, American Beekeeping Federation, and the American Honey Producers Association, to leverage partnerships to make the most beneficial impact for pollinators. USDA will be executing memoranda of understanding, where appropriate, and providing webinars to increase understanding of our programs and how they benefit pollinators. One such webinar was hosted by the USDA FSA where a research ecologist with the USGS presented results from a cooperative USDA/USGS study investigating the use of USDA conservation lands by honeybees. The results from this study will be used to monitor the success of USDA initiatives to improve habitat to enhance honey bee nutrition and health.

The USDA FSA plays a critical role in the delivery of programs that protect important habitat for a variety of pollinator species and provide a valuable safety net for beekeepers who experience losses due to natural disasters. The Emergency Assistance for Livestock, Honeybees and Farm-Raised Fish Program (ELAP) provides assistance for the loss of honeybee colonies, in excess of normal mortality, due to Colony Collapse Disorder or other natural causes. For 2012 and 2013 ELAP, over 1,500 applications totaling over $36 million in honeybee losses were received. Due to limited funds, approximately $28 million in payments are being issued related to these claims. These funds are helping beekeepers rebuild their hives and remain solvent.

With over 24 million acres enrolled nationwide, the FSA-administered Conservation Reserve Program (CRP) helps farmers voluntarily remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. The long-term goal of the program is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat. For more than 25 years, CRP has provided millions of acres of habitat for honey bees and other pollinators. With abundant acres of legume-rich forage or diverse wildflower plantings, CRP lands offer hives (bee colonies) large-scale sources of pollen and nectar that help keep pollinators and their habitat healthy. In addition, honey bee hives are consistent with the conservation objectives of CRP, and may be located directly on CRP land.

FSA is evaluating land already enrolled in CRP to see where pollinator friendly habitat exists; investing in increased incentives to improve habitat for pollinators; and working collaboratively with the USDA Natural Resources Conservation Service (NRCS) to allow use of more affordable pollinator friendly seed

mixes on CRP land. Notably, in 2014, FSA announced a new $8 million honey bee incentive to enhance CRP covers to make them more pollinator friendly. CRP participants in five Midwestern states (Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin), which are home to more than 65 percent of honeybee hives during the summer months, are being offered incentives to establish pollinator habitat on their CRP lands as a mid-contract management activity. As this work often involves significant land preparation, installation may take two seasons. During Fiscal Year 2015, outreach including targeted materials to eligible CRP participants in the five-state area will be completed to boost practice installation in FY 2015 and FY 2016.

FSA also has over 124,000 acres currently enrolled in a pollinator habitat practice and has allocated an additional 76,000 allocated acres of CRP land specifically for that practice. This pollinator practice is generally comprised of planting native plant species, although exceptions are made if diverse native seed mixes are unavailable. The species mix includes a variety of plants that flower at different times throughout the growing seasons providing a diversity of pollen sources that are critical for managed bee and wild bee nutrition health. These plants can be an integral part of the conservation practices that landowners, farmers, and ranchers install as part of their conservation plan.

FSA is exploring whether additional types of CRP pollinator acres and practice varieties may be beneficial to pollinators, such as a practice or food plots more focused on honeybees or monarch butterflies in particular. Depending on stakeholder interest, FSA will work with NRCS to develop and implement such new practices or sub-practices. Many other initiatives and practices under CRP provide significant habitat for pollinators while also meeting other conservation goals. For example, CRP includes the State Acres For wildlife Enhancement (SAFE) with more than 1 million acres nationwide that include diverse seed mixes and cover types. Michigan has used the incentives provided by SAFE to develop agreements with the Michigan Department of Agriculture and Michigan Fruit and Vegetable Associations. Under these agreements, SAFE incentives are provided to participants who establish a diverse stand of grasses and wildflowers designed to benefit pollinators. CRP also includes buffer practices with diverse plantings. As a whole, CRP plays a valuable role in providing pollinator habitat nationwide.

NRCS also has a long history of supporting activities that promote the health of pollinator populations. Since the 2008 Farm Bill, the NRCS has revised all of its applicable Conservation Practice Standards to include criteria for managed and wild bees and other pollinator habitat, and the Conservation Stewardship Program offers a pollinator habitat enhancement. Most, if not all, NRCS state offices have updated appropriate practice payment scenarios to better reflect the higher costs of establishing high-quality pollinator habitat.

State and regional biologists, plant materials specialists, and agronomists across the United States have revised and expanded plant lists and technical guidance documents for pollinator forage conservation to maximize opportunities to improve pollinator health. This has often been done in collaboration with non-governmental partners and academics. Some of these materials are posted online at https://plants.usda.gov/pollinators/NRCSdocuments.html and the agency will continue to use this website for document sharing. Several states, including Montana and South Dakota, target pollinators in Wetlands Reserve Program upland habitat restoration work. By the end of calendar year 2015, the agency will

also have revised these standards and enhancements to include milkweed to improve monarch habitat, where appropriate.

The NRCS Conservation Innovation Grants program has supported several projects across the country designed to demonstrate the value of habitat for pollinators, as well as expand and improve NRCS capacity to establish and monitor high-quality, permanent bee forage. The NRCS Plant Materials Program has pollinator forage demonstration field trials underway at many Plant Materials Centers across the United States, and is working with stakeholders including the Xerces Society and native seed industry partners to increase the availability of important pollinator plant materials. Plant Materials Centers continue to study plant species to support pollinator habitat as well as to evaluate methods to improve the seeding, establishment, and management of pollinator plantings.

Starting in FY2014, NRCS targeted five states in the Upper Midwest—Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin—to help improve the health of honey bees. More than $3.2 million were provided in technical and financial assistance to implement conservation practices that would provide diverse plant forage in these states, which are home to more than 65% of the managed honey bee population throughout the prime feeding months of June to September, when bees are building up hive strength for the winter. This funding led to over 220 contracts on more than 26,000 acres. The agency will continue to provide funding focused on these States and will continue to work with partner agencies to leverage additional program funding.

NRCS received significant interest in the effort from farmers and ranchers and recently renewed their commitment to this important region by announcing the availability of $4 million in FY 2015 Environmental Quality Incentives Program funding. Additionally, several NRCS state offices are setting aside additional funds for similar efforts, including California—where more than half of all managed honey bees in the United States help pollinate almond groves and other agricultural lands—as well as Ohio and Florida.

The U.S. Forest Service (USFS) is a natural resource agency whose mission is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. The USFS is responsible for managing habitat to maintain viable populations of plants and animals on the 193 million acres of national forests and national grasslands in 44 states, Puerto Rico, and Virgin Islands. Honey bees and wild pollinators are essential to this mission.

In FY 2014, over 300,000 acres of pollinator habitat were restored on the national forests and grasslands using an array of land management tools, including prescribed fire and silvicultural thinning of forested stands, to restore woodland/savanna habitats and thus provide for increased floral diversity in these habitats, which leads to more resilient pollinator habitat and pollinator populations.

Over the last several years the agency has increased its public outreach to include many varied pollinator activities for the public. Of particular note, the USFS has developed a comprehensive, user friendly, "Celebrating Wildflowers" pollinator website for use by educators, students, employees, and the public. The site is divided into educational modules about animals that assist plants in reproduction through pollination, including ants, bats, bees, beetles, birds, butterflies, flies, moths, wasps, and other more unusual animals. The website features a detailed module on conservation of the Monarch Butterfly in North America. Throughout the site, people may download publications on various pollinator topics such

as the popular Monarch Butterfly North America's Migrating Insect, and Attracting Pollinators to Your Garden Using Native Plants booklets. The website features a "Pollinator of the Month" which highlights the unique qualities at a particular animal pollinator each month. Last year the Celebrating Wildflowers website had 536,000 users and over 250,000 brochures were printed and distributed to our field offices.

The Forest Service has installed over 100 pollinator gardens at our administrative sites across the country, most of which have detailed interpretive signage to educate the public about the value of pollinators and the ecosystem services of pollination, and with guidance to enable visitors to replicate pollinator gardens at home. In FY 2014 over 250 events, including pollinator walks, garden demonstrations, presentations, festivals, tours, Master Gardener courses, interviews, Congressional briefings, pollinator garden installations, field trips, webpages, newspaper articles, teacher activity guides, brochures, and other media were carried out on the national forests and grasslands. The USFS is committed to increasing this public engagement as interest and fiscal resources allow in FY 2015 and beyond.

The USDA National Agroforestry Center (NAC) in Lincoln, NE provides timely research and technology transfer on agroforestry for resource professionals who work with farmers, ranchers, woodland owners, Tribes, and communities nation-wide. NAC is a partnership between two arms of the Forest Service—Research & Development and State & Private Forestry—and the Natural Resources Conservation Service, and works with a national network of partners as guided by the USDA Agroforestry Strategic Framework (2011-2016). Together, they conduct priority research, develop technologies and tools, establish demonstration projects, and provide educational materials and training.

Agroforestry blends agriculture and forestry to build more weather and economic resilient farms, ranches, and rural communities. While in place to provide a variety of services from crop production, clean water, and soil conservation to renewable energy and wildlife habitat, agroforestry can also be designed to address key pollinator issues. This co-production of ecosystem services offers viable opportunities for establishing cost-effective pollinator habitat. Agroforestry practices can create vital nesting and foraging habitat within highly fragmented and intensively managed agricultural lands. In addition, agroforestry practices can protect pollinators by reducing spray drift and providing refuge during application of pesticides. Enhancing plant diversity through agroforestry can alleviate the potential phenological mismatch between pollinators and plants due to climate change, minimizing this impact on pollinators. Many of the USDA cost share programs (*e.g.*, EQIP, CSP, and CRP) that can assist in agroforestry establishment include consideration of pollinator needs in the planting design.

Pollinator-related work at the USDA National Agroforestry Center focuses on science delivery activities that incorporate pollinator considerations into agroforestry planning and design. Examples of science delivery products include the Conservation Buffer Guide and Agroforestry Notes General#6-9. The Conservation Buffer Guide synthesizes research from over 1,400 peer-reviewed publications into illustrated guidelines for designing agroforestry practices that can provide multiple services including effective pollinator habitat. This resource has been delivered to over 10,000 resource professionals in the fifty States and territories, and has been translated into Spanish and four additional foreign languages.

The USDA Agricultural Marketing Service's (AMS) National Organic Program (NOP) is preparing to publish proposed standards for the production of organic apicultural (i.e. beekeeping) products. This action will establish certification standards specifically for organic bees and bee products, including

provisions for transition to organic apiculture production, replacement bees, hive construction, forage areas, supplemental feeding, health care, pest control practices and an organic apiculture system plan.

Metrics: FSA will complete a review of CRP practices to identify practices that already include native pollinator and managed bee friendly seeds, and where additional pollinator seeds can be included. This review will be completed in calendar year 2016.

FSA and NRCS will announce funding for pollinator focused efforts in CRP and EQIP in FY 2015.

Beginning in calendar year 2015, the Department will host at least two pollinator-focused outreach session for appropriate conservation programs, including CRP, EQIP, and CIG in 2015.

Agencies will enter into new MOUs as appropriate in calendar year 2015 and will continue to build on existing partnerships (see below). NRCS will post two webinars in calendar year 2015 developed in partnership with a non-government stakeholder. NRCS and USFS will work with NACD to amplify the Sustainability Week 2015 "Local Heroes—Your Hardworking Pollinators."

Partnerships

Agencies across the Department are working will multiple stakeholders to have a more meaningful impact on pollinator nutrition and health through our conservation programs and technical assistance.

Essential to the success of the Forest Service's pollinator interpretive program are our numerous and varied partners from sister Federal agencies, states, tribes, non-governmental organizations and members of the public who volunteer their time and talent to our many pollinator programs. Important partners such as the Butterfly Conservation Initiative, Pollinator Partnership, Xerces Society, Monarch Joint Venture, Monarch Watch, NatureServe®, and North American Butterfly Association have worked with the Forest Service on numerous projects that have led to the development of a broad diversity of print and electronic outreach materials. Two such partnership efforts were the PollinatorLIVE! and MonarchLIVE! (FSNatureLIVE.org) distance learning adventures—which were year-long engagements targeted towards middle school teachers and students that included live webcasts (3 and 5, respectively), webinars (11 for PollinatorLIVE!), and online educational resources that are available online indefinitely.

The Forest Service and other U.S. agencies participate in the North American Pollinator Protection Campaign (NAPPC). NAPPC is an organization whose members include government agencies, non-governmental, private and non-profit organizations, colleges and universities from Canada, Mexico, and the United States. NAPPC's mission is to encourage the health of resident and migratory pollinators, raise public awareness, promote conservation, protection, conservation and restoration of pollinator habitat, and encourage collaborative, working partnerships among participants with Federal, state, and local government agencies. This partnership has provided the agencies with many excellent opportunities to partner with other NAPPC members to manage, conserve, and protect pollinators and their habitats on the national forests and grasslands.

The USFS Agroforestry Notes series on pollinators was developed in partnership with the Xerces Society and presents information for ranchers and farmers to consider pollinators in their agroforestry practices.

The USDA National Agroforestry Center is continuing to build on these efforts and will be releasing additional pollinator resources in FY 2015 and FY 2016.

NRCS also continues to expand its public outreach on pollinator declines. NRCS has hosted more than 10 webinars archived on www.conservationwebinars.net on the conservation of pollinators or pollinator habitat. The agency will continue to offer these webinars and intends to explore additional webinar topics through new and strengthened partnerships.

NRCS and the Forest Service have developed brochures and posters to help the public understand the challenges facing bees, as well as the opportunities for conservation support on working lands. Multiple USDA agencies also recently partnered with the National Association of Conservation Districts (NACD), leveraging resources to develop joint pollinator education and outreach materials for NACD's 2015 Sustainability Week campaign. These educational campaign materials will be used by the 3,000 conservation districts across the country and their 17,000 board members during 2015. The agency will also continue to explore partnerships with relevant stakeholders, including beekeeper organizations, and opportunities to have joint partnerships with FSA that will support all USDA conservation efforts to provide additional forage for honey bees and other pollinators.

NRCS and FSA developed a Memorandum of Understanding to partner with the U.S. Geological Survey to study the impacts of our joint efforts in these five Upper Midwest states on honey bee health. In both FY 2014 and FY 2015, NRCS provided a list of plant species recommendations for early/mid/late-season blooms for the diverse landscapes and conservation needs across the five targeted States, with the decisions on which specific plants to use taking place at the local level. The applied research project is examining what plants honey bees rely on for pollen and nectar during different parts of the season, through a combination of pollen analysis and tracking the weight gain or loss of hives in different types of habitat (*e.g.* comparing areas dominated by row crops vs. areas with significant CRP and pasture acreage). In FY 2015 the research is being expanded to study more sites across additional states to improve the ability to draw statistically significant conclusions and also a demonstration project focused on areas with orchards to look beyond the grassland/row crop habitats of the current study. The agency will continue to refine its seeding recommendations based on the findings of the work conducted by USGS in order to ensure the provision of plants that are both cost effective and of optimal benefit for honey bees.

Appendix C. Department of Defense Pollinator Protection Plan

Pollinators contribute substantially to the economy of the United States and are vital to keeping fruits, nuts, and vegetables in our diets. Over the past few decades, there has been a significant loss of pollinators, including honey bees, wild bees, birds, bats, and butterflies. The problem is serious and requires immediate attention to ensure we sustain our food production systems, avoid additional economic impact to the agricultural sector, and protect environmental health. Consequently, on June 20, 2014, President Obama issued a Presidential memorandum, *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*, expanding Federal efforts to reverse pollinator losses and help restore populations to healthy levels.

