THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION


Protecting the Life that Sustains Us

Comments from the Xerces Society for Invertebrate Conservation

Regarding U.S. Environmental Protection Agency's *Risk Management Approach to Identifying Options for Protecting the Monarch Butterfly*.

Docket ID EPA-HQ-OPP-2015-0389

August 20, 2015

The Xerces Society for Invertebrate Conservation (Xerces Society) appreciates that the U.S. Environmental Protection Agency (EPA) released the overview document *Risk Management Approach to Identifying Options for Protecting the Monarch Butterfly.* This risk management proposal is an initial step in determining what actions are needed to best protect dwindling monarch populations from pesticides.

Monarch butterfly (*Danaus plexippus plexippus*) populations in North America have declined precipitously over the last two decades. It is estimated that Eastern monarch populations, that overwinter in Mexico, have dropped by 82% from the 21 year average. Western monarchs that overwinter on the California coast have suffered an estimated 48% drop from the 18 year average. Monarch declines are so severe that groups petitioned the U.S. Fish and Wildlife Service (FWS) to list the North American Monarch as threatened under the Endangered Species Act.[1] In December of 2014 FWS recognized the gravity of monarch declines and announced a positive 90-day finding on the petition, determining that there was sufficient concern to warrant a 12 month finding. Additionally, as EPA outlined, the federal government, and other entities, are taking numerous actions to help restore the monarch.

EPA's risk management proposal takes an initial step in order to determine the actions needed to increase of milkweed habitat while protecting this habitat and the monarchs that use it from the risks of pesticides, while taking into account weed management needs. The following comments by the Xerces Society provide both background information on monarchs and their milkweed habitat, and input on potential actions to support monarch habitat restoration efforts.

I. Seasonal distribution of the western monarch

In defining the scope of this risk management effort, EPA specifically requested "information on the monarch butterfly such as its lifecycle, seasonal distribution, its population demographics over time …" While much information is publicly available regarding the seasonal distribution of monarchs in the eastern US, information on the seasonal distribution of western monarchs is not as readily available. Therefore we would like to draw your attention to the following resources on monarch distribution.

Dingle et al. (2005) undertook a review of museum and collection records of western monarchs in order to derive a basic picture of their distribution and movement. Their plots suggest:

> "*…a movement of Oregon, Washington and other north-western populations of summer butterflies to California in the autumn, but movement of more north-easterly populations (e.g. from Idaho and Montana) along two pathways through Nevada, Utah and Arizona to Mexico*."[1]

The article, attached, provides significantly greater detail.

Adding another layer to the knowledge-base of western monarch distribution the Xerces Society's research including a spatial database of overwintering sites in California. The attached map was created by that dataset.[2] The map includes data from the 1980s-present. Journey North is another important source of information for monarch seasonal distribution nationwide.[3]

The Xerces Society is also currently working on a monarch modeling project with FWS which will provide greater information on western monarch seasonal distribution in the coming years. We would welcome the opportunity to provide the EPA with further information on this and other monarch related projects.

II. Risk management measures must address the broader set of milkweed species beyond common milkweed

EPA's risk management proposal accurately states the importance of common milkweed (*Asclepias syriaca L.*) as a food source for monarch larvae (p. 2). Yet, EPA failed to mention other important milkweed species. Approximately 40 of the 72 milkweed species native to the United States are considered host plants for monarchs. Within that, *Asclepias speciosa* (showy milkweed) and *Asclepias fascicularis* (narrow leaved milkweed) are considered two of the most important species for western monarchs; though in the Southwest, *Asclepias subverticillata* (horsetail milkweed) is an important species. In the east *Asclepias incarnata* (Swamp Milkweed) and *Asclepias tuberosa* (Butterfly Weed) are also important.[4]

Any efforts by EPA to assist in the protection and restoration of milkweed must include this broader set of milkweed species, and native, locally produced species should be chosen for restoration efforts.[5] Furthermore, many of the remaining milkweed species, without documentation of their

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[1] Dingle, H., M. P. Zalucki , W. A. Rochester and T. Armijo-Prewitt. 2005. Distribution of the monarch butterfly, Danaus plexippus (L.) (Lepidoptera: Nymphalidae), in western North America. Biological Journal of the Linnean Society, 2005, 85, 491–500.

