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## Saving the Monarch Butterflies

Monarch butterflies, one of the few beloved insects in popular culture, complete a long, multi-generational migration from Mexico to Canada, stopping along the way to breed with the help of milkweed (see Figure 1). However, in the past 50-or-so years, the population of these amazing invertebrates has been declining. To explain this occurrence, some scientists have blamed the decrease in density and abundance of milkweed across the U.S. (Stenoien et al., 2018). Other scientists point the finger at reduced habitat in the butterflies' overwintering land in Mexico (Inamine et al., 2016). Still other hypotheses explain increasingly dramatic weather patterns, a lack of nectar for feeding on on their way back to Mexico, as well as drought (Inamine et al., 2016). These varying perspectives lead to a plethora of solutions to this problem, including reducing herbicide use as well as planting more milkweed to increasing habitat availability in Mexico. However, due to the variety of scientific perspectives that exist, the best solution, as is common in conservation conundrums such as this, is to educate the public on what information is out there and what they can do in their daily lives. This way, the public can make the best decisions in their own lives to help the populations of monarch butterflies.

To illustrate one popular and widely practiced solution, scientists such as Stenoien et al. have advocated for the planting of milkweed as a result of their studies' results. They say that GMOs have given rise to higher quantities of herbicides, harming milkweed plants which grow near crops. They say that conservation efforts should focus on planting milkweed in low-density areas such as along the sides of roads and on between agricultural fields. As a result, citizens have listened to this advice and have started planting more milkweed. Such has been the case at St Olaf College.

On the other hand, some scientists have made claims that reject the idea that a reduction in milkweed is the main source of a decline in the monarch population. Specifically, Inamine et al. (2019) found no correlation between increased use of GMO crops and herbicides, and a decrease in the monarch population. They analyzed citizen science data compiled over 22 years, counting monarch numbers across four regions of the U.S.. They found that numbers increased during the spring and summer months while numbers decreased during the fall and overwintering seasons. Thus, Inamine et al. suggest that the solution to recovery of the monarch population lies in conservation efforts in areas where monarchs spend the fall and winter months, in Mexico. They do not offer very concrete solutions, but they mention focusing on nectar availability and reducing habitat fragmentation in Mexico.

Interestingly, many of these scientists, rather than offering clearly defined and well-supported suggestions for recovery of monarch populations, merely refute others' claims about the source of the problem. This makes it confusing for consumers looking to know what to do to help the problem. Overall, as is common in conservation conundrums such as this, the best solution is to educate the public on what literature is out there and what they can do in their daily lives. It is not a bad idea to plant milkweed, to reduce the amount of pesticide we use on our own land, to talk about it with others to spread the word, and to be aware of movements supporting habitat expansion in monarchs' fall and overwintering sites. But it is also important to know that we may still have not yet figured out the best way to help monarchs reestablish a larger population. Finally, as is true for most all conservation movements, it is important to stay politically engaged and active, support any efforts to help the monarchs, and vote for those who care about the environment and the health of our planet.

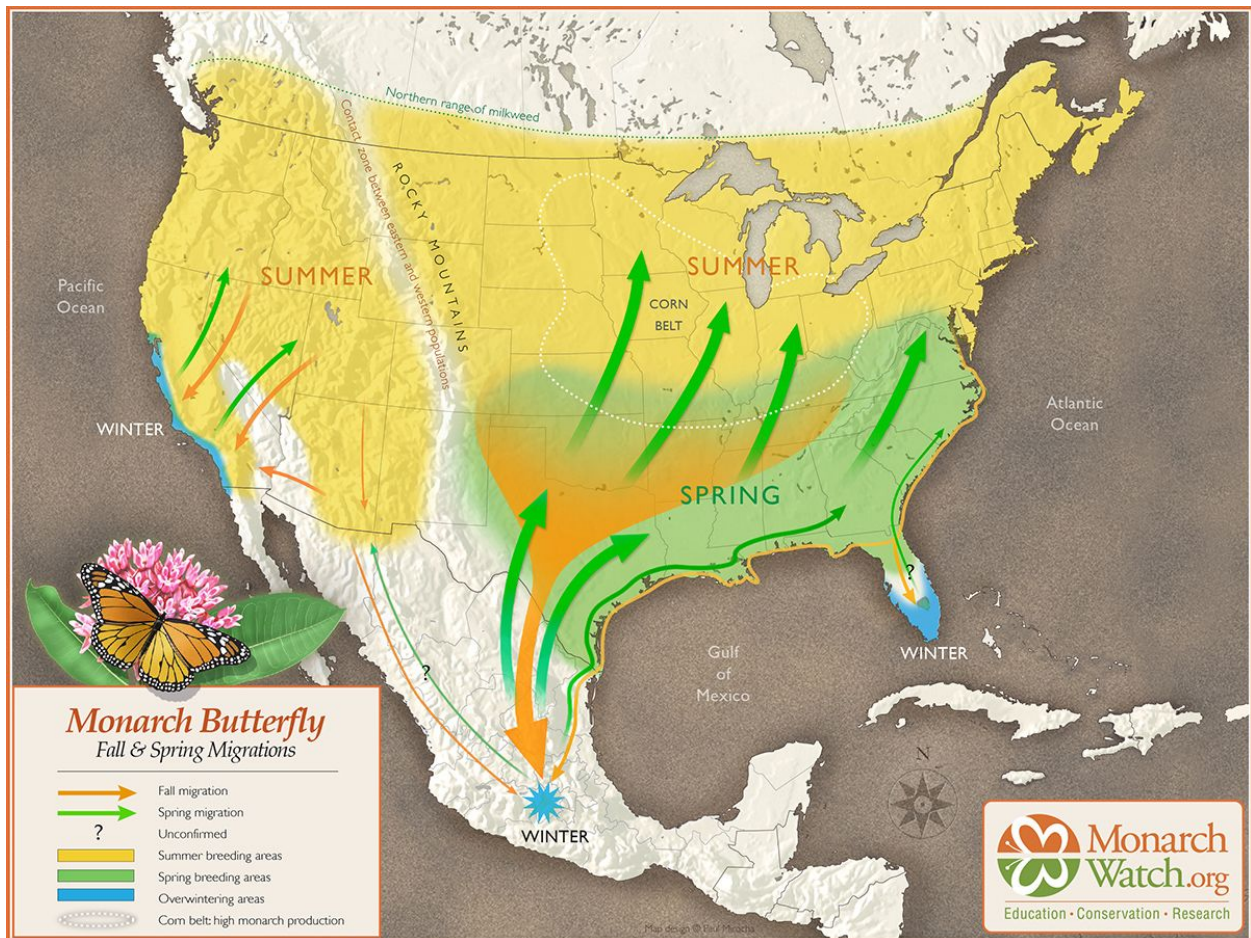


Figure 1. A map of the monarch migration, from their overwintering site in Mexico, to their Spring breeding grounds in the Southern U.S., all the way to their summer locations across the U.S. and Southern Canada (Taylor, 2010).

## References

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