The Presidential memorandum specifically directs DOD to "consistent with law and the availability of appropriations, support habitat restoration projects for pollinators," and to "direct military service installations to use, when possible, pollinator-friendly native landscaping and minimize use of pesticides harmful to pollinators through integrated vegetation and pest management practices." DOD developed this implementation strategy in response to the Presidential memorandum.

Why DOD's Natural Resources Program Supports the Military Mission

The U.S. Department of Defense (DOD) manages about 25 million acres of land. These lands encompass a wide variety of habitats, including many that are now rare and unique. They also make up the landscape on which our soldiers depend for realistic military training and testing activities. Diverse, native plant communities are resilient to impacts from both DOD activities, such as tank maneuvers, fire, and other stresses, and from naturally occurring stressors, including drought and invasive species. Managing for healthy landscapes helps DOD support the warfighter by maintaining our flexibility to effectively use these lands to support essential testing and training. Sound natural resources management also protects quality of life for our military and their families by facilitating a host of outdoor recreation opportunities. And, it promotes efficiencies by encouraging partnerships with many different national, regional, and local agencies and organizations. By managing our lands for long-term military use, DOD plays an important role in the effort to restore habitats for pollinators and contribute to essential plant diversity.

Ongoing DOD Pollinator Support

To meet both its readiness and stewardship obligations, DOD cares about pollinators and works to benefit their populations. As early as FY 2001, the DOD Legacy Resource Management Program (Legacy), the Congressionally-established funding program for DOD-wide natural and cultural resources conservation, funded pollinator restoration demonstration efforts at Dyess Air Force Base and the U.S. Naval Academy. Since that time, DOD has continued to advocate and support pollinator conservation and management activities, including funding a full-day Pollinator Habitat Restoration workshop at the annual Military Fish and Wildlife Association's training workshop. DOD has demonstrated its continuing support through the following recent actions:

Project Funding

From 2009-2014, DOD funded approximately 150 pollinator-related National Public Lands Day (NPLD) projects across 26 states and two territories. NPLD is the nation's largest hands-on volunteer effort to improve and enhance our nation's public lands. The event occurs annually in September, and DOD plans to continue to participate as it has each year since 1999.

Information and Outreach

DOD's Natural Resources Program has participated in and helped sponsor the U.S. Department of Agriculture's Pollinator Week events since 2010, and will continue to do so for the foreseeable future.

One of the initiatives highlighted on the DOD Natural Resources Program webpage is dedicated to pollinators (http://dodpollinators.org). The site contains fact sheets, guidance, links, and other information about actions to take to benefit pollinators.

DOD issued a memo to the Military Services in September 2014 reminding them that it is DOD policy to use native landscaping, when possible, and to avoid using pesticides in sensitive habitats; to coordinate with other agencies and non-governmental organizations on habitat and pollinator issues; and to emphasize habitat restoration for pollinators in National Public Lands Day (NPLD) projects. The memo is entitled *DOD Policy to Use Pollinator-Friendly Management Prescriptions.*

Future DOD Pollinator Support

Per Section 3 of the Presidential Memorandum, DOD will continue its current efforts, implement new actions that support pollinator habitat restoration, and direct the Military Services to use, when possible, pollinator-friendly native landscaping; use integrated vegetation and pest management practices; and minimize use of pesticides harmful to pollinators. Specifically, the Office of the Secretary of Defense (OSD) will develop policy and guidance that can be implemented on military installations and ranges across the country. Pollinator-friendly projects are identified in installation integrated natural resources management plans (INRMPs), and compete for available funding based on Military Service-specific funding criteria. The Department will take the following initial actions:

Policy Issuances

Track implementation of the recent memo to the Military Services, *DOD Policy to Use Pollinator-Friendly Management Prescriptions.*

Add pollinator-friendly management language to the DOD Instruction 4715.03, *Natural Resources Conservation Program*, which is DOD's primary policy document for natural resource management.

Metrics: Pen-and-ink changes to appropriate DOD Instructions by December 31, 2015.

Technical and Programmatic Guidance

Renew DOD's Memorandum of Understanding (MOU) with the Pollinator Partnership (P2), thereby reaffirming DOD's commitment to the White House Pollinator Initiative. Updating the agreement among DOD and P2 that facilitates installation natural resource manager access to pollinator and pollinator habitat related technical assistance to help implement specific projects on DOD lands. Help train DOD personnel about pollinators and pollinator habitat conservation and management, and inform the general public about DOD pollinator conservation projects.

Metrics: Signed MOU; completed February 2015.

Update the *Unified Facilities Criteria for Landscape Architecture* (UFC 3-201-02), issued in February 2009, to include pollinator friendly management practices. This UFC describes technical requirements and guidance for natural resource and facilities projects associated with site improvements and site design (*e.g.*, lighting, water features, plazas, recreational areas). DOD's contractors use UFCs, which are publicly available, as the tools to design and construct projects for DOD. UFCs unify all technical criteria and standards pertaining to planning, design, construction, and operation and maintenance of DOD real property facilities. The UFC program seeks to streamline the military criteria system by eliminating duplication of information, increasing reliance on private-sector standards, and creating a more efficient criteria development and publishing process. Companies that perform work related to construction, repair, and maintenance of DOD facilities use UFCs to guide their performance. UFCs are available other agencies, organizations and the general public at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4.

Metrics: Updated UFC formally approved by December 31, 2015.

Include pollinator protection and management in DOD's Natural Resources Strategic Plan, which will provide broad goals and objectives for implementing natural resources conservation and management on DOD installations.

The Armed Forces Pest Management Board, which provides support to DOD personnel on any pest management issue in any situation (*e.g.*, pesticide use), will communicate with and help the DOD Components ensure implementation of appropriate Technical Guidance.

Metrics: None; situationally dependent over time.

Disseminate Pollinator Health Task Force products (as available), including: Best Management Practices; the Outreach and Education Committee report; and Research Committee report on DOD Web pages, including the Defense Environmental Information Network (DENIX), as they are finalized. These products will be available to DOD military and civilian personnel and their dependents, as well as to other agencies, organizations, and the general public through DOD pollinator-focused Web pages.

Metrics: Post on DOD Web pages, including Defense Environmental Information Network (DENIX) when finalized.

Project Funding

Continue to support small, on-the-ground pollinator-related projects through National Public Lands Day. NPLD is managed by the National Environmental Education Foundation (NEEF), which awards small projects ($6500 or less) that provide tools and resources to volunteers to help improve public lands. DOD evaluates proposals and funds these projects through the DOD Legacy Program. DOD will provide funding for NPLD pollinator projects each FY that funds are available, and work with the NEEF to ensure all funded projects are completed. DOD will identify top priority projects and provide funding to NEEF by July 31st each year that funds are available.

Designated DOD project managers or natural resources professionals will ensure that DOD contractors and appropriate personnel incorporate pollinator efforts into existing construction, landscaping, or natural resources management projects.

Metrics: DOD will, subject to funding availability, report annually on habitat improvement acreage for NPLD projects.

Appendix D. Department of Education Pollinator Protection Plan

Pollinator garden resources communicated and collaborators connected to school communities

In 2011, the U.S. Department of Education (ED) created U.S. Department of Education Green Ribbon Schools (ED-GRS) to inspire schools, districts, and institutions of higher education (IHE) to strive for excellence by highlighting exemplary practices and resources that all can employ. ED-GRS recognizes progress in reducing environmental impact and costs, improving the health and wellness of schools, students, and staff, and providing environmental education. Combined progress in all three of these pillars serves as the basis for recognition.

After developing criteria and enlisting states' voluntary participation in 2011, ED has awarded over 280 schools, districts, and postsecondary institutions in the first four years of the recognition (*i.e.*, 2012, 2013, 2014, and 2015). Nearly all of the schools have native plant gardens, food gardens, pollinator gardens, certified wildlife habitats, and/or monarch way stations of some sort, although a precise count is difficult because many awardees are expansive school districts or postsecondary campuses rather than individual schools, and because honorees in all categories continue to advance their efforts even after receiving the one-time recognition.

ED uses the award as a platform to share the promising practices of honorees and resources that they are using through its Green Strides outreach. This encompasses a resources page, webinar series in which over 220 webinars offered by various Federal agencies and non-profit organizations have been publicized over two years, a blog, newsletter, and social media. To bring further attention to the honorees, their practices, and the resources that they are employing, ED conducts an annual Green Strides Best Practices Tour from August to October, with the Director participating in some 86 events across 17 states in the first two iterations of the Tour and chronicled extensively on the blog. For its part, the newsletter reaches 15,000 school, district, state, and non-profit education contacts with a specific interest in school sustainability, and offers a valuable means to share resources and practices in the areas of school facilities, health, and environment from all of the Federal agencies and non-profit entities, including native gardens and pollinators.

ED can further the Presidential Memorandum by adding, to its Green Strides pages, resource links and webinars offered by Federal agencies or non-profits that focus specifically on advancing schools' work to plant native pollinator gardens. The Director, who also serves as Facilities, Health, and Environment

Metrics: ED will disseminate school-appropriate opportunities through its Green Strides resource and webinar pages, social media, and newsletter. When appropriate, the Director will also ensure that these announcements are disseminated through additional ED channels, in addition to sustainability-specific ones. ED will add pollinator resource Web links to its Green Strides site during the next website refresh, which is expected to take place before June 2015.

Liaison, can continue to build ED's extensive list of collaborators who work in the area of school sustainability, health, and environmental education by connecting with pollinator-specific non-profit organizations. Through the use of its newsletter, social media, and Green Strides resources and webinars listings, ED can communicate pollinator resource, awards, grants, and challenges to school communities.

Partnerships

U.S. Department of Education Green Ribbon Schools is a voluntary Federal communications and outreach tool focused on school sustainability that is structured as a recognition award. State education agencies elect to participate and nominate schools, districts, and/or postsecondary institutions for this recognition award. It is structured to encourage collaboration and communication at Federal, state, local, and school levels, and among public and private sectors.

In addition to over 30 state education authorities, both K-12 and postsecondary, that participate annually, the Green Strides program counts over 80 collaborating national organizations. Roughly a dozen Federal agencies have collaborated in myriad ways since the pilot year, rightly understanding the award as a way to promote their resources to schools, including by participating in the Federal review, sponsoring the ceremony, and joining the Director on the Green Strides Best Practices Tour.

At the state level, ED-GRS is structured to encourage state education authorities to work across facilities, health, and science offices; inter-agency among state health, environment, and energy counterparts; and to bring state non-profit organizations as well as chapters of national organizations into their committees. In some cases, Federal regional offices also work with the state education authorities as a result of the award, allowing them to direct their resources and expertise into schools.

Appendix E. Department of Energy Pollinator Protection Plan

Adoption of Best Management Practices (BMPs)

Adoption of best practices by DOE, where consistent with a site's mission, enlarges the land area and DOE policies supporting pollinator health. The Department is not a land management agency but it does own thousands of acres associated with its national laboratories, field offices, user facilities, and National Nuclear Security Administration (NNSA) operations. For example, the Argonne National Laboratory campus includes 1,500 acres, Brookhaven National Laboratory campus has 5,320 acres, the Fermi National Laboratory campus is 6,800 acres, and the Oak Ridge complex is located on 4,421 acres. The Hanford site consists of 586-square-miles of shrub-steppe desert. Each site will be assessed to determine whether the BMPs are appropriate and, if they are, the specifics of how they will be adopted. Because the DOE properties are located in very diverse habitats, for example the Los Alamos and Sandia Labs versus the Argonne Lab, individual assessment will be undertaken. At clean-up sites, such as the Hanford property, the compatibility of particular BMPs and the ongoing remediation efforts will need to be carefully evaluated. The availability of adequate water resources to support the introduction of the recommended BMPs and plantings will also be considered in areas where drought is a continuing issue.

Several DOE facilities are located near land owned by Federal land management agencies. For example, DOE lands in Nevada, Colorado, New Mexico, Idaho, and Washington State are close to lands managed by the National Park Service, Bureau of Land Management, Department of Defense, U.S. Forest Service, and the Fish and Wildlife Service. DOE will work with these agencies to identify pollinator habitat protection programs they are using that are applicable to DOE lands. By adopting applicable programs, DOE will be able to expand the area benefiting from these practices to enhance pollinator habitats.

DOE will work with the Power Marketing Administrations (PMAs) to support pollinator health. While PMAs' transmission systems constitute a substantial footprint, the land associated with transmission systems is not owned by the PMAs. Instead the PMAs lease rights-of-way from private land owners, tribes, and Federal, state, and local governmental entities. These long-term leases limit the PMA's activities but when allowable under the terms of the leases, the PMAs will adhere to best practices to preserve and protect pollinator habitat.

This commitment to enhance, preserve, and protect pollinator habitat according to BMPs is consistent with Section 3, Subsection (a) of the Presidential Memorandum which calls for "*the development of a plan to enhance pollinator habitat and the implementation of a plan to manage lands and facilities under the auspices of the Department to enhance pollinator health on those lands*". Once DOE has completed the assessments for its properties, a timetable will be established for the deployment of the appropriate BMPs.

Where consistent with the site's mission, DOE will implement the recommendations of the Council on Environmental Quality and General Services Administration concerning the management of Federal

buildings and landscapes including using regional seed mixes (as appropriate) developed by the United States Department of Agriculture.

Metrics: The first step in the development of performance metrics will be to identify those sites appropriate for the adoption of BMPs and provide estimates of the area of potential habitat DOE adds. The first deliverable will be the determination of the scope of the potential addition of habitat. The schedule for this effort will be dictated by resource constraints. However, 12 to 18 months is a realistic estimate.

Once DOE identifies the candidate sites, adoption of BMPs will proceed on a site-by-site basis. The relevant metric will be the annual increase in acreage covered by best practices. The schedule for adoption of BMPs will be dependent on required resources, which are difficult to estimate at this time due to the uncertainty concerning the magnitude of the gap between current practices and the BMPs. Resources permitting, DOE intends to adopt BMPs at the identified sites over a 10-year timeframe.

Partnerships

Through its regular meetings and partnerships with utility trade associations and companies, DOE will encourage the deployment of BMPs and other measures to improve and increase pollinator habitat in rights-of-way and other properties controlled by utility companies. This message will help build on Federal efforts to encourage the protection of pollinators and increase the quality and amount of habitat and forage for pollinators.

Appendix F. Department of the Interior Pollinator Protection Plan

The U.S. Department of the Interior (DOI) protects America's natural resources and heritage, honors our culture and tribal communities, and supplies the energy to power our future. The DOI serves as the keepers of our Nation's legacy by managing the resources in our care to benefit Americans now and in the future. With 9 bureaus, each with distinct missions, DOI manages 507 million acres of land on behalf of the American people, honors our Nation's responsibilities to tribal nations, and provides credible scientific information that furthers our understanding of the Earth. For years, DOI bureaus have actively benefitted pollinating species through a range of management, educational, monitoring, and research activities. There is also significant potential to increase the collective DOI contributions for the betterment of pollinators. The June 2014 Presidential Memorandum on Pollinator Health (PM) asks DOI to do more, and in a more coordinated fashion. As a result, DOI bureaus are undertaking plans to protect, restore, enhance pollinator habitat for their managed lands and facilities consistent with their own missions and public safety. Many of the actions listed in the PM and the resultant plans summarized herein dovetail with the Secretary of the Interior's priorities, including America's Great Outdoors, climate change, Native American nations, New Energy Frontier, water challenges, and youth.

This DOI pollinator enhancement plan (Plan) includes a summary of the more significant actions, a list of more detailed actions, and initial metrics and goals. The Plan also encompasses the range of programs and actions undertaken already, more recent actions in direct response to the PM, and plans for future actions.