[2] Xerces Society. 2014. Database of western monarch overwintering locations. For a map documenting known and potential western monarch breeding areas go to: http://www.xerces.org/wp-content/uploads/2011/10/Milkweed-and-Monarch-map-8-Jul-2015.jpg

[3] Journey North information data is available at: http://www.learner.org/jnorth/maps/galleries/2015/monarch_an_spring2015.html.

[4] More information on milkweed species can be found at both: http://monarchjointventure.org/images/uploads/documents/MilkweedFactSheetFINAL.pdf. and http://www.xerces.org/wp-content/uploads/2014/06/Milkweeds_XerSoc_june2014.pdf

[5] A table of milkweed species, indicating which are known monarch host species can be found in Appendix I of *Milkweed a Conservation Practitioner's Guide*. Available at: http://www.xerces.org/wpcontent/uploads/2014/06/Milkweeds_XerSoc_june2014.pdf

suitability as hosts, have a fairly narrow distribution or are relatively uncommon in the landscape, which results in people having fewer opportunities to observe monarchs using the plants. Therefore, a more cautionary approach would seek out mitigations to protect all native milkweed species.

III. The scope of EPA's risk management plans must be expanded to include actions that help restore milkweed, not just preserve existing milkweed

EPA's current risk management proposal states it will: "…contribute to ongoing monarch butterfly conservation by identifying situations in which areas of milkweed can be preserved in a manner that balances this objective with weed management needs." (p. 2-3) Milkweed has been removed from broad swaths of the landscape, in part due to EPA regulated herbicide use on croplands (see more detail in section IV. A.). Federal agencies are currently working to design an ambitious restoration strategy with the initial goal of returning 300 million monarchs to Mexico each year. Work by the U.S. Geological Survey Powell Center Group, of which Xerces is part, suggests that millions of acres of high quality habitat (nectar sources and milkweed) are needed to reach the 300 million goal. EPA has a role to play in this restoration strategy. Changes in pesticide use practices, through both voluntary and regulatory actions, for both crop and non-crop uses, will be needed to successfully restore the amount of milkweed habitat required to increase and sustain a robust monarch population.

IV. EPA's risk management measures should immediately address priority concerns that could impede restoration efforts

EPA's risk management proposal states that: "…direct effects to the monarch butterfly, from herbicides, insecticides or other types of pesticides can be addressed through the agency's risk assessment framework utilized for estimating effects to other pollinators. And so, the focus of this effort will be on reducing potential indirect effects to the monarch butterfly from herbicide impact on milkweed plants." (p. 3) The proposal also states that EPA "recognizes that it is possible that if EPA were to take regulatory action to reduce the potential impact from one herbicide to protect important monarch butterfly resources, such efforts could result in a market shift to other herbicides that would not be subject to similar risk mitigation measures. To the extent that happened, there could well be little or no improvement for monarch butterflies." (p. 3)

The Xerces Society believes that this proposal fails to address existing priority threats that could impede current restoration efforts. The level of monarch decline in North America warrants immediate action for the most profound pesticide related risks. Therefore, the Xerces Society recommends that EPA's Office of Pesticide Programs immediately respond to: (1) the loss of milkweed habitat due to the increased use and efficacy of herbicides on genetically modified, herbicide-resistant crops; and (2) the direct risks posed to larval monarchs from exposure to long-lived highly toxic insecticides such as neonicotinoids.

A. *EPA should immediately address the loss of milkweed habitat due to the increased use and efficacy of herbicides on genetically modified, herbicide-resistant crops*

A primary threat to the monarch is the drastic loss of milkweed caused by the combination of increased and later season use of the herbicide glyphosate in conjunction with widespread planting of genetically

engineered, herbicide-resistant corn and soybeans in the Corn Belt region of the United States. The planting of genetically-engineered cotton in parts of the monarch's southern and western breeding range may have also contributed to milkweed loss, although milkweed density estimates in cotton fields prior to the onset of GMO cotton are not readily available. In the Midwest, nearly ubiquitous adoption of glyphosate-resistant "Roundup Ready" corn and soybeans has caused a precipitous decline of common milkweed, and thus of monarchs. The majority of the world's monarchs originate in the Corn Belt region of the United States where milkweed loss has been severe, and the threat that this habitat loss poses to the resiliency, redundancy, and representation of the monarch cannot be overstated.