The nine DOI bureaus are:

- Bureau of Indian Affairs (BIA)
- Bureau of Land Management (BLM)
- Bureau of Ocean Energy Management (BOEM)
- Bureau of Reclamation (BOR)
- Bureau of Safety and Environmental Enforcement (BSEE)
- National Park Service (NPS)
- Office of Surface Mining Reclamation and Enforcement (OSMRE)
- U.S. Fish and Wildlife Service (FWS)
- U.S. Geological Survey (USGS)

Summary of DOI Pollinator Enhancement Plans

This Plan includes a number of DOI actions, plans, and commitments, which differ in size and scope on the basis of the missions of each bureau. Contributions focus on the provision of habitat, education,

and research. Some actions follow directly on current practices, whereas others require some creative approaches to "business as usual." This section includes a high-level description of what might be considered the more significant contributions from DOI. The DOI is drafting two overarching policies to promote pollinators on DOI lands. The first policy will address landscaping practices in order to promote habitats on DOI owned facilities and offices. The second policy will direct all DOI bureaus to review their processes for establishing and managing easements and rights-of-way, and make recommendations by the end of the year to manage easements and rights-of-way, to the extent practicable, in a pollinator-friendly fashion.

The DOI bureaus that manage land will play a significant role in establishing, restoring, or enhancing acres of pollinator habitat across the country.

1. The FWS, for example, has launched a major new campaign to restore Danaus plexippus (monarch butterfly; hereafter, "monarch") habitat, which will be valuable to a suite of native pollinators. In Fiscal Year (FY) 2015, FWS is committed to restoring or enhancing more than 200,000 acres of monarch habitat through existing and planned projects on public and private lands; acquiring more than 46,000 acres of land in FWS Midwest and Mountain-Prairie Regions for the protection of priority bird habitats that will also provide benefits to monarchs and other pollinators; allocating an additional $2 million for priority monarch conservation projects; and partnering with the National Fish and Wildlife Foundation to establish the Monarch Conservation Fund, which was seeded with $1.2 million in February 2015.
2. The NPS is making significant contributions in public education and outreach through partnerships designed to inform park visitors and others about the role of pollination in natural settings and the value of healthy, intact ecosystems to the Nation. Relationships already include NPS and an array of organizations that reach a crosscut of the Nation, such as Burpee Seeds, Save Our Monarchs, E.O. Wilson Biodiversity Foundation, NatureServe, Bat Conservation International, Garden Club of America, Student Conservation Association, Greening Youth Foundation, and Mosaics in Science program. The NPS will also engage the public by hosting citizen science activities, including the pollinator-themed nationwide Biodiversity Discovery event (BioBlitz) with participation from as many as 400 NPS parks and units, thereby establishing new pollinator-centric projects with NPS Biodiversity Youth Ambassadors for their schools and communities and incorporating pollinator citizen science and monitoring projects into NPS Migratory Species Initiative.
3. The BLM has developed a draft National Seed Strategy and Implementation Plan, which seeks to ensure long-term availability of plant materials necessary for reclamation and restoration activities. Once complete, this strategy will provide land management agencies the tools needed to address ecological restoration across the United States. Additionally, BLM is making policy adjustments to land management programs by incorporating native, pollinator-friendly vegetation as standard practice in common management actions that cover large parcels of land each year. These new policies will benefit pollinators through post-fire vegetation, fuels management, and green stripping activities on BLM lands.

4. The FWS is extending their efforts to reach state fish and wildlife agencies by partnering with the Association of Fish and Wildlife Agencies (AFWA) and encouraging states to include pollinators and the monarch butterfly as Species of Greatest Conservation Need in their State Wildlife Action Plans (SWAPs). The FWS is providing tools to assist states in expanding education and understanding of pollinator conservation and of the value of including pollinators in SWAPs. Such expansion and understanding will allow states to use a portion of their State Wildlife Grant Program funds for direct pollinator conservation. States are required to update their SWAPs by October 2015 (this date is not related to the PM but is otherwise required to receive FWS State Wildlife Grant Program funding). The 2015 State Wildlife Grant Program is offering an additional funding opportunity for states to address pollinators in their SWAPs.

Detailed DOI Actions to Promote Pollinators

The following sections include further details, lists of more specific actions, and initial metrics and goals.

Continued Research and Scientific Contributions

Scientifically credible information is valued in the development of management plans and setting of policies. Many sources have cited a lack of scientific information for many pollinating species, which limits the Federal Government's ability to take meaningful action. The PM directs the development of the Pollinator Research Action Plan (PRAP) to "focus Federal efforts on understanding, preventing, and recovering from pollinator losses" and ultimately to inform the development of management plans and setting of policies.

The USGS and the U.S. Department of Agriculture (USDA) coordinated the development of the PRAP, with contributions from scientists and managers from numerous Federal bureaus and agencies. The PRAP will be used as a road map for prioritizing future research. The PRAP describes a number of research needs related to status and trends, habitats, nutrition, pathogens and pests, pesticides and toxins, genetics, native plants, economics, collections and informatics, and models and tools. The USGS has dozens of studies related to many of these areas (examples may be found in PRAP appendix B), primarily focusing on pollinator populations and habitats and the factors influencing both. The USGS researchers have long-standing studies and capabilities on relevant topics such as species ranges and distributions, wildlife monitoring techniques, taxonomy and identification, plant-pollinator associations, habitat characteristics and modeling, genetics, imperiled species science, chemistry and toxicology, decision science, and data systems management. The USGS also works closely with partners, including other DOI bureaus, Federal agencies, states, tribes, nongovernmental organizations (NGOs), and academics to set research directions and ensure that products are applicable to real information needs.

Metrics: The USGS will complete the current research focused on monarch populations, habitats, and restoration by the end of FY2015. These results will be shared with interested partners, including the FWS, USDA, Monarch Joint Venture (MJV), and others.

Partnerships

The USGS seeks to build on longstanding partnerships while establishing new scientific relationships to improve the quality of science. Many projects are based on broad partnerships, such as the current monarch study (which includes participants from three Federal organizations, nine universities, and three NGOs) and USGS contributions to the Integrated Taxonomic Information System (ITIS, a database maintained by six Federal organizations, one Canadian and one Mexican Federal organization as well as one NGO).

Ongoing studies include, for example, partnerships with the USDA (i.e., assessing the utility of Conservation Reserve Program [CRP] grasslands and rowcrops for both honey bees and native bees) and the NPS and FWS (i.e., distribution of native bees on select Federal lands and understanding pollination networks on select NPS lands). Other studies benefit from collaboration with universities. The USGS is also a member of the North American Pollinator Protection Campaign (NAPPC) and the MJV, both of which serve as venues to share scientific results. Development of the PRAP has created new connections among Federal agencies and suggested new partnership opportunities.

Engaging the Public

The public can make significant contributions toward improving pollinator health. The DOI, and NPS in particular, play an important role in public engagement. The DOI lands, where people can learn by directly experiencing the Nation's rich landscapes and biodiversity, are visited by millions of citizens each year. This access provides an important educational venue where visitors not only enjoy scenic views but also learn of the importance of natural spaces and the services they provide. The PM calls for plans to expand and coordinate public education programs, outlining steps that individuals and businesses can take to help address the loss of pollinators. The NPS served as a lead in developing the Pollinator Public Education and Outreach Plan and is committed to providing new outreach resources and programs designed to engage and excite citizens.

Metrics: Given the potential contributions of an informed citizenry, the NPS will undertake a range of educational and related land management actions over the next 2 years. To disseminate information and encourage public participation, the NPS is will do the following:

- Host a new web site, www.nps.gov/pollinators (completed January 2015).
- Develop an outreach toolkit for all Agencies to use (March 2015).
- Distribute seeds donated by Burpee Seeds to the public (throughout FY2015).
- Fund at least 20 pollinator projects annually in FY2015 and FY2016. These projects may be focused on education, habitat, monitoring, and (or) research.
- Develop educational curriculum to be used by education programs in parks across the Nation (FY 2015).
- Host a BioBlitz that can reach more than 400 parks, engage thousands of citizen scientists, and include underserved communities including youth (2016).
- The NPS will report annually at the end of FY2015 and FY2016 to the DOI Deputy Secretary's Office on each of the goals listed here.

Partnerships

Outreach and education programs through NPS are based on partnerships and collaborations. As discussed in the Summary section, NPS will achieve these goals by working with a range of partners on multiple scales, including but not limited to Burpee Seeds, Save Our Monarchs,

E.O. Wilson Biodiversity Foundation, NatureServe, Bat Conservation International, Garden Club of America, Student Conservation Association, Greening Youth Foundation, and Mosaics in Science program.

Increasing and Improving Pollinator Habitat

Availability of quality habitat is a recognized limiting factor for many pollinating species.[22] The DOI manages a large and diverse range of lands for a variety of purposes, providing ample opportunity to conserve and manage habitats for the benefit of pollinators. Indeed, many of DOI's current land management practices provide nesting substrate and food sources for a range of pollinator species. The DOI will take steps to increase the extent and quality of habitat through a collection of specific actions and commitments pertaining to policies, managed lands, facilities, and easements and rights-of-way.

Promoting Pollinators through Policy

Policies and procedures are in place to standardize and govern the way organizations function. Policies that DOI bureaus have in place may be updated for the betterment of pollinators. Although these changes may not result in immediately measurable change, they can have a gradual impact over time through day-to-day operations. Bureaus also will be reminded of the existing Integrated Pest Management Policy (Departmental Manual Part 517 Chapter 1), which requires all bureaus and offices

22. National Research Council (U.S.) Committee on the Status of Pollinators in North America, and National Academies Press (U.S.). *Status of Pollinators in North America*. Washington, D.C.: National Academies Press, 2007. Print.

to "incorporate Integrated Pest Management (IPM) into their pest management activities," to reduce the chance of negative impacts due to chemical treatment.

The BLM will begin updating stipulations for apiary permits on BLM lands. By the end of FY 2015, BLM will develop and issue instructional memoranda to State Directors to identify a coordinator for pollinator project development, coordination, and reporting. By the end of FY 2016, BLM will begin revising Manual Section 1740, "Renewable Resource Improvements and Treatments," to include the use of pollinator-friendly native plants in vegetation treatments and the use of appropriate best management practices (BMPs).

The NPS will review turf management standards of the NPS Cultural Landscapes Program to better reflect historical landscape plans, with an eye to increasing native plant diversity while still meeting the historical missions of particular parks. The BOR will actively promote awareness of and explore the use of pollinator-friendly tools among environmental staff and managers and incorporate pollinator-friendly activities into new or revised land use plans, National Environmental Policy Act (NEPA) documents, wildfire rehabilitation plans, pesticide use proposals, and related land management documents, as appropriate. The NPS is collecting baseline information about current actions in order to plan for future expansion and establish targets. Similarly, BOR is establishing baseline information on the percentage of water contractors in California who use bee pollinators on their crops and, where possible, the amount of acreage they estimate normally benefits from these activities.

Increasing and Improving Pollinator Habitat on Managed Lands

All bureaus will incorporate, as appropriate, BMPs for increasing and improving pollinator habitat on managed lands. The DOI bureaus hold millions of acres in trust for the public. Managing these lands through practices that benefit pollinators will also benefit the American people, who will enjoy the ecological services provided by pollinators through sustained wildlands, wildlife populations, and other uses of public lands. Bureaus will adjust land management practices to provide additional habitat acres, either through actions specifically for pollinators or by modifying other actions to also benefit pollinators.

The FWS, for example, is delivering pollinator conservation in conjunction with the trinational initiative to conserve the Monarch butterfly in North America being coordinated through the Canada/Mexico/United States Trilateral Committee for Wildlife and Ecosystem Conservation and Management. Restoration and enhancement of essential monarch habitat components, milkweeds (*Asclepias* spp - the host plant for monarch larvae) and other native flowering plants, provide the nectar sources required by other insect pollinators. "Monarch-friendly" best management practices also benefit other pollinators. Pollinator habitat acres will be delivered on FWS owned lands, through partnerships on state-owned lands, and on private lands through the Partners for Fish and Wildlife, Coastal, and Farm Conservation Programs, FWS's primary tools for delivering voluntary, citizen and community based conservation on lands beyond the boundaries of FWS-owned lands.

The BLM is already restoring lands for Centrocercus urophasianus (Greater Sage-Grouse) habitat and in response to wildfires. These projects will be encouraged to incorporate, as appropriate, pollinator-friendly native plants, including the addition of milkweed in monarch migration routes and summer breeding grounds. Habitat will also be enhanced through fuels management and green stripping projects by inclusion of at least one pollinator-friendly native plant species. The BLM is also adjusting

procedures that may impact habitat quality, for example, by updating the standard operating procedures in the Vegetation Treatments Environmental Impact Statement to include the new pollinator BMPs, targeting specific plant problems to reduce broadcast spraying with insecticides to control pests, and developing a pilot module on pollinators and threats for the BLM Certified Pesticide Training Course. Additionally, at least one pollinator-friendly native plant species will be used in all fuels management and green stripping projects that include seeding.

Over the next 2 years, NPS will work to restore pollinator habitat where appropriate in NPS units.

The OSMRE promotes the provision of wildlife habitats through the Appalachian Regional Reforestation Initiative (ARRI), a partnership-based program for the restoration of former mine lands to native forests. To date, more than 1,000 people representing 207 different organizations have joined ARRI, including 52 government agencies, 59 coal industry organizations, 5 schools, 17 academic institutions, as well as 17 watershed/citizen, 10 environmental, 17 conservation, 8 faith-based, 7 international, and 15 other groups. The OSMRE will continue to promote this program and train state regulatory authorities to promote the use of native tree and ground-cover species, thereby increasing native habitat for the benefit of pollinating species.

Metrics: The FWS will focus their efforts in FY2015 on acres of habitat with goals to (1) restore and (or) enhance more than 200,000 acres of monarch habitat through existing and planned projects on public and private lands, (2) acquire more than 46,000 acres of land in the FWS Midwest and Mountain-Prairie Regions, and (3) allocate an additional $2 million for priority monarch habitat conservation planning, design, delivery, and inventory and monitoring projects.

The BLM will strive to include pollinator-friendly native plantings on at least 90% of the acres seeded after fire events in FY2015.

The OSMRE will continue to promote habitat on reclaimed minelands through ARRI, with the following goals over the next 2 years:

a) Develop a pollinator species-specific Forestry Reclamation Advisory, which will enhance species selection to be used in reclamation per locality or region (FY2015).

b) Increase the number of trees planted from FY2015 to FY2016 by 10%:
   - Trees planted goal for FY2015 for active mine sites: 6.5 million trees
   - Trees planted goal for FY 2016 for active mine sites: 7.2 million trees
   - Trees planted goal in FY2015 for legacy mine sites: 190,000 trees
   - Trees planted goal in FY 2016 for abandoned or legacy mine sites: 210,000 trees

c) Increase the number of acres planted in trees and pollinator-friendly species from FY2015 to FY2016 by 10%:
   - Acres planted goal for active mine sites in FY2015: 8,000 acres
   - Acres planted goal for active mine sites in FY2015: 9,000 acres
   - Acres planted goal for legacy mine sites in FY2015: 200 acres
   - Acres planted goal for legacy mine sites in FY 2016: 275 acres

d) Increase the number of partners engaged in pollinator-friendly species plantings on both active and legacy mine sites from FY2015 to FY2016 by 40:
   - FY2015 goal: 150 partners
   - FY2016 goal: 190 partners

The FWS, BLM, and OSMRE will report annually to the DOI Deputy Secretary's Office on each of the goals listed here.

Partnerships

The FWS has established a new and significant partnership with the National Fish and Wildlife Foundation (NFWF), working together to fund and promote monarch habitat projects. The FWS has provided $1.2 million in seed money to establish the NFWF Monarch Conservation Fund, which will be matched by other private and public donors.

The ARRI is a partner-driven program (as described in the Promoting Pollinators Through Policy section). The OSMRE will continue this partner-based approach for effective land management outcomes.

Increasing and Improving Pollinator Habitat on DOI-Owned Facilities

Opportunities exist to provide and enhance habitat through the facilities and buildings owned and managed by the DOI and DOI bureaus. Certain landscaping practices may provide valuable habitat on DOI facilities, thereby replacing poor quality or non-existent habitat. Toward this end, steps are being taken to capitalize on this opportunity and benefit pollinators.

The DOI is drafting a policy that will provide and increase habitats at appropriate facilities where DOI bureaus have authority over physical operations and maintenance. The BLM is collecting baseline information to quantify the number of facilities that already maintain native plant landscaping and the number of existing partnerships for schoolyard or other interpretive gardens not on BLM facilities. The USGS is also establishing a baseline for facilities with native plant landscaping. The FWS is creating monarch and pollinator habitat, including landscaping, gardens, and trails, on FWS owned lands and facilities on National Wildlife Refuges and National Fish Hatcheries. The NPS plans to include BMPs that support pollinators into contractual agreements with park concessionaires, increasing habitat quality near facilities.

Metrics: The goal is to add pollinator beneficial requirements in all DOI owned facilities landscaping contracts within 5 years. Bureaus will report to the DOI Deputy Secretary annually to track progress.

Increasing and Improving Pollinator Habitat through Easements and Rights-of-Way

Easements and rights-of-way provide additional opportunities to establish and enhance pollinator habitats on lands managed for other purposes.[23] These lands may be managed in ways that benefit pollinators with little or no additional effort. The DOI is drafting a policy that will direct all bureaus to evaluate by the end of FY 2015 their permitting and management practices that establish easements and rights-of-way and make amendments as necessary to manage easements and rights-of-way, to the extent practicable, in a pollinator-friendly fashion.

At such time, BLM will review their mineral and rights-of way stipulations to determine if there is a need to create new policies that consider native pollinators and create pollinator habitat along rights-of-way on public lands. The FWS will recommend and promote the use of native forbs, including milkweeds, in seed mixes and restoration activities in monarch habitat during environmental reviews for projects requiring Federal permits, licenses, or rights-of-way.

23. Russell, K.N., H. Ikerd, and S. Droege. "The Potential Conservation Value of Unmowed Powerline Strips for Native Bees." *Biological Conservation* 124.1 (2005).

Metrics: The departmental-wide policy will be issued during FY2015, and Bureaus will report to the DOI Deputy Secretary the number of both rights-of-way and easements that are managed for pollinators.

Partnerships

A memorandum of understanding (MOU) among the USDA, DOI, EPA, Edison Electric Institute member companies and affiliates, American Public Power Association, the Utility Arborist Association and the National Rural Electric Cooperative Association is being drafted to address vegetation management within electrical rights-of-way on certain Federal lands. This MOU is being drafted with guidance on pollinator habitats and will guide actions under this new DOI policy.

Best Management Practices

Per the PM, BLM and USFS coauthored "Pollinator-Friendly Best Management Practices for Federal Lands." This document consolidates general information about BMPs and procedures to use when bureaus are considering pollinator needs in project development and management of Federal lands. All DOI bureaus will consider and use these BMPs during land management activities when appropriate and consistent with mission and public safety.

Reserve of Native Seed Mixes

The ability of Federal agencies to repair damaged lands and stem the loss of cultural and economic benefits to society, as well as reverse pollinator declines, depends upon the availability of genetically appropriate native seed. The lack of these seeds is often a critical bottleneck in restoration and rehabilitation of pollinator habitats. To address this critical need, the PM directed DOI and USDA to "establish a reserve of native seed mixes, including pollinator-friendly plants, for use on postfire rehabilitation projects and other restoration activities." The BLM has taken the lead for this action within DOI because it purchases much of the available seed in the West for use in postfire stabilization and rehabilitation. Just 10 days after the PM on pollinators was signed, the Director of BLM convened a Native Seed Summit in Washington, D.C., with the heads of 12 Federal agencies and their representatives to discuss how to increase the availability of native seed for all restoration projects. The resulting draft National Seed Strategy (NSS) meets the requirements of the PM, as well provides a research framework, decision tools, and public support for ecological restoration of native plant communities on public lands through collaboration and communication. The specific actions to establish the native seed reserve are summarized in the sections below.

Identifying Pollinator Friendly Species

Federal agencies will work with Natural Resources Conservation Service (NRCS) Plant Materials Centers, local native plant societies, the seed industry, and other partners, agencies, and organizations to create or update technical notes that outline pollinator-friendly species by ecoregion. By 2017 all ecoregions in the United States will have pollinator-friendly plant lists. Under the NSS, Federal agencies that use native plants in restoration activities will work with agencies that have plant materials development

responsibility to determine which pollinator-friendly native plant species are the highest priority for developing seed transfer and distribution zones by September 2016.

Plant Material Development and Production

Under the NSS, a team of Federal agency staff, including BLM, USFS, USDA Agricultural Research Service (ARS), and NRCS, will lead regional native plant and pollinator partnership groups to identify those species on the pollinator species list that are currently in production and those species that might need to be increased through established plant materials programs or through collection of seed and grow-out contracts with private industry.

- The BLM, USFS, ARS, and NRCS plant materials programs will identify the species that are most beneficial to pollinators to consider in regional development and increase programs by August 2015.
- Federal agencies with plant materials development responsibility will identify species beneficial to pollinators that are currently being produced by each of the Federal agencies and establish the availability of each species by December 2015.
- Because not all of the desired species are commercially available, Federal agencies will also identify additional pollinator-friendly species of interest that could be developed into agricultural crops.
- By October 2015, Federal agencies will identify those pollinator-friendly plant species currently in grow-out programs that are expected to be harvested and made commercially available in summer or fall 2016.
- Agencies will also identify in October 2015 those species they expect to begin evaluating and producing, along with estimated targets for when adequate seed of such species will be available to transfer to commercial producers. The targets for having new seed stocks available depend on the ease of propagation and production of new species, as well as on the resources available to Federal agencies to conduct new plant development work.
- By December 2016, Federal land management agencies (the USFS, BLM, NPS, FWS, Department of Defense [DOD], Department of Energy [DOE]) will identify pollinator-friendly plant species appropriate for permitted wildland collection, areas where seed may be collected, and the amounts of seed that can be sustainably collected in average years on lands they manage and will begin collecting seed according to priority for the species.

Seed Storage

Under the NSS, Federal agencies will assess ongoing work for pollinator-friendly species at NRCS Plant Material Centers, nurseries, seed extractories, germplasm storage centers, and other facilities. Federal agencies will also outline current capacity and capacity needed to maintain a steady supply of pollinator-friendly native plant species for all agencies to use in restoration, rehabilitation, and other projects requiring pollinator-friendly plant species.

Federal agencies with plant material storage facilities will assess the current status of agency supplies and storage of pollinator-friendly native plant materials, as well as how these native seeds are distributed to regions and projects. Agencies with responsibilities in the eastern, southern, and midwest U.S. will work with the private seed industry to determine the storage reserve of pollinator-friendly native plant materials for use in those areas. In the western U.S. fire-prone areas, USFS has need for increased decentralized storage capacity and mobile refrigerated units to facilitate short-term storage needs for on-site restoration projects. Federal agencies with land management responsibility in the west will assess the need for such storage, as well as the quality of mobile units for that storage investment.

Seed Collection

Under the NSS, by October 2015, Federal agencies with plant materials development responsibility will outline how existing seed collection programs such as Seeds of Success, as well as seed stored in the ARS National Plant Germplasm System, may be used in plant development programs and then determine priorities for additional seed collection efforts through ecoregional partnerships. Empirical seed zones derived from common garden research studies are used to guide seed collection and use where they are available. For species lacking genetic information, climate-based provisional seed zones are widely used in the western regions, superimposed by Level III Omernik ecoregions (see http://www.epa.gov/wed/pages/ecoregions.htm). Where provisional seed zones are available, Federal agencies will use them to develop collection plans for native plant species. Information on empirical and provisional seed zones, as well as maps and downloadable geographic information system (GIS) shapefiles, are available at http://www.fs.fed.us/wwetac/threat_map/SeedZones_Intro.html.

Seed Banks

By September 2015, all Federal agencies will identify funding sources implementing the seed reserve actions in the PRAP.

- Although variable across the country, existing USFS seed banks contain a number of species that are pollinator friendly and are routinely used in ongoing restoration activities on USNFS lands.
- Regions have initiated new partnerships with the NRCS, non-Federal entities, and the research community to more explicitly focus on pollinator species and the associated plants that will provide for their full temporal needs (i.e., first flowers of spring to last flowers of fall). In the Pacific Northwest region, for example, ecoregional seed collections for priority species will commence in 2015; phase 2 of the project will focus on seed increase of wildland collections in USFS nurseries, NRCS Plant Materials Centers, and private growers.
- All Federal agencies with native plant development responsibility will work together to establish or expand at least one pilot project per ecoregion that will serve as a training or demonstration site on planting pollinator-friendly native seed or nursery stock, with monitoring to determine the effectiveness of the restoration techniques.
- Federal agencies with plant materials development responsibility and plant materials use (USFS and BLM) will assess current databases for reporting and maintaining information about native plant species important to pollinators, including how much seed is used and how much seed

is available. They will assess the need for an interagency data standard so that all agencies who use native seed can share this information in their systems.

- In the USFS, wildland seed collection is often accomplished "in house" by seasonal crews and botanists or revegetation specialists. An indefinite delivery, indefinite quantity (IDIQ) restoration services contract is in place that contains bid items for seed as nursery stock production, outplanting, and other restoration-related activities. All Federal agencies may use the contract and will evaluate the need for using such a contract by December 2015.
- Wild collected seed is generally processed at USFS seed extractories and nurseries. These facilities also provide services to BLM, NPS, USDOT Federal Highway Administration, FWS, and other Federal agencies and tribal entities. The NSS will evaluate the capacity of these facilities to provide the seed of pollinator-friendly plant species.
- Seed increase and nursery stock production for USNFS lands is provided largely by USFS nurseries. The USFS and BLM IDIQ contracts are also available for seed increase and plant propagation and are heavily used by the western regions.

Public-Private Partnerships

The DOI recognizes the value of partnerships, with many bureaus serving as members in good standing of organizations such as NAPPC, MJV, and the Plant Conservation Alliance (PCA).

The DOI bureaus will continue and will expand partnerships through the following list of actions:[24]

- Continue collaborations with NAPPC on joint education, outreach, and science projects to benefit all pollinators (USGS, BLM, FWS, and NPS).
- Continue membership in and collaborations with MJV (FWS, USGS, NPS, and BLM).
- Support the distribution of native milkweeds and the milkweed inventory on public, state, and private lands through MJV, The Xerces Society, and the National Wildlife Federation (FWS, BLM).
- Coordinate with other Federal agencies to share resources and increase pollinator work on public lands. For example, BLM intends to sign an MOU with the USFS in FY 2015.
- Begin working with the BLM's National Training Center in FY2015 to produce educational and training programs about pollinator resources on public lands and best ways to manage them to mitigate threats.
- Enlist National Fishery Friends Partnership and Regional Conservation Education Coordinators to assist in encouraging local Fishery Friends Groups to support monarch habitat conservation and education activities (FWS).
- Partner with the USFS and MJV to enhance and promote the existing environmental Web casts "MonarchLIVE" and "PollinatorLIVE" for K–12 schools (FWS).

24. Names of involved Bureaus (in parentheses) and, if applicable, target dates are included at the end of each bullet.

- Work with youth service organizations through the 21st Century Conservation Service Corp to provide volunteer and work opportunities and to engage communities in monarch conservation in key urban areas along the coastal and central U.S. monarch flyways (FWS).
- Develop environmental education training on pollinator and monarch conservation, including the Monarch Butterfly Conservation Webinar series in partnership with the MJV (FWS).
- Engage partners, including NRCS Plant Materials Centers, the Lady Bird Johnson Wildflower Center, The Xerces Society, state conservation and transportation agencies, universities, seed companies, and schools, to increase the availability of and distribute regionally appropriate native milkweed and nectar plant seed (FWS).
- Continue outreach efforts to support monarch and pollinator conservation in FY 2015. About 750 schoolyard habitats and pollinator gardens currently exist or are planned on FWS lands or through partnerships with schools and other community facilities (FWS).
- Launch public awareness campaigns, including FWS action plan for monarchs and the signing of an MOU with the National Wildlife Federation to collaborate on monarch and pollinator conservation (FWS).
- Explore new opportunities to promote habitat near the Interstate-35 corridor through partnerships with USDOT Federal Highway Administration and state departments of transportation (FWS).
- Continue and expand numerous partnerships with Burpee Seeds, Save Our Monarchs, E.O. Wilson Biodiversity Foundation, NatureServe, Bat Conservation International, Garden Club of America, Student Conservation Association, Greening Youth Foundation, and Mosaics in Science program (NPS).
- Host a BioBlitz emphasizing pollinators in 2016 with the National Geographic Society and other partners in Washington, D.C., and across the Nation in as many as 400 NPS units (NPS).
- Increase citizen scientist numbers related to pollinator education, awareness, and monitoring (NPS).
- Establish new pollinator-centric projects with NPS Biodiversity Youth Ambassadors for their schools and communities (NPS).
- Support science-based pollinator research and inventorying and monitoring projects in NPS units (NPS).
- Incorporate pollinator citizen science and monitoring projects into NPS Migratory Species Initiative (NPS).
- Work with NPS Inventory and Monitoring Program networks to focus on pollinators in and surrounding park units (NPS).
- Increase science partnerships to leverage resources to benefit pollinators and their habitats (NPS).

- Develop a national inventory and monitoring strategy for monarchs, including a citizen science component, in collaboration with the National Phenology Network, MJV, and other partners. (FWS).
- Continue the Monarch Conservation Science Partnership, hosted by USGS John Wesley Powell Center for Analysis and Synthesis, with FWS, USDA, universities, and NGOs to produce a strong scientific basis for monarch conservation (USGS).
- Expand partnerships with Federal agencies and universities for native bee monitoring and identification on public lands (USGS).
- Seek partnerships with universities and scientific organizations that can identify the pollinators on public lands (BLM).

Appendix G. Department of State Pollinator Protection Plan

The Department of State is committed to conservation and sustainable use of natural resources, and represents the United States globally in numerous international fora to advance U.S. views on a range of environmental issues. As an agency, this commitment is displayed through the many actions taken to enhance sustainability, including increasing energy conservation and efficiency, deploying renewable energy, and installing pollinator and wildlife-friendly landscaping. The Department is not a large landowner inside the United States, with seven domestic properties totaling fewer than 71 hectares.

In 2009, Secretary Clinton launched the Greening Diplomacy Initiative (GDI), a commitment to lead by example and improve the sustainability of the Department's facilities and operations. The mission of the GDI is to improve the Department's environmental footprint and increase efficiencies by harnessing expertise in policy, management, and public diplomacy from grassroots to senior management, in order to cultivate and institutionalize sustainability efforts, measure and report progress, and challenge others by fulfilling our environmental and energy resources commitments and highlighting our successes. To implement these goals, the Department has an agency-wide senior-level Greening Council and more than 150 Green Teams at overseas posts.

As a result of these efforts, there are currently more than 20 U.S. Diplomatic Posts and two domestic facilities featuring pollinator-friendly and/or native plant-focused landscaping. In addition, Integrated Pest Management practices are in place in all Department-owned facilities. Four Missions are registered as Certified Wildlife Habitat by the National Wildlife Federation in recognition of their contributions to supporting local wildlife.