Monsanto introduced Roundup Ready soybeans in 1996 and Roundup Ready corn in 1998. Herbicide-resistant varieties (nearly all Roundup Ready) comprised 93 percent of soybeans and 85 percent of all corn grown in the United States in 2013.[6] Between 1995, the year before Roundup Ready soybeans were introduced, and 2013, total glyphosate use on corn and soybeans rose from 10 million to 204 million pounds per year, a 20-fold increase.[7]

Glyphosate used in conjunction with Roundup Ready crops has played a role in eliminating milkweed from cropland throughout the monarch's vital Midwest breeding range. In just the 13 years from 1999 to 2012, it is estimated there was a 64 percent decline in overall milkweed in the Midwest, most of which was from croplands.[8] Because, milkweed from crop fields is particularly significant for maintaining monarch abundance,[9,10,11] milkweed loss in corn and soybean fields has had a disproportionate impact on monarch numbers.[12] It is estimated that in 2012, the Midwest produced 88 percent fewer monarchs than it did in 1999.[13]

Glyphosate is also heavily used in the western portion of the monarch's range, and may be degrading habitat there as well. In 2012 in California, glyphosate was among the top five pesticides (and the top herbicide) in terms of amount used, and the leading pesticide as measured by cumulative acres treated.[14] Glyphosate accounts for 74 percent of total pounds of herbicides applied to cotton "due to the large

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[6] U.S. Department of Agriculture Economic Research Service (USDA ERS). 2014a. Adoption of genetically engineered crops in the U.S.: 1996-2014. Available at: http://www.ers.usda.gov/media/185551/biotechcrops_d.html (accessed July 31, 2014).

[7] USDA NASS (2013, 2011, 1991-2008). Glyphosate use on corn and soybeans: 1995-2013. See Figure 17 of Xerces petition. Available at: http://www.xerces.org/wp-content/uploads/2014/08/monarch-esa-petition.pdf (accessed July 31, 2014).

[8] Pleasants, J.M. 2015. Monarch Butterflies and Agriculture, Ch. 14. In Oberhauser, K.S. and K. Nail, editors, Monarchs in a Changing World: Biology and Conservation of an Iconic Insect. Ithaca: Oxford University Press.

[9] Oberhauser, K.S., M.D. Prysby, H.R. Mattila, D.E. Stanley-Horn, M.K. Sears, G. Dively, E. Olson, J.M. Pleasants, W.K. Lam, R.L. Hellmich. 2001.Temporal and spatial overlap between monarch larvae and corn pollen. *Proceedings of the National Academy Sciences.* 11913–11918, doi: 10.1073/pnas.211234298

[10] Pleasants, J.M., and K.S. Oberhauser. 2012. Milkweed loss in agricultural fields because of herbicide use: effect on the monarch butterfly population. Insect Conservation and Diversity 6:135–144. Available at: http://doi.wiley.com/10.1111/j.1752-4598.2012.00196.x (accessed May 31, 2013).

[11] Flockhart, D.T., J.B. Pichancourt, D.R. Norris, and T.G. Martin. 2014. Unraveling the annual cycle in a migratory animal: Breeding-season habitat loss drives population declines of monarch butterflies. Supplementary Material in addition. Journal of Animal Ecology: doi: 10.1111/1365- 2656.12253

[12] The disproportionate importance of croplands as monarch habitat underscores the importance of EPA working to reintroduce milkweed into agricultural lands.

[13] Pleasants, J.M. 2015. *supra*

[14] California Department of Pesticide Regulation. 2014. Summary of Pesticide Use Report Data 2012 Indexed by Chemical. 726 pp. Available at: http://www.cdpr.ca.gov/docs/pur/pur12rep/chmrpt12.pdf. (accessed August 20, 14).

acreage of Roundup Ready cotton," and its use is rising on alfalfa "because of increased planting of Roundup Ready alfalfa".[15] Genetically engineered, herbicide-resistant cotton rose from 21 percent to 68 percent of total California cotton acres from 2000 to 2013.[16] Heavy use of glyphosate in California, a state with extensive agriculture production, threatens the multiple species of milkweed that provide habitat in California, and thus monarch reproduction and survival west of the Rockies.