One mechanism the Department of State uses to foster pollinator-friendly efforts outside the Continental United States is its portfolio of diplomatic missions around the world. U.S. Embassies are a powerful force for introducing innovative solutions and influencing individuals and institutions in host countries, and play an important role in mobilizing public opinion and action. Our missions work with local communities and international partners as they strive to integrate sustainability within their operations through increasing energy efficiency, using native plants in landscaping, deploying renewable energy, applying green procurement practices, and reducing water use.

Building on its solid foundation of achievement at its facilities, the Department of State is preparing to take a number of actions in response to the *Presidential Memorandum on Creating a Federal Strategy to Promote the Health of Honeybees and Other Pollinators* to make further gains in pollinator conservation domestically, and as appropriate internationally.

Increasing and Improving Pollinator Habitat

Domestically, the Department will continue its ongoing partnership with the General Services Administration to explore further pollinator-friendly landscaping enhancements at appropriate facilities, and Integrated Pest Management practices will remain in place at all facilities owned.

Metrics: Efforts will include, consistent with the master plan for the facility and subject to the availability of resources, cultivation and planting of a pollinator meadow at the National Foreign Affairs Training Center (NFATC), the main campus of the Foreign Service Institute (FSI), in Arlington, Virginia, during the spring of 2015. Consistent with the master plan for the facility and subject to the availability of resources, a rooftop pollinator garden will be installed in 2016 after the replacement of the roof system on a building at NFATC. FSI is the Federal Government's primary training institution for the U.S. foreign affairs community, preparing U.S. diplomats and other professionals to advance U.S. foreign affairs interests overseas and in Washington. More than 100,000 students from the State Department and 47 other U.S. government entities in the executive, judicial, and legislative branches of government attend classes each year at NFATC. By the fall of 2016, interpretive signage will be created and installed, consistent with the master plan for the facility and subject to the availability of resources, to explain the purpose and benefits of these landscaping installations—as well as the multiple existing native plant gardens already incorporated into the NFATC's 29 hectare campus—and to provide context about U.S. domestic and foreign policies related to pollinators and biodiversity. Other State Department-owned facilities in the United States will also be considered for additional efforts to further enhance their pollinator-friendly habitat.

Partnerships

To support these efforts, the Department of State is exploring development of active cooperative relationships with Bat Conservation International, the National Wildlife Federation, and the Xerces Society for Invertebrate Conservation.

Property Abroad

On State Department-owned properties that are located outside of the United States, the Department will build on its existing pollinator-friendly landscaping and work to increase the amount of pollinator habitat at appropriate facilities where possible.

Metrics: Through the coordinated efforts of Green Teams, Facilities Management, and Environment, Science, Technology, and Health officers and others, the Department will seek to add additional pollinator-friendly landscaping installations, subject to the availability of resources. Under the Greening Diplomacy Initiative, the Department will disseminate guidance to posts from the Bureau of Overseas Buildings Operations on best practices for pollinator friendly habitats.

Wildlife Habitat Certification

The State Department will explore the potential for Department-owned properties with pollinator/native plant gardens to be recognized as wildlife habitats.

Metrics: Four U.S. missions—Bern, Ciudad Juarez, Geneva, and Santo Domingo—already have National Wildlife Federation (NWF) Wildlife Habitat Certifications in recognition of the biologically diverse and wildlife-friendly nature of those facilities. This recognition is highlighted in eco-diplomacy outreach. Initial efforts to seek further NWF certifications will focus on the National Foreign Affairs Training Center (NFATC) and selected U.S. diplomatic missions overseas with existing pollinator-friendly habitat. Subject to the availability of resources, the Department will seek to have additional missions certified.

Bat Pollinators

In recognition of the role that bats play as pollinators in many countries, the Department will also consider, subject to the availability of resources, possibilities for appropriately sited U.S. diplomatic missions to increase their bat-friendliness.

Metrics: The Department will use guidelines and information from bat conservation experts to explore which facilities might be candidates for such efforts.

Social Media

The State Department will complement and amplify existing and future on-the-ground actions with pollinator-themed social media.

Metrics: Starting with the rollout of the *Federal Strategy*, Washington, DC-based and overseas diplomatic missions' social media platforms will be used on a weekly and monthly basis, respectively, to reach and influence a global audience about the U.S. government's perspectives on the importance of pollinators to biodiversity, food security, and sustainable development globally and achievements in these areas. The social media platforms of cooperating non-governmental agencies will also be leveraged when possible to further the reach of messages and messaging.

Other International Engagement

In addition to these efforts, the Department will continue to support the work of the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES). The State Department is a major funder of IPBES and, in partnership with the U.S. Department of Agriculture, actively supported the designation for one of the first IPBES deliverables to be a thematic assessment of pollinators, pollination, and food production. The project, which is due for completion in 2015, will provide useful insight for U.S. government and global efforts to promote pollinator health. The State Department will also continue its membership in the North American Pollinator Protection Campaign (NAPPC), a collaborative body of more than 120 partners who are working together to support the health of resident and migratory pollinating animals in North America.

Appendix H. Department of Transportation Pollinator Protection Plan

The U.S. Department of Transportation (Department or USDOT) recognizes the ecological and economic importance of promoting pollinator health. The Department supports the Presidential Memorandum on Pollinator Health, and is committed to working with both Federal and non-Federal partners to meet the President's objectives.

Below is a general outline of the Department's actions to date that support the Presidential Memorandum, as well as current and planned actions. The Department has multiple operating administrations (OAs). Not all Departmental administrations will have actions or activities for each of these sections. In some cases, administrations have collaborated around a single effort to address the Presidential Memorandum.

Development of plans to enhance pollinator habitat on Department facilities and lands

The USDOT action on this issue will include the following OAs: Federal Aviation Administration (FAA), Office of the Secretary of Transportation (OST), Federal Highway Administration (FHWA), Saint Lawrence Seaway Development Corporation (SLSDC), Maritime Administration (MARAD), and Federal Railroad Administration (FRA). The OST Office of Sustainability and Safety Management (OSSM) is coordinating these actions.

The OSSM is working closely with the USDOT OAs that own or directly manage properties (FHWA, OST/Volpe, MARAD, FRA, SLSDC, and FAA) to identify and implement landscape management practices that support and improve the health of wild pollinators and honey bees and identify additional opportunities for supporting pollinator health. The following is an interim list of actions taken and future commitments from USDOT:

The USDOT's Assistant Secretary for Administration issued a policy memorandum directing the OAs to support pollinator friendly practices throughout their operations and facilities nationwide through implementation of the CEQ addendum, *Supporting the Health of Honey Bees and Other Pollinators*, part of the *Sustainable Practices for Designed Landscapes* guidance. The OSSM and USDOT OAs are reviewing landscape management contracting processes to identify ways to incorporate recommendations from the addendum into future landscape management contracts and develop contract evaluation criteria that support pollinator health. The OSSM has worked collaboratively with the USDOT HQ building management company to install a pollinator garden at USDOT headquarters that will be managed without the use of pesticides and will adopt other landscape management practices that support pollinator health; the garden has been certified by the North American Butterfly Association.

The FAA planted pollinator-friendly plants at the Mike Monroney Aeronautical Center in Oklahoma City, OK in spring 2015. This included planting Oklahoma redbuds, four types of crepe myrtles, and native butterfly milkweed. Plant selection considered many environmental criteria, such as pollinators supported, greenhouse gas emissions benefits, drought tolerance, disease and pest resistance, and the promotion of native species. The selected plants provide bloom coverage during the spring, summer, and fall, and support both bees and butterflies.

The OSSM conducted an inventory of landscape management practices documenting widespread use of native plants and minimal insecticide use on USDOT-managed properties. The OSSM will prepare a report of USDOT facility landscape management practices supporting pollinator health.

The OSSM educated USDOT employees and contractors working at the Washington, DC headquarters building about threats to pollinator health and the importance of the use of native plants in home gardens, by sponsoring lectures on pollinator health and pollinator gardens in conjunction with the USDOT's Earth Day celebration on April 21, 2015. At this event, OSSM also sponsored the distribution of free pollinator-friendly saplings (*Amphora fruticosa*) and seed packets (*Echinacea purpurea*) to USDOT employees for planting in their yards and gardens.

The OSSM identified three USDOT properties (FHWA's Turner-Fairbank Highway Research Center, OST/Volpe's National Transportation Systems Center, and the FAA's Mike Monroney Aeronautical Center) to serve as "Pollinator Flagship Facilities." Managers of these properties, overseeing a total of approximately 50 acres, have agreed to develop plans for enhanced plantings of pollinator gardens including native plants and to reduce mowing to allow increased flowering of existing grassland plants. Each of the USDOT Pollinator Flagship Facilities is currently developing a pollinator support enhancement plan. The OSSM will work to support the implementation of these plans at USDOT Pollinator Flagship Facilities.

Metrics:

- On April 13, 2015, USDOT issued a policy directive to incorporate pollinator friendly practices into USDOT managed landscapes nationwide.
- The OSSM will complete its report by June 2015. The OSSM sponsored Earth Day activities and events in April, 2015. The OSSM distributed 1000 pollinator-friendly saplings and seedlings to USDOT employees and contractors. The pollinator garden at USDOT headquarters was installed. The first USDOT Flagship Pollinator Facility habitat will be installed by June 1, 2015. All three USDOT Pollinator Flagship Facilities will complete their planning document by September 2015.
- The OSSM met with facility managers at each of the USDOT-owned or USDOT-leased properties to discuss opportunities to improve support for pollinators by reducing the use of pesticides, adding flowering plants that bloom throughout the growing season, allowing longer intervals between mowing of grasslands, and other pollinator-friendly practices. These meetings resulted in the concept of flagship facilities.
- The OSSM is working with the FRA to explore options for including pollinator language in the environmental assessment of the 52-square mile Transportation Technology Center in Pueblo, Colorado.
- The OSSM will identify USDOT facilities in the I-35 corridor that could participate in coordinated "monarch highway" activities.

Roadway Pollinator Habitat

In May 2014, FHWA signed a Memorandum of Understanding establishing the Federal Native Plant Conservation Committee of the Plant Conservation Alliance. The purpose of the Committee is to identify and recommend, as appropriate, priority conservation needs for native plants and their habitats and

coordinate implementation of programs for addressing those needs. This collaborative work will benefit pollinator health by increasing the availability of native plant habitat.

The FHWA has contracted to create materials to support best management practices (BMPs) for pollinator health in roadside vegetation management. The FHWA contractor has retained a non-profit organization specializing in invertebrate ecology to help develop these materials. Based on the latest science in vegetation management and pollinator habitat, the BMP materials will provide transportation agencies with practical tools to promote increased pollinator habitat along roadways through improved plant material selection, mowing practices, and other roadside habitat maintenance practices. Deliverables for the BMP contract include: 1) a literature review of the latest scientific data on pollinator health and factors affecting pollinators to establish a foundation for BMP documents for transportation agencies; 2) a report on the state of the practice for roadside vegetation management based on interviews with nine State departments of transportation; 3) a high-level report for FHWA and State departments of transportation program, policy, and maintenance management staff; and 4) a detailed and practical BMP guidance document for State department of transportation field staff and contractors.

In 2013, FHWA published a limited number of hardcopies of *Vegetation Management: An Eco-regional Approach,* which discusses regional vegetation management practices, native species recommendations, and other activities along highway rights-of-way that support pollinator health. The FHWA is developing the publication into an e-book for wider dissemination to State departments of transportation and other transportation stakeholders. The e-book will be publically available on FHWA's website.

Metrics:

- The FHWA completed its literature review for use in developing the BMP report in January 2015. The FHWA is working to make this document, and the e-book, publicly available by spring 2015.
- The FHWA will complete a report on the state of the practice by spring 2015, complete a high-level report for FHWA and States' departments of transportation staff by fall 2015, and complete a detailed BMP guidance document by spring 2016.

Work with State Departments of Transportation, etc. to promote pollinator-friendly practices and corridors

The FHWA has completed an informal survey of FHWA field offices in the States (Division Offices) about current State department of transportation practices. Of the 35 States that responded, 28 States identified native seed or wildflower programs, nine identified pollinator-specific programs, and eight identified monarch butterfly-specific programs as part of their roadside management practices.

The FHWA will continue to participate in the interagency U.S. High-Level Working Group on Monarch Butterfly Conservation, led by the U.S. Fish and Wild Service. Through this group, FHWA coordinates with other Federal agencies, State agency stakeholders, and non-profit conservation organizations to share information and coordinate efforts to support monarch conservation. The FHWA will continue to participate in the Plant Conservation Alliance's Interagency Seed Strategy Development Work Group.

The FHWA has strengthened partnership and collaboration between the Department and the American Association of State Highway and Transportation Officials (AASHTO) around the issue of pollinator health. The FHWA will continue to work with AASHTO to promote pollinator-friendly practices among State departments of transportation.

The FHWA is coordinating with AASHTO's Center for Environmental Excellence to conduct a pollinator webinar with State departments of transportation in 2015. The webinar will introduce State departments of transportation to the new resources FHWA is developing and provide opportunities to share information on best management practices in roadside vegetation management to improve pollinator habitat in highway rights-of-way.

The FHWA has identified two committees on the Transportation Research Board relevant to pollinator health – Roadside Maintenance and Operations (AHD50) and Ecology and Transportation (ADC30). The FHWA will work through these committees to promote pollinator health among transportation stakeholders.

Identify opportunities to educate privately owned railways, pipelines, and other transportation-related facilities about the need to increase pollinator habitat

The USDOT will continue to identify opportunities to educate stakeholder communities about the need to promote pollinator health. The Department will develop links on the DOT website that will provide visitors access to additional resources promoting the role of the transportation sector in support of pollinator health.

Metrics:

- The FHWA will host a webinar in 2015. The Department intends for links to pollinator resources to be online by Pollinator Week (June 16-23, 2015).
- The USDOT will continue to explore partnership opportunities with a number of organizations. The USDOT is collaborating with AASHTO, the Office of Science and Technology Policy, the U.S. Fish and Wildlife Service, and the National Wildlife Federation to explore a multi-state partnership to enhance habitat for the monarch butterfly. This vision includes a potential special designation for Interstate 35 (I-35) and the enhancement of habitats on Federal lands and the highway rights-of-way along the 1,500 miles of I-35. Connecting habitat through rights-of-ways for monarchs will also benefit other pollinators.
- The USDOT has worked with the American Society of Landscape Architects (ASLA) regarding information on pollinator-friendly landscaping design for transportation stakeholders, as well as the Rails-To-Trails Conservancy in order to identify opportunities to promote pollinator health on unused rights-of-way.
- The Department will measure progress by ensuring implementation of the USDOT actions and activities discussed above. In addition to the actions listed above, the Department will continue working to identify opportunities to respond to the Presidential Memorandum and promote pollinator health. The Department welcomes the feedback and ideas of the Task Force partners and stakeholders.

Appendix I. General Services Administration Pollinator Protection Plan

The U.S. General Services Administration (GSA) provides the spaces, services, and goods required to operate the Federal Government. GSA's Public Buildings Service (PBS) provides workplaces by constructing, managing, and preserving government buildings and by leasing and managing commercial real estate. PBS owns or leases over 8,700 assets, comprising approximately 377 million square feet of workspace for over 1 million Federal employees.

While GSA's holdings do not place it among the largest Federal land management agencies, the agency has many prominent landscaped building sites, from Federal buildings to courthouses and land ports of entry, where Federal employees and the public can observe, and the environment can benefit, from best practices in pollinator-friendly gardening and landscaping. In addition to thousands of acres of ground-level vegetation, GSA maintains over 2 million square feet of green or vegetated roofs.[25]

GSA's approach to carrying out the Presidential Memorandum, *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*, is focused on designing new or renovated landscaped sites to promote and protect pollinators, and instituting pollinator-friendly management of sites within our inventory through targeted contract specifications, employee training, and special emphasis projects. The key elements of this strategy include:

Contributing to CEQ's Designed Landscape Guidance

During the summer of 2014, GSA worked closely with the Council on Environmental Quality (CEQ) and other executive branch agencies to develop *Supporting the Health of Honey Bees and Other Pollinators*, an addendum to the *Guidance for Federal Agencies on Sustainable Practices for Designed Landscapes*. This document is now available on the White House CEQ website, and is referenced by, and consistent with, GSA standards and guidance.

Adding Pollinator Habitat Guidance to Facility Standards

GSA's Facilities Standards for the Public Buildings Service, the P-100,[26] provides design performance guidance to meet agency design goals. The P-100 laid the groundwork for policies to protect pollinator habitat through existing standards that promote the preservation of greenfields, protection of existing site trees and other vegetation, and use of non-invasive, native, or adapted vegetation. GSA has now added pollinator specific guidance to the P-100, including practices to promote both nesting and foraging for regionally-appropriate pollinators on landscaped sites. The new draft standard was distributed throughout the agency, as a Public Buildings Service Commissioner's directive on September 18, 2014, and made available to all Federal agencies associated with this initiative.

25. http://www.gsa.gov/portal/content/166443
26. http://www.gsa.gov/portal/content/104821

Metrics: This draft revision to the standard is going through the official PBS issuance process and is anticipated to be finalized by GSA and incorporated into the 2015 P-100 issuance the end of the third quarter of FY15. Like the rest of the P-100, the new pollinators section sets standards for three different tiers of performance from which project managers, and Federal clients, may choose. The performance metrics range from a baseline non-mandatory 20% target of pollinator-positive plant material (as a percentage of all newly introduced plant material to the site), to a mandatory 50% target of pollinator-positive plant material at the third tier. Tier 3 includes additional requirements, including planting a higher diversity of plant species for each viable growing season, and providing educational signage to benefit the public.

Incorporating Pollinator Habitat Protection in National Custodial Specifications

GSA informs the management of agency facilities and landscapes nationwide through a national custodial specification providing model contract language. The agency added new pollinator friendly guidance references to relevant custodial specification sections, such as Grounds Maintenance, that cross reference the new P-100 Facilities Standards pollinator requirements and the *Supporting the Health of Honey Bees and Other Pollinators* addendum to the *Guidance for Federal Agencies on Sustainable Practices for Designed Landscapes*. This language will assist facility managers across GSA's 11 Regions to obtain the expertise they need to properly manage agency landscapes in ways that protect pollinator health. Furthermore, the revision of standard contract language has the potential to influence the practices of landscape service providers nationwide.

Metrics: GSA will use its existing management systems to track implementation of pollinator-friendly practices across the agency.

GSA Staff Education

Effective pollinator protection requires GSA to educate key staff regarding best practices and underlying scientific dynamics. GSA has already provided training webinars to staff on sustainable land development and design via the Sustainable Sites Initiative (SITES) and Lady Bird Johnson Wildflower Center. The agency now has an additional agreement with the Director of the U.S. Botanic Garden to develop and provide GSA with a learning module on pollinator basics for design and construction professionals. This will allow GSA professional design staff to become educated on the subject as part of their annual continuing education requirements to maintain accreditations by the American Society of Landscape Architects (ASLA), American Institute of Architects (AIA), and American Planning Association (APA).

Metrics: The training is anticipated to be completed by the end of the third quarter of FY15. GSA will evaluate the number of employees trained by the fourth quarter of FY15 and assess additional training needs at that time.

Partnerships

GSA's partnerships with the Sustainable Sites Initiative (SITES), Lady Bird Johnson Wildflower Center, and U. S. Botanic Garden to provide training to GSA staff allows the Agency to expand its expertise in pollinator-friendly landscaping practices.

Demonstrating Pollinator Habitat Protection through Special Emphasis Projects

GSA has demonstrated sustainable landscaping practices through several projects, including the SITES-certified Pete V. Domenici U.S. Courthouse, (Albuquerque, N.M.) landscape renovation,[27] which provides a refuge for urban wildlife with 79 percent native plants, and the Federal Building at 50 United Nations Plaza (San Francisco, CA), with a green roof designed to create a safe haven and fly-over for bird, butterfly, and insect populations. GSA will review our current capital project programs in an attempt to identify additional special emphasis pollinator friendly projects to demonstrate best practices and educate the public about them.

Metrics: We anticipate identifying several special emphasis pollinator friendly projects by the end of the third quarter of FY15.

Facilitating Procurement of Specialized Landscaping Services

GSA's Federal Acquisition Service (FAS) provides comprehensive solutions for the procurement of millions of products and services by other Federal agencies at the best value possible. As part of this effort, it maintains the GSA Schedules, which serve as a collection of pre-negotiated contracts. GSA issued an official Request for Information (RFI #95967) on February 18, 2015 for a ten-day period, with the aim of assessing vendor qualifications and capabilities to convert simple turf acreages to native grasslands, with the aim of providing greater forage and nesting habitats for pollinators.

Metrics: If the industry responds favorably, FAS will assess the possibility of adding this service to the GSA Schedule for use by agency partners.

Partnerships

Based on this RFI, GSA will explore critical partnerships with other agencies across the Federal government by offering access to contracting vehicles that would make it easier for these agencies to procure pollinator-friendly landscaping services.

27. http://www.sustainablesites.org/certified-sites/petedomenici

The GSA will provide comments on latent opportunities to incorporate pollinator-friendly landscaping practices and references within:

1. Green building and landscaping certification systems such as LEED, SITES and Green Globes;
2. Standards and model codes such as ASHRAE Standard 189.1 and the International Green Construction Code;
3. Standard Form Contracts, *e.g.*, those of the American Society of Landscape Architects (ASLA) and American Institute of Architects (AIA);
4. Construction Specification systems such as MASTERSPEC and CSI.

Appendix J. Department of Housing and Urban Development Pollinator Protection Plan

The Department of Housing and Urban Development (HUD) has a broad network of partners including states and local governments, as well as private and nonprofit housing providers. There are a number of opportunities to encourage support for pollinators across HUD programs. HUD's approach to carrying out the Presidential Memorandum, *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*, is focused on 1) developing a Notice to encourage grantees to support pollinator habitats in their projects, 2) developing training and educational materials about the importance of pollinators and their habitat, 3) reviewing the Better Buildings Challenge guidance for opportunities to incorporate pollinator habitat on Green Roofs, and 4) reviewing current guidance to identify opportunities to support pollinators.

Most HUD projects are designed and implemented by grantees. Even though there are no landscaping requirements for HUD funding at this time, grantee communities could improve stormwater management and reduce water usage and landscaping maintenance by developing project sites landscaped with native, flowering plants. Furthermore, including educational signage in the landscaped areas of the project sites would improve the public's knowledge on pollinators and their habitats and the many beneficial ways they improve communities.

Strategy

HUD funds over 11,000 grantees across the country. The Department funds development projects in every state and city and is highly influential in the national housing market.

HUD's pollinator strategy is opportunistic. It strives to adapt grantees' current operations and maintenance regimes to benefit pollinators in practical, and therefore sustainable, ways for long-term improvement.

The lack of landscaping requirements is a challenge, but opportunities still exist to encourage pollinator health in HUD-assisted projects. Thorny shrubbery, typically installed to restrict and channel pedestrian access, could easily be wild pollinator habitat. Shade trees to reduce heat island effects could support pollinators while reducing energy consumption. More trees will also trap airborne dust to improve air quality for residents. Xeriscaping (*i.e.*, drought resistant landscaping) recommendations to improve drought resilience further enhance compliance by valuing the advantages of native plant species.

The strategy provides new guidance on landscaping with compelling arguments for implementation. Finally, this approach uses interactive training and educational materials to incorporate pollinator awareness into property management decisions.

Draft a HUD Notice

HUD uses a public notice process to reach stakeholders quickly. HUD will use this process to issue a public notice for encouraging grantees to support the National Strategy. This notice will reach local

decision makers about the plight of pollinators and what they can do to improve conditions for the bees and butterflies we rely on. This public notice will provide suggestions and actions that public housing directors, grant managers, facility managers, and elected officials can take to improve pollinator habitat on HUD assisted projects.

HUD will encourage major programs and their grantees to incorporate new pollinator habitats into existing and future projects. Additionally, HUD will encourage these stakeholders to adjust their landscaping procedures to reduce mowing, plant native species, and review pesticide usage. The notice will include economic arguments for pollinator support (such as reduced landscaping and maintenance costs) as incentives to implementation.

Train Grantees in Pollinator Awareness

HUD's in-person training events for environmental compliance alone reach over 1,000 public and private practitioners annually. Webinars and podcasts reach hundreds more. The Department is expanding its virtual training to reach more people at all levels of HUD-assisted organizations. One product currently in development is the Environmental Review Core Curriculum - Learning Management System (LMS). This training suite is designed to teach the basics of environmental review at HUD to HUD staff and grantees who conduct environmental reviews. The goal is improved compliance with the National Environmental Policy Act and related Federal environmental laws and authorities.

The LMS could incorporate pollinator health to raise awareness and suggest supportive practices. Incorporating pollinator awareness into HUD's training materials and events will spread the message to thousands of people able to help.

Review the Better Buildings Challenge Guidance for Opportunities to Incorporate Pollinator Habitat on Green Roofs

HUD has joined with the Department of Energy to promote energy efficiency improvements in buildings through the Better Buildings Challenge. To date, 3 billion square feet of offices, manufacturing plants, stores, and multifamily housing have taken the challenge. Among the techniques used to improve buildings are green roofs. Many partners have installed green roofs on their buildings to insulate, control stormwater, or retain rainwater for use in the building. Some have created open, green space in cities where none existed before. Those spaces could also nurture pollinators. HUD will review the Better Buildings Challenge guidance for opportunities to discuss pollinators.

Review Current Guidance

The Department provides numerous guidance materials to communicate policy goals and aid compliance. None currently include landscaping requirements for HUD-assisted projects. Program office staff will review existing guidance looking for opportunities to support pollinators as part of the process of drafting a Notice to grantees.

Metrics: Most HUD projects are designed and implemented by grantees. The notice will encourage states, cities, and local public housing authorities to support pollinators, induced by savings in operating costs and improvements to appearance of properties and quality of life for residents and neighbors.

Appendix K. U.S. Army Corps of Engineers Pollinator Protection Plan

This plan establishes guidance to promote the health of pollinator species on lands and waters administered by the U.S. Army Corps of Engineers.

The Corps Environmental Stewardship mission states: "The Army Corps of Engineers is the steward of the lands and waters at Corps water resources projects. Its Natural Resources Management Mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations. In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance, and restoration practices. The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other Federal, state, tribal and local agencies as well as the private sector. The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air, and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life."

Although the primary focus of this plan is on Corps fee-titled lands, this plan shall be applied, as appropriate, to all Corps commands having responsibility for Civil Works (CW) functions. In accordance with Title 36, CFR, Chapter III, part 327.0 this guidance shall be applicable to water resources development projects, completed or under construction, administered by the Chief of Engineers, and to those portions of jointly administered water resources development projects which are under the administrative jurisdiction of the Chief of Engineers. Additional activities and pollinator friendly management actions will be shared among other Corps programs and where appropriate added to the Corps overall plan.

Presidential Memorandum—"Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators," dated June 20, 2014, directs agencies to develop plans to enhance pollinator habitat. *As per Section 3. Increasing and Improving Pollinator Habitat, subsection k, the Army Corps of Engineers shall incorporate conservation practices for pollinator habitat improvement on the 12 million acres of lands and waters at resource development projects across the country, as appropriate.* While accomplishing activities on Corps lands per Section 3 (k), the Corps also presents valuable contributions to Section 2 (b) and Section 2 (c) for public education and partnerships.

USACE Commitments to Enhance Habitat on USACE Fee Owned Projects

The Corps will work with others to promote education, awareness, and management practices that provide for improved bee and pollinator populations and habitat through the following USACE PM Implementation Actions:

- Identify existing policy and guidance, and modify for pollinator health including access for commercial hives.
- Incorporate pollinator work within budget guidance.

- Increase awareness and education.
- Implement conservation and best management practices for pollinator health.

Issue Policy/Guidance on Pollinator Health and Management

Once the task force work is completed for "Pollinator Friendly Best Management Practices", the Corps HQ Natural Resource Management (NRM) branch will issue a policy memo or similar guidance to Divisions, Districts, and Projects encouraging the manual to be used as part of normal operating principles during land management. The Corps will revise guidance of natural resource regulations when updated.

Metrics: The Corps will issue either a policy memo or guidance dependent upon the final release of the "Pollinator Friendly Best Management Practices for Federal Lands" (BMPs) publication from the Task Force, which is expected June 2015.

The Corps will revise guidance of natural resource regulations during updates of Engineering Regulation 1130-2-540 Stewardship Operations and Maintenance Guidance and Procedures that direct the Corps land management.

Metrics: The Corps will modify ER 1130-2-540 to include pollinator protection and management —TBD.

Incorporate Pollinator Work within Budget Guidance

Provide guidance in USACE Budget Engineer Circular and Environmental Stewardship Budget Tools that allow pollinator habitat improvements and other projects that benefit bees and wild pollinators to be identified and considered during the budget process under the stewardship business line.

Metrics: Completed. Budget identifiers have been established in the ENS Business Line Budget Tool (ESBEST).

Increase Awareness and Education

Section 2 (b) of the Presidential memorandum calls for plans to expand and coordinate public education programs, outlining steps individuals and businesses can take to help address the loss of pollinators. The Corps is one of the leading providers of outdoor recreation with over 370 million visitors per year. The Corps is uniquely qualified to engage with visitors as over 80 percent of Corps projects are within 50 miles of a metropolitan area.

The Corps will incorporate information on pollinator health in exhibits and displays for visitor education, as appropriate, and increase the pollinator habitat message into ranger contact materials when updates occur. The Corps will consider construction of pollinator gardens near visitor centers and other high pedestrian traffic areas to promote healthy pollinator habitat.

Metrics: The Corps will develop a timeline to implement awareness and education actions for both Corps' managers and the public.

Implement Conservation and Best Management Practices for Pollinator Habitat

Many opportunities exist for the Corps to improve pollinator habitat on its 12 million acres across 470 projects. The Corps will use the Task Force BMPs publication to improve and protect pollinator habitat. More specifically, the Corps supports utilization of the following BMPs to improve pollinator habitat as established in the draft BMP for Federal lands: 1) thinning and understory shrub control, 2) removing invasive species to improve pollinator habitat, 3) promoting native plant communities along forest roads for pollinators, 4) seeding native forb species in restoration, rehabilitation, and re-vegetation efforts.

Furthermore, the Corps supports utilization of the following BMPs to protect pollinators: 1) integrated pest management, 2) prescribed burning, 3) mowing, 4) agricultural practices for wildlife management, 5) mulching for landscaping and gardens, 6) managing lawns for pollinators.

The Corps will seek opportunities for habitat improvements specific to monarch butterflies. In recent years the monarch butterfly has experienced a 90 percent decline in population, with the lowest recorded population occurring in 2013-2014. Recently, the U.S. Fish and Wildlife Service has focused on the I-35 corridor from Texas to Minnesota as an area that provides important spring and summer habitat along the butterfly's migration path. Coordination with partners, such as Texas Parks and Wildlife, has begun as the Corps has over 1 million acres at 45 projects within 50 miles of I-35. Additionally, the Corps will look for opportunities to prioritize projects and habitat enhancement actions that occur with recognized zones of importance.