Glyphosate has unparalleled effectiveness on perennial weeds—such as common milkweed—that most other herbicides fail to kill.[17] Glyphosate is systemic, when sprayed on a weed, it is absorbed by the leaves and stems and then translocated inside the plant to concentrate in actively growing tissues, including the plant's roots and developing buds.[18] By killing common milkweed at the root, regrowth the following year is largely prevented.[19]

Common milkweed's success in 20th century corn and soybean fields is attributable in large part to its tolerance to the commonly used herbicides of the period.[20] While these non-glyphosate herbicides wither milkweed leaves, the plant usually recovers in two to three weeks by sprouting new branches from leaf axils and new stems from the perennial root; in contrast, with glyphosate treatment most plants do not recover.[21]

Monarch habitat is further threatened by the imminent introduction of new herbicide-resistant crops that are genetically engineered to now be resistant to multiple herbicides including for the first time 2,4-D and dicamba, which will be used in addition to glyphosate. Herbicide efficacy trials show that application of high rates of either 2,4-D or dicamba alone cause considerable lasting damage to common milkweed, though not as much as glyphosate.[22] EPA should further consider immediate risk management in response to genetically engineered crops resistant the effects of 2,4-D and dicamba.

In general the Xerces Society agrees that comprehensive assessment is important to avoid replacing one risk with another. Yet, this proposal fails to acknowledge the significant body of research suggesting that glyphosate is uniquely toxic to milkweed, plus the genetic engineering of crops to be resistant to glyphosate has greatly increased its use and minimizes the likelihood of a quick market shift to other herbicides. Therefore, we recommend that EPA promptly respond to the existing concerns caused by the

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[15] California Department of Pesticide Regulation. 2014. *Supra.*

[16] U.S. Department of Agriculture Economic Research Service (USDA ERS). 2014b. Data Set: Genetically engineered varieties of corn, upland cotton, and soybeans, by State and for the United States, 2000-14. Available at: http://www.ers.usda.gov/data-products/adoption-ofgenetically-engineered-crops-in-the-us.aspx#.U961LVawyao (accessed August 20, 2014). Note that the total percentage of herbicide-resistant crops is the sum of "herbicide-tolerant only" and "stacked gene varieties."

[17] Franz, J.E., M.K. Mao, and J.A. Sikorski. 1997. Glyphosate: A Unique Global Herbicide. ACS Monograph 189. American Chemical Society, Washington, D.C.

[18] Duke, S.O. and S.B. Powles. 2008. Glyphosate: a once-in-a-century herbicide. Pest Management Science 64: 319-325.

[19] Bhowmik, P.C. 1994. Biology and control of common milkweed (Asclepias syriaca). Reviews in Weed Science 6:227 – 250.

[20] Martin, A., and O.C. Burnside. 1977. G77-384-A. Common Milkweed (Revised July 1984). Historical Materials from University of Nebraska-Lincoln Extension:1491. Available at: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2488&context=extensionhist (accessed June 11, 2013).

[21] Pleasants, J.M. 2015. *supra*

[22] Zollinger, R. 1998. Common milkweed control. NDSU Crop and Pest Report, North Dakota State University, July 30, 1998. Available at: http://www.ag.ndsu.edu/archive/entomology/ndsucpr/Years/1998/July/30/weeds_30july98.htm

large-scale use of glyphosate, a uniquely effective herbicide against milkweed. Otherwise, the ongoing risk could compromise restoration efforts.

B. *EPA should immediately address the direct risks posed by neonicotinoids*

Two new studies evaluated the risks of neonicotinoids to monarchs. Both concluded that these long-lived, systemic insecticides harm larval monarchs when their milkweed host plants are contaminated.[23,24]

Estimates by Douglas and Tooker show that approximately 90% of all conventional corn seed is treated with neonicotinoids prior to planting.[25] A study by Pecenka and Lundgren gives an initial assessment of potential risks posed by planting neonicotinoid coated corn seeds near monarch host plants. The study found that at environmentally relevant levels (1 ppb), the neonicotinoid clothianidin reduced monarch larval size. The average levels of clothianidin that the researchers found on milkweed near corn planted with clothianidin coated seeds was 1.14 ppb. The maximum detection was 4 ppb on a single plant. The researchers concluded that field realistic levels of clothianidin could contribute to monarch butterfly population declines.

Another study, relevant to non-crop neonicotinoid use, Krischik et al., evaluated the impact to monarchs and painted lady (*Vanessa cardui*) butterflies when their host plants were treated with legal ornamental application rates of the neonicotinoid imidacloprid. Larval survival of both species of butterflies was significantly reduced when they fed on vegetation of host plants treated with a single application of imidacloprid at a legal rate (300mg a.i./3 gallon pot).

The exposure analysis found that survival of adult butterflies was not significantly reduced by imidacloprid. It is important to point out that monarch larvae – unlike adults or other pollinators like bees – are feeding on plant tissue in extremely large quantities. This makes the situation different and likely more problematic than that of animals that are only visiting flower for nectar and/or pollen.

Based on the initial research and the significance of the potential effects due to the scale of neonicotinoid use, especially as seed coatings, this issue warrants immediate action.

V. EPA should implement a multi-faceted risk management approach

To facilitate broad acceptance of and compliance with monarch risk management the project should include voluntary measures, advisory and enforceable label language, as well as education and outreach.

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[23] Pecenka, J. R., and J. G. Lundgren. 2015. Non-target effects of clothianidin on monarch butterflies. *The Science of Nature* 102:19. doi.10.1007/s00114-015-1270-y

[24] Krischik, V. A., M. Rogers, V. Gupta, and A. Varshney. 2015. Soil-Applied Imidacloprid Translocates to Ornamental Flowers and Reduces Survival of Adult *Coleomegilla maculata*, *Harmonia axyridis*, and *Hippodamia convergens* Lady Beetles, and Larval *Danaus plexippus* and *Vanessa cardui* Butterflies. *PLoS ONE* 10(3):e0119133. doi:10.1371/journal.pone.0119133

[25] Douglas, M. R., and J. F. Tooker. 2015. Large-scale deployment of seed treatments has driven rapid increase in use of neonicotinoid insecticides and preemptive pest management in U.S. field crops. *Environmental Science and Technology* 49:5088–5097

A. *Incentivize the inclusion of milkweed in nutrient management plantings via Clean Water Act Section 319 grants to states*

Research into monarch distribution suggests that migration, at least for western monarchs, could follow riparian corridors.[26]

Collaborating with EPA's Office of Water to incentivize milkweed in the nutrient management plantings via Clean Water Act Section 319 grants to states could provide valuable milkweed and nectar plant resources in the areas travelled by monarchs. Incentives such as this could also act as a mitigation measure to replace eradicated milkweed in order to offset the loss.

Furthermore, such collaboration fits with EPA's risk management proposal:

> "*Interaction 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. For example, conservation banking effort(s) could be undertaken that could establish, preserve, or restore habitat for monarch butterflies… If appropriate, support of such efforts could be considered by EPA as risk mitigation in regulatory decisions for herbicides that are determined to adversely impact the monarch butterfly.*" (p. 4)

Xerces is also supportive of the examples provided by EPA regarding conservation banking and research into protection needs. These collaborative efforts are to be lauded. We hope EPA continues to seek out such partnerships.

B. *Change label requirements to assist in monarch risk management*

EPA's risk management proposal states that label changes could be made to protect monarchs. The examples provided by EPA included: decreasing application frequency, lowering application rates, modifying application timing, and establishing buffers to reduce drift. (p. 4) The Xerces Society is supportive of these enforceable label changes, if they afford sufficient protection to already severely compromised monarch populations.

The Xerces Society also recommends that the drift protections for monarchs be expanded beyond protecting milkweed habitat to include other nectaring plants important to adult monarch survival. Although monarch larvae can only thrive on milkweeds, adult butterflies feed on a wide variety of nectar-producing flowers.[27] They depend on flowers that are in bloom in their breeding habitat during the spring and summer, and then along migration routes to their winter roosts.[28] Various models of herbicide spray drift suggest that from one percent (commonly) to 25 percent (occasionally) of the

[26] Dingle et al. 2005 *supra*

[27] Tooker, J.F., P. F. Reagel, and L.M. Hanks. 2002. Nectar sources of day-flying Lepidoptera of central Illinois. Conservation Biology and Biodiversity. Annals of the Entomological Society of America 95(1):84-96.