The Corps will consider pollinator practices related to specific program areas to include the following: 1) *Land Use Planning* - Consideration of impacts to pollinators shall be incorporated into work related to out-grants, licenses, and other land management decisions. Additionally, the Corps shall review current policies related to beekeeper access to Corps lands and evaluate regional procedures to assist in providing improved access. 2) *National Environmental Policy Act (NEPA)* - Technical material from subject matter experts will be distributed via web on proper management and protection of pollinators and their habitat to allow for improved decision making during the NEPA process. 3*) Wildfire Management* - Wildfire management plans shall be considerate of impacts related to pollinators and, when flexibility permits, adjusted to minimize impacts. 4) *Integrated Pest Management Plans* - The Corps will distribute information from the Task Force agencies to educate the Corps field staff on improved uses of pesticides

Metrics: The Corps, with assistance from the Task Force, will evaluate potential metrics to track both work and accomplishments that improve pollinator habitat, partnerships, and/or education. For FY 2017 budget development, the Corps has developed specific indicators to track work activities and accomplishments that target pollinator protections. At a minimum, the acreage of habitat improvement, invasive species treatment, plantings, site protection and other related activities will be identified, consolidated, and incorporated into the Corps annual program recommendations. Additional metrics focusing specifically on monarch improvements and pesticide management will be evaluated for future development.

Milestone: The Corps will begin Implementation of Conservation and Best Management Practices for Pollinator Habitat dependent upon the final release of BMP manual from Task Force and the issuance of Corps guidance.

Partnerships

The Corps recognizes the power of partnerships and volunteers to accomplish natural resource management activities. In both 2013 and 2014, the Corps received over $50 million in value from partner contributions and in-kind services. The existing network of partners will provide the Corps an excellent starting point for this initiative.

Along with Task Force assistance, the Corps will contact national partners to identify opportunities for pollinator work on Federal lands. The Corps along with Task Force assistance will engage with existing partners such as the National Wild Turkey Federation, Quality Deer Management, and the American Chestnut Foundation to discuss assistance in both management and education of pollinator health. The Corps Stewardship Advisory Team will engage the Corps Partnership Advisory Committee to evaluate existing partnership tools, such as challenge partnerships and handshake programs to determine their use to improve pollinator health.

Appendix L. National Science Foundation Pollinator Protection Plan

The National Science Foundation's (NSF) funds basic research in all areas of science and engineering, except medicine, through competitive merit review of grant proposals submitted primarily by American universities and research institutions. Other government agencies, universities, and corporations use basic scientific research funded by NSF to develop applied solutions and new technologies.

NSF's substantial ongoing support for pollinator research comprises over 250 currently funded projects focused on pollinators, totaling over $113 million. There is no single pollinator focused program at NSF, however pollinator-relevant research and education projects are supported in science, education, and engineering programs across the entire agency. The following thematic portfolio of NSF-supported research and education programs relevant to the White House Pollinator Health Initiative is an example of how NSF-funded projects advance and promote science in the United States and worldwide. These ongoing multi-year projects represent the best pollinator-related research to be submitted in the last several years, and we expect investigators interested in pollinators will continue to submit proposals to the wide variety of pollinator-relevant programs in all areas of science and engineering.

Research

Pollinator relevant research projects are funded in numerous programs found in every directorate within NSF, however the majority of these projects (175 awards) are in the biological sciences. Together these projects span a wide range of basic research on all aspects of pollinator biology. Of several key areas, many focus on pollinator systems including the interactions of plants and their pollinators, changes in pollinator communities in agricultural and natural landscapes, and biodiversity of key pollinator groups in the United States and around the world. Other awards address the basic biology of insect, bat and bird pollinators (*e.g.*, development, physiology, genomics, nutrition, immunity, and behavior). A third group involve developing new tools to aid in the study of pollinators, such as building better predictive models to monitor butterfly distribution and migration, or new tools to digitize museum collections of pollinators. NSF-funded biology researchers are also studying ecosystem services, such as insect control provided by bats and other pollinators in addition to pollination.

Because issues affecting pollinators are not solely biological, NSFs active awards include other pollinator-focused projects in the social and economic sciences, mathematical sciences, engineering, and computer science. These projects include, but are not limited to, social science analyses of how beekeepers, farmers, and scientists work together to protect pollinators, mathematical models of insect group behavior, and the engineering of flying robotic bees that could ultimately behave as pollinators. The following is a sample from the more than 250 ongoing pollinator related projects of especially notable NSF awarded pollinator research conducted at universities across the country. While not exhaustive, this list highlights some of the major contributions by U.S. scientists to understanding pollinator health.

Notable NSF-awarded Pollinator Research Conducted at Universities across the Country

Reassembling pollinator communities to promote pollination in agricultural landscapes. Claire Kremen, University of California, Berkeley, with many colleagues from California, Maryland, and Illinois, studies pollinators in California's Central Valley, one of the nation's most extensive agricultural areas. Dr. Kremen and colleagues combine field observations and experiments to understand how restoring patches of natural pollinator habitat can help sustain diverse communities of pollinators. The team also assesses the economic value to agriculture and conservation pollination as an ecosystem service.

Genetics, function, and diversity of symbiotic gut microbes of honey bees and bumble bees. Nancy Moran, from the University of Texas, Austin, is examining the genome sequences and metabolism of beneficial microbes found in honey bee guts. Dr. Moran is investigating how different microbes' abundance and gene expression change when bees experience nutrient stress and disease. She is also documenting which species of microbes are found in bumble bees and honey bees collected globally. This research is crucial to understanding bee health.

Role of propolis in honey bee social immunity and health. Marla Spivak, of the University of Minnesota-Twin Cities, is studying how honey bees collect tree resin and deposit it in the hive, where it is called propolis. A propolis envelope lines the inner walls of the hive and acts as an antimicrobial layer surrounding the colony. This project investigates how this resin layer benefits bee immune defenses and colony-level social immunity. Dr. Spivak received a McArthur Award in 2010 for her work on honey bee behavior, genetics, and group immunity.

RoboBees: A convergence of body, brain and colony. Robert Wood, Harvard University, and Joseph Ayers, Northeastern University, are leading this project to create a coordinated colony of robotic bees that mimic the forms and functions of natural bees. Drs. Wood and Ayers and their team are developing a power and propulsion system for the robotic bees, as well as circuits for sensing and decision-making, and complex communication and control systems that will enable group flight. This project is of interest to researchers who work in behavior, biomechanics, neuroscience, and who engineer micro-aerial vehicles for civilian and defense use.

How stakeholders produce and share knowledge about Colony Collapse Disorder. Chloe Silverman of Pennsylvania State University is investigating how different groups of humans define and communicate what they consider scientific evidence when faced with a complex issue and scientific uncertainty. The complex issue for Silverman's research focus is honey bee Colony Collapse Disorder. As a result, she is conducting interviews with bee researchers, bee keepers, farmers and other stakeholders, as well as analyzing relevant scientific publications and media coverage. This project can demonstrate how to most effectively develop, share and spread best practices for managing pollinators.

NSF also funds national biological infrastructure that can support the White House Pollinator Health Initiative. The *National Ecological Observatory Network (NEON),* which is a large-scale integrated infrastructure of sensors, instruments, field stations, archives, and remote sensing linked to analytical tools, initiated operations in late 2014. When fully operational in 2017, NEON will make accessible continental-scale data, collected from soils, water, organisms and the atmosphere, that are essential to studying

ecological change over time. Data from NEON observatories will be an invaluable resource available to university scientists and their government and corporate counterparts assessing the impact of climate on the pollinator-supported plants and pollinator health.

As NSF already has a strong pollinator portfolio described above, NSF will continue to welcome research proposals on the variety of insect and other animal pollinators in its ongoing core programs solicitations, where the majority of the more than 250 ongoing projects were funded. Once NEON is fully online, NSF BIO will welcome grant proposal submissions to ongoing programs for projects using NEON resources. Many of the issues facing pollinators, such as habitat loss or changing climate, are not specific to a single species, yet the scientific communities studying diverse insect and vertebrate pollinators don't typically interact. To promote interaction between researchers working on a wide variety of insect and vertebrate pollinators, NSF BIO will recruit workshop leaders and support a workshop to occur in the 2016 fiscal year to identify common needed pollinator specific short term and long term research that can be used downstream by the more applied mission agencies, and metrics for measuring the impact of that research. Following the pollinator workshop, participants will produce a workshop report that will be publically available online upon completion, likely late in 2016.

Education and Outreach

Education and outreach at NSF occur through the Directorate for Education and Human Research and through education and outreach efforts that are a required part of every scientific and engineering project funded by NSF.

Proposals submitted for NSF funding are reviewed using two merit review criteria specified by the National Science Board. The first is the intellectual merit which covers the scientific impact of the project. The second criterion is the broader impacts, which includes the impact on society and the efforts aimed at training the next generation of scientists and/or educating the public. All NSF-funded science research projects must include these broader impacts activities. As part of these broader impacts activities, many researchers conduct public outreach activities to broadly disseminate their findings at their universities, local museums, and field stations. And, because most NSF research grants go to U.S. colleges and universities, the largest investment in training the next generation of scientists is through the scientific research portion of grants where many undergraduate and graduate students are involved in doing both research and outreach. In addition, the Directorate for Education and Human Resources directly funds research into effective education, and supports programs specifically designed to train the next generation of scientists. For example, the Graduate Research Fellowship Program and Research Experiences for Undergraduates program support undergraduate and graduate training across the wide range of fields of science and engineering relevant to pollinator related issues. Other programs support the informal science education that occurs at parks and other natural areas, zoos, aquaria, and museums.

Recent Notable Examples of NSF-Awarded Education Projects Occurring at Institutions Across the Country

***Project Budburst*.** Project Budburst (http://budburst.org/), a National Ecological Observatory Network (NEON) program, encourages citizen scientists to learn to make scientific observations, and to collect and share data on the timing of plant flowering. Scientists can then use the data to learn about how individual plant species respond to climate locally, regionally, and nationally. Begun in 2007, thousands of people of all ages from all 50 States have participated. The Project Budburst website contains resources for learning how to observe the plants, resources for educators and games, and promotional tools to make participation even more fun.

Maryland Science Center's Film "Flight of the Butterflies". Produced and distributed by United States, Mexican, and United Kingdom film companies, this 3D Imax film centered around the research of Dr. Fred Urquhart chronicles the longest known insect migration on earth, the migration of monarch butterflies from Canada and the United States through a narrow swath of Texas to a small number of mountaintops in Mexico. NSF funding supported the many educational materials available with this film. In addition to its NSF support, this film is co-sponsored by Mexican Federal and corporate sponsors and United States and Mexican conservation partners, and is being shown at science centers and museums throughout the world.

Eastern Kentucky University's Honors Program: Serving, Exploring and Engaging in Science in Appalachia. Led by Dr. David Coleman, director of the EKU honors program, this set of courses pairs students in the university's competitive honors program with middle schools to engage college students in real world scientific problems, expose non-STEM majors to real scientific research, provide mentoring to middle school students by the college honors students, and to collect, record, analyze, and publicize scientific data about their projects on watershed planning and bee sustainability within the Appalachian region. One of these projects is on honey bee sustainability. The research and service components for the bee sustainability project will be carried out in conjunction with Coal Country Beeworks. Coal Country Beeworks is an outreach unit of the Eastern Kentucky Environment Research Institute at EKU that promotes the re-introduction of sustainable bee populations and value-added products (such as wax, honey, queens) in the region.

NSF's education goals involve continued support for teaching, training, and learning activities including public outreach, citizen-science activities, and training of future STEM professionals. The National Science Board has repeatedly affirmed the use of NSFs two merit review criteria and the NSF expects to continue to require and support education and outreach efforts as part of all the science, engineering and education projects that we fund.

Metrics: The Lingo3G or Lingo4 text document clustering engine and associated visualization approaches described earlier to assess the research portfolia will also be used to identify education focused proposals and awards involving pollinators based on the free text content after XML extraction. This same system can be used to identify and quantify broader impacts outreach activities involving pollinators within grants focused on scientific research in the biological sciences, mathematics, physics, chemistry, computing, and engineering. Similarly to the research focused analysis, subsequent analyses will include summaries of requested and committed funding, geographic distribution of activities, topical breadth and profile, researcher and institutional profiles, and products reported through the Research.gov reporting system. Using this approach we can monitor the amount of education activities focused on pollinators to ensure support continues at a similar level.

Partnerships

In addition to the many partnerships sustained through activities within the grants that NSF awards, NSF has a variety of partnerships with other Federal agencies and public and private foundations in the United States and abroad. One such partnership is the basis of the Basic Research to Enable Agricultural Development program (BREAD). BREAD is collaboration between NSF and the Bill and Melinda Gates Foundation to support innovative basic research with outcomes that address key constraints facing smallholder farmers in the developing world. The following research project on African honey bees was funded through BREAD and the results from this work are directly applicable here in the United States and in Africa.

Recent Notable Example of a NSF-Awarded Research Project in Africa

BREAD: Sustaining pollinator health in East Africa. James Tumlinson and colleagues at Pennsylvania State University, in a project co-funded by the Bill and Melinda Gates Foundation, are comparing honey bees in Africa to those in the United States to better understand Colony Collapse Disorder. Colony Collapse Disorder has decimated U.S. honey bee hives, but has not been reported in African honey bees. NSF-funded American scientists are working with Kenyan scientists to conduct a detailed geographic and behavioral survey of native honey bees in Kenya, and to document the distribution and effects of the widespread parasite *Varroa destructor* and other pathogens that impact colony health. This basic information will help researchers understand how these pathogens and their treatments are affecting managed honey bees here in the United States.

Appendix M. Smithsonian Institution Pollinator Protection Plan

The Smithsonian Institution (SI) has been a leader in conducting top-quality research on pollinators and providing intriguing public education about the importance of pollinators in everyday life. Scientific research, public outreach, and pollinator habitat enhancement takes place at six Smithsonian research centers: National Museum of Natural History (NMNH), National Zoological Park (NZP), Smithsonian Conservation Biology Institute (SCBI), Smithsonian Environmental Research Center (SERC), Smithsonian Tropical Research Institute (STRI), and Smithsonian Gardens (SG). More taxonomic and ecological research on pollinators is needed to understand and combat pollinator declines. The Smithsonian is committed to continuing its efforts on the scientific research and public education of pollinators. As a trust instrumentality, and not an executive agency, SI is voluntarily complying with the spirit of the Presidential Memorandum.

Scientific Research

The Smithsonian excels in producing high-caliber scientific papers on the taxonomy, ecology, evolution, paleobiology, and conservation of pollinators and the plants they service. Research is focused on, but is not limited to, bees, butterflies, moths, beetles, flies, birds, and bats in the United States and abroad. Topics of research at NMNH, SCBI, SERC, and STRI include better understanding of pollinator taxonomy and examining the ecology and evolution of local plant-animal pollination networks. Several upcoming projects include bee surveys, DNA barcoding, taxonomy of closely-related species groups, phylogeny, and phylogenomics. One study, for example, will reconstruct and analyze plant-pollinator networks using next generation sequencing and DNA barcoding using pollen grains on the bodies of insect pollinators.

Digital Collections

The scientific collections at NMNH form the largest, most comprehensive natural history collection in the world. By examining botanical and zoological specimens gathered in different eras and regions, scientists learn how our world has varied across time and space. Smithsonian scientists and their colleagues worldwide use these specimens to conduct research on vital topics such as evolutionary relationships of organisms, biodiversity loss, and global climate change. The plant collection contains over 5 million botanical specimens, of which 1 million have been inventoried and a third of those have been digitized (photographed and made available online). Among the vertebrate collections, which are jointly curated with USGS, 75 percent of the SI bird collection (~640,000 specimens) is digitized, while the mammal collection (~590,000 specimens) is entirely digitized and available online. The insect collection, which is jointly curated with USDA, is the second largest in the world with 35 million specimens, of which

~300,000 records are online. Just over 5.7 million SI species occurrence records are also available through the Global Biodiversity Information Facility (GBIF).