[28] Brower, L. P., and R. M. Pyle. 2004. The Interchange of Migratory Monarchs between Mexico and the Western United States, and the Importance of Floral Corridors to the Fall and Spring Migrations. Pages 144 – 166 in G. P. Nabhan, editor. Conserving Migratory Pollinators and Nectar Corridors in Western North America. University of Arizona Press and The Arizona Sonora Desert Museum, Tuscon.

applied herbicide dose drifts beyond field boundaries to reach wild plants growing nearby.[29,30,31] Areas surrounding cropland provide most of the biodiversity in agriculture-dominated landscapes[32] such as the Midwest. Herbicide drift threatens the wild plants monarchs depend upon for nectar. Furthermore, the imminent introduction of next-generation herbicide-resistant crops, such as those resistant to 2,4- D and dicamba, discussed above, will lead to increased herbicide use, drift, and associated damage to wild plants, reducing monarch nectaring habitat. Herbicide drift is exacerbated by herbicide-resistant crops. This is demonstrated by experience with Roundup Ready crops. Glyphosate has relatively low volatility and is not regarded as a drift-prone weed killer.[33] Nevertheless, it has become one of the top two herbicides (along with 2,4-D) implicated in herbicide drift complaints nationwide since the Roundup Ready era began.[34]

C. *Include integrated pest management requirements on labels*

Creating label language that requires integrated pest management (IPM) practices should be considered in monarch risk management. EPA is already employing IPM solutions in response to pesticide resistance. The value of requiring IPM to manage other risks, including adverse effects to monarchs, should be further explored. For example, EPA could consider actions that would ensure pesticide applications on or near milkweed plants are only performed if the pest population is at a threshold that poses economic harm.

In response to the risks that neonicotinoid coated seeds pose to monarch larvae, labels could require scouting of fields for the pests of concern prior to planting neonicotinoid coated seeds. This would necessitate EPA regulating coated seeds as a pesticide, a recommendation that the Xerces Society has already made to EPA in previous comments.

D. *Encourage education and outreach*

All risk management efforts will be more successful if they include education and outreach components. Collaborating with Extension, state lead agencies, and the Natural Resources Conservation Service will increase acceptance and implementation of risk management practices.

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[29] Holterman, H.J., J.C. Van De Zande, H.A J. Porskamp, and J.F.M. Huijsmans. 1997. Modeling spray drift from boom sprayers. Computers and Electronics in Agriculture 19(1):1-22.

[30] Wang, M. and D. Rautmann. 2008. A simple probabilistic estimation of spray drift - factors determining spray drift and development of a model. Environmental Toxicology and Chemistry 27(12):2617-2626.

[31] Boutin, C., B. Strandberg, D. Carpenter, S.K. Mathiassen, and P.J. Thomas. 2014. Herbicide impact on non-target plant reproduction: What are the toxicological and ecological implications? Environmental Pollution 185:295-306.

[32] Boutin C., and B. Jobin. 1998. Intensity of agricultural practices and effects on adjacent habitats. Ecological Applications 8:544 – 557.

[33] Lee, E.H., C.A. Burdick, and D.M. Olszyk. 2005. GIS-based risk assessment of pesticide drift case study: Fresno County, California. EPA/600/R-05/029. p. 135.

[34] Association of American Pesticide Control Officials (AAPCO). 1999. 1999 Pesticide Drift Enforcement Survey. Available at: http://www.aapco.org/documents/surveys/drift99.html. (access August 20, 2014). Association of American Pesticide Control Officials (AAPCO). 2005. 2005 Pesticide Drift Enforcement Survey. Available at: http://www.aapco.org/documents/surveys/DriftEnforce05Rpt.html (accessed August 20, 2014).

VI. Conclusion

If monarch recovery efforts are to be successful, the risks herbicides and other pesticides pose must be addressed. As EPA correctly notes, these large-scale issues deserve a holistic approach; yet some risks warrant a more immediate response. Using a multi-faceted approach that includes regulatory actions as well as support for voluntary changes will allow EPA to reach its goals of reducing the effects of pesticides to the monarch butterfly.

Thank you for considering our comments. We await EPA's next steps in this important effort. If you have any questions, please do not hesitate to contact us.

Sincerely,

Aimee Code
Pesticide Program Coordinator

Sarina Jepsen
Endangered Species Director