SI will continue to digitize its extensive animal and plant collections. About 600,000 plant specimens are planned to be digitized in 2015, and 7,000 bird specimens are scheduled to be digitized per year. Of the extensive insect collections, 46,000 bumble bee (*Bombus*) specimens are in the process of being digitized and 5,000 honey bee (*Apis mellifera*) specimens are slated to begin the digitization process in 2015. Specimen label data from digitized specimens can be used by scientists in examining population trends over time within the United States and document potential declines in pollinator populations and species.

Metrics: SI will evaluate progress of digitizing plant and animal collections over the next few years by measuring the number of pollinating animal and plant specimens at NMNH that are digitized and available online. Additional digitization projects will occur as funding becomes available. Additionally, SI is partnering with the Consortium for the Barcode of Life in building and expanding the public DNA Barcode Library that holds data for pollinating taxa and flowering plants. SI will measure progress by monitoring the number and diversity of DNA barcode records representing native plants and pollinating animals that are added to the DNA Barcode Library each year.

Encyclopedia of Life & the Biodiversity Heritage Library

In collaboration with the Global Biotic Interaction project, the Encyclopedia of Life (EOL) is building TraitBank (http://eol.org/traitbank), an open platform for biotic trait and association data derived from museum specimens, citizen science observations, and the literature. EOL is also involved in efforts to model species association data in the Open Biological Relation Ontology. SI hosts the EOL Secretariat and the EOL Content Working Group, and will soon be hosting the EOL global data center. As information resources are published or become available, EOL will acquire, curate, and distribute pollination interaction data (e.g., plant-pollinator relationships, pollinator host plants, and parasites of pollinator) as a tool for research, education, and public engagement. With data on 1.7 million species and 6.5 million visitors a year, EOL is a free, global resource for knowledge about life on Earth. SI will measure progress on this initiative by tracking how many pollinating species and host plant species are added to EOL and the number of species association data modeled.

SI serves as the secretariat for the Biodiversity Heritage Library (BHL). BHL will continue to digitize and provide public access to historical collections-related literature on pollination biology and plant-pollinator interactions from the 1800s and early 1900s that in some instances provides the only documented evidence of and species occurrence data associated with historical collections. The digitized literature can serve as a tool for research on historical studies about pollinator health. SI will measure progress on BHL by tracking the number of historical literature that is digitized each year.

Metrics: SI will measure progress on the EOL initiative by tracking how many pollinating species and host plant species are added to EOL and the number of species association data modeled.

SI will measure progress on BHL by tracking the number of historical literature that is digitized each year.

International Studies

International studies can assist in understanding global trends. The 'Arthropod Initiative' of the Center for Tropical Forest Science (CTFS) is monitoring key arthropod assemblages over the long-term and studying insect-plant interactions over the network of SI's Forest Global Earth Observatories (ForestGEO). At each participating ForestGEO site, key insect groups are being monitored and key interactions are being studied. The monitoring sub-program is directed to detecting long-term changes in insect populations driven by climatic cycles, climatic change, and landscape scale habitat alteration. Over the next several years, Euglossine bees will be monitored at the ForestGEO site in Barro Colorado Island (BCI) in Panama, nocturnal bees at BCI and Khao Chong in Thailand, and butterflies at Khao Chong in Thailand, Hong Kong and Xishuangbanna in China, Rabi in Gabon, and Wanang in Papua New Guinea.

Metrics: SI will manage performance on the Arthropod Initiative by tracking the number of sites that measure long-term pollinator population trends of various pollinating animal taxa, and by tracking the analysis of datasets resulting from this initiative.

Public Outreach and Education

SI provides public education through a variety of major exhibits with a key focus on pollination. These exhibits include the Butterfly Pavilion and Insect Zoo at NMNH, and signage in SG's Butterfly Garden and Urban Bird Habitat at NMNH. SG provides educational programs to visitors such as Garden Fest and Pollinator Week as well as regular gardens tours which highlight the Butterfly and Bird Habitat Gardens. Garden interpreters will continue to interact with visitors to encourage conversations on pollination within the gardens and discuss what ordinary citizens can do to help pollinator health.

NMNH volunteers that interact with museum visitors will receive training on pollinators to better inform the public. Many upcoming youth programs and educational facilities at NMNH will include programming on pollinators, including QCrew teen volunteers, YES! High School Internship programs, and ongoing expert led programs and hands-on activities in Q?rius and Q?rius Jr. Under the mentorship of scientists at NMNH, teens will have the opportunity to conduct pollinator related research and communicate their findings to the public.

The web-based Smithsonian Transcription Center relies on internet citizen volunteers to transcribe digitized specimen labels from the SI collections. NMNH plans to hold crowd-sourcing events to transcribe the recently digitized bumble bee collection records, which represent baseline data on the distribution of bumble bees over the last century. NMNH will use a global transcription event organized across natural history museums around the world to promote bumble bees as important pollinators. The goal is to have the labels of all digitized bumble bee and honey bee specimens transcribed before the end of 2015.

Working with SG and NZP, NMNH will expand programming for Pollinator Week 2015 and integrate messaging related to the campaign. A significant digital outreach component is on-site at NMNH, which includes a Butterfly Pavilion Facebook page as well as opportunities to promote research and programs on the main NMNH Facebook, Twitter, Instagram accounts and blogs, and the additional opportunity to cross promote on the NMNH Entomology Facebook page.

NMNH bee specialists will continue to teach skills at wild bee identification workshops. Past workshops, held jointly with specialists from U.S. Geologic Survey and U.S. Environmental Protection Agency, have been targeted to citizens who wish to learn the basics of wild bee identification and those who would like to participate in future citizen science projects. These workshops will continue over the next few years.

Pollinator Habitat Enhancement

SI oversees and manages approximately 7,000 acres of land within the United States. SI's direction, stemming from SG's Strategic Plan for 2010-2015, is to reduce turf and mulch areas in gardens surrounding Smithsonian facilities and replace areas where appropriate with native plantings. SI is minimizing dependency on synthetic chemicals by utilizing biological controls whenever feasible and by identifying latest trends in integrated pest management, trialing new practices, setting acceptable thresholds, and evaluating both effectiveness and costs compared to current practices.

Pollinator foraging habitat has been developed using native plants at SG's Butterfly Garden and Urban Bird Habitat (both gardens feature prominent educational signage about pollinators) at NMNH, as well as in landscapes around the National Museum of the American Indian and the Cultural Research Center in Suitland, MD. Smithsonian Gardens has been designated a "Certified Audubon Cooperative Sanctuary" through the Audubon Cooperative Sanctuary Program, an Audubon International program. Smithsonian Gardens is the first property in the District of Columbia and the 62nd property in the world to be certified in the Audubon Cooperative Sanctuary Program.

NZP recently completed a rain garden featuring native plantings next to its Conservation Carousel (the carousel features a custom-carved ruby-throated hummingbird, among other animals of conservation concern). Native plants are also prominently featured in the newly planted "Zoo in Your Backyard" exhibit. NZP has increased the number of native species to its butterfly garden. As NZP fills in voids along Olmsted walk (the main one-mile walkway of the Zoo), native plant species will be utilized as much as possible.

About 2,200 acres of land at SERC in Edgewater, MD, are in natural vegetation—mostly native species that constitute pollinator-friendly habitat. The designed landscape surrounding SERC's new Mathias Lab, a LEED-certified platinum research facility, is a 4.65-acre constructed wetland that acts as a rain garden to filter stormwater. The recently planted wetland will feature pollinator-friendly aquatic native plants. The garden surrounding SERC's New Dominion building will also be planted with a wide variety of native plants that attract pollinators.

SCBI in Front Royal, VA, manages 200 acres of old fields, 400 acres of pasture, and 200 acres of hay fields, all of which are managed with pollinator-friendly native plants. An additional 30 acres of land will be converted to native grassland in the spring of 2015 by SCBI using a mix of native wildflowers.

Metrics: For all of SI's pollinator habitat enhancement projects, SI will measure the annual increase of acreage on SI property in the United States covered by best management practices for pollinator health. Specifically, SCBI has a goal to convert 30 acres of pollinator-friendly habitat in the spring of 2015, in addition to continuing to maintain its 800 current acres of pollinator-friendly space.

Additional Partnerships

NMNH is a member the North American Pollinator Protection Campaign (NAPPC), a collaborative body of more than 120 partners (scientists, researchers, government officials and volunteers) who are working together to protect pollinators, to raise pollinator-related issues, and to benefit the health of all threatened species (both plants and their pollinators). NMNH and NZP have both served as past hosts for the annual NAPPC international conference, and are committed in serving as future hosts of the annual conference. NMNH staff has served on the NAPPC Steering Committee since 2000 and will continue to serve as requested.

The staff of the NMNH Insect Zoo/Butterfly Pavilion is participating in a recently formed Mid-Atlantic interstate butterfly working group. The group is spearheaded by the Maryland State Department of Natural Resources and includes DNR representatives and zoos from PA, VA, DE, WV, and DC. The focus of the group is on the conservation of threatened butterflies through data collection, modeling, captive rearing, land management, and education.

The North American Orchid Conservation Center (NAOCC) is a new joint effort of SERC, NZP, NMNH, SG, and external partners including the Center for Plant Conservation, the Nature Conservancy, the New England Wild Flower Society, the U.S. Botanic Garden, and six other botanical gardens (Alaska Botanical Garden, Atlanta Botanical Garden, Chicago Botanic Garden, Desert Botanical Garden, Duke Farms, and Mt. Cuba Center) in the United States. In the coming years, NAOCC will (1) compile a detailed account on pollinators of every native North American orchid species, (2) develop a national seed bank representing the genetic diversity of all native orchid species, and (3) develop techniques for conserving, cultivating, and restoring orchids in native habitats.

Virginia Working Landscapes (VWL) is a network of partners convened by SCBI to promote the conservation of native biodiversity and encourage the sustainable use of working landscapes through research, education, and outreach. VWL will continue to coordinate grassland biodiversity surveys on private and public lands across 10 counties in Virginia. The surveys will be conducted in large part by citizen scientists from regional or state organizations, such as Virginia Master Naturalists, Virginia Native Plant Society, and the National Audubon Society. The rusty-patched bumble bee (*Bombus affinis*), which has not been seen in the Eastern United States in five years, was recently rediscovered during one such survey at Sky Meadows State Park in the summer of 2014.

Appendix N. Federal Emergency Management Agency Pollinator Protection Plan

The Federal Emergency Management Agency's (FEMA) role in pollinator protection and enhancement stems from the national goals of preparedness and recovery. The loss of pollinators is of national concern, providing an opportunity for Federal agencies to work together using existing authorities and relationships to proactively lessen the risk. This provides FEMA with the opportunity to serve as a leader alongside the Federal family in efforts to enhance pollinators nationally by serving as advisors and coordinators, expanding workforce capacity beyond the Taskforce agencies. FEMA is uniquely able to influence state and local policy in the area of environmental sustainability, especially when environmental hazards can lead to potential disasters. Recognizing the urgent need to protect pollinators for our economy, food supply, and environment, FEMA commits to the following actions.

The Intersection of Recovery and Pollination in Community Recovery

A large span of coordination responsibility falls to FEMA in the wake of a disaster. Our Area of Responsibility is coordination and rebuilding communities to be stronger than before, two mandates that can be expanded to include pollinator enhancement. Recognizing that land development—urban, suburban, and even farmland—has proven detrimental to pollinator habitat, FEMA seeks to use our environmentally sustainable recovery ethic to assist habitat restoration. The Community Planning and Capacity Building (CPCB) Recovery Support Function (RSF) works to build recovery capacities and community planning resources for local, state, and tribal governments. These actions are needed to effectively plan for, manage, and implement disaster recovery activities resulting from large, unique, or catastrophic incidents. CPCB achieves this mission through coordination of partner resources and expertise to build recovery capacities and inclusive community planning efforts. While CPCB maintains that the onus for decision making rests with local and tribal governments, the RSF also prioritizes sustainable recovery efforts. CPCB has the ability to guide partners towards implementing Federal priorities, and milestones can include the integration of White House sustainability priorities.

Following previously developed models such as the Greater Atlanta Pollination Project (GAPP), specialists can encourage communities to initiate green spaces in their communities. GAPP was an interesting prototype where the Forestry Service in Atlanta was able to implement multiple pollinator population enhancements through public/private partnerships and community planning. Following this example, CPCB can assist local and tribal authorities to effectively use resources to map out potential areas for green spaces. These spaces can become pollination centers by encouraging local officials to plant vegetation that would attract and sustain target species. Again, following previous models, this has the potential for expansion through public and private partnerships. GAPP successfully used such partnerships to fund the planting of green spaces. This technical assistance can also include the promotion of green programs, such as community and school gardens, which can be specifically designed to be pollinator friendly. Coordination of the various necessary components, such as local planners, wildlife

experts, entomologists, biologists, among many others, can stem from Interagency Coordination networks availed through CPCB and other applicable RSF's.

Metrics: FEMA recommends the integration of pollination and biodiversity enhancement concepts into the current National Disaster Recovery Framework and Federal Interagency Operation Plan interagency refresh.

The loss of pollinator habitat continues to be a significant factor in species' population declines. FEMA also assists to coordinate the actual rebuilding of properties and buildings damaged from disasters. Recovery also includes infrastructure projects. FEMA disperses grant funds for projects to grantees through state, local, territorial, and tribal authorities. FEMA also coordinates infrastructure projects through various applicable RSFs. While the guidelines for infrastructure projects cannot be changed, FEMA employees can provide input and awareness of various methodologies for pollinator habitat enhancement through sustainably mindful infrastructure projects. Our responsibility is to rebuild stronger and smarter. In order to do so, FEMA will need to find innovative methodologies for our grantees to realistically pursue the options to rebuild more sustainably. This includes incorporating environmental protection as another major component of rebuilding strategies. Moreover, in the event that pollinator habitat is lost to an event, recovery operations can be encouraged to include restoration. Major infrastructure projects can be more sustainably driven and effective recovery must include long term sustainability considerations, including the enhancement of pollinator populations.

Metrics: Capitalize on outreach and education opportunities with relevant FEMA programs and RSF partners by the end of FY15. Opportunities include FCO/FDRC Workshops and Regional Coordination Meetings as well as collaboration with RSF partners.

Coordinating the Integration of Taskforce Priorities into Recovery Efforts

FEMA's coordination role provides another opportunity for the agency to support the White House's pollinator initiative. Taking a leadership role in disaster recovery efforts allows us to promote Federal priorities on the local level, including green recovery generally. Recognizing our limited ability to restore pollinator populations, FEMA's strength is in assisting other agencies in their work toward pollinator health goals. As a leading recovery agency, we can assist other recovery coordinating agencies and supporting agencies to implement their individual pollinator innovations in areas where we have ongoing recovery operations; especially in areas where there is an intersection of Federal agencies. Our technical assistance and liaison capabilities allow us to formulate collaborations among involved stakeholders to create recovery guidelines that are unique for each situation. Thus, the scope of a disaster's recovery can include pollinator enhancement beyond FEMA's CPCB role, through collaboration with other Task Force agencies. As a leader among RSF partners, we have the capacity to raise awareness of pollinator issues. This includes offering access to training materials from pollination partners to the RSF action officers. Through RSF leadership and interagency coordination, we have the ability to develop the means through which RSFs with Taskforce members can work together to internally align priorities for sustainable purposes.

Metrics: Utilize the Recovery Support Function Leadership Group as a forum of interagency coordination to involve RSF action officers and coordinators with Taskforce representatives to raise awareness and create opportunities for the integration of pollination and biodiversity priorities into recovery planning.