Making Room for Monarchs: Emerging research can help recover an iconic species within rights-of-way (ROWs)

By Sand County Foundation

The monarch butterfly is among the most iconic of animal species. Children and adults alike marvel at the monarch's beauty and its fascinating annual migration across multiple generations and thousands of miles, but monarch populations have declined dramatically in recent years, as modern agriculture and urban expansion have removed much of the breeding habitat on which monarchs depend. In response to a petition, the U.S. Fish & Wildlife Service is now evaluating whether to list the species as threatened under the Endangered Species Act—a result that could alter vegetation management (VM) within utility rights-of-way (ROWs).

Butterflies require a diversity of flowering plants to survive. But to reproduce, monarchs also need one-plant species in particular: milkweed. Adult monarchs lay eggs only on milkweed, and caterpillars eat only milkweed. Therefore, integrated vegetation management (IVM) of utility ROWs within the monarch migratory range requires successful recruitment of milkweed along with other flowering plants.

Making IVM work for monarchs involves the following questions: Which of the multiple milkweed species is most appropriate for a specific location? At what densities and distributions? What are the most effective and economical methods to establish and maintain milkweed, and how do we measure outcomes for the overall monarch population?

Research is underway to answer these questions, especially within the agricultural landscape. Early this year, the Iowa Monarch Conservation Consortium was created by agricultural and conservation organizations, state agencies, companies, and Iowa State University to enhance monarch butterfly reproduction in Iowa through collaborative and coordinated efforts. The consortium's research will help the agricultural community to restore monarch habitat while preserving agricultural productivity through effective establishment methods, at appropriate scales and distribution, and with accurate monitoring. The consortium is coordinating with universities in the Midwest and southern plains, and results will be relevant to IVM practitioners as well. (Visit *www.monarch.ent.iastate.edu* for more information.)

On a national scale, the Monarch Joint Venture is a science-based partnership of federal and state agencies, non-governmental organizations, and academic programs that are working together to support and coordinate efforts to protect the monarch migration across the lower 48 United States. The Joint Venture taps into the expertise that participating organizations offer, including studies of effective milkweed seed production, habitat monitoring through citizen and professional science, and dissemination of research via webinars and publications. (Find links to these and many other resources at *www.monarchjointventure.org*.)

Sand County Foundation is a partner with both the Iowa Consortium and the Monarch Joint Venture, and an established supporter of voluntary conservation on agricultural lands. We believe that agriculture and utility sectors share common interests in monarch recovery. A great deal of the monarch's potential breeding territory lies in the Corn Belt and other key crop and livestock producing regions. Likewise, the extent of electric transmission and gas pipeline ROWs from Texas to the Canadian border, and from coastal California to the mountain west, presents a

Sand County Foundation

Sand County Foundation (*www.sandcounty.net*) is a non-profit conservation organization dedicated to working with private landowners across North America to advance ethical and scientifically sound land management practices that benefit the environment. We achieve this mission by supporting private individuals as primary agents of conservation, providing public recognition for outstanding private lands leadership; facilitating the exchange of information among producers, scientists, funders, and policy makers; and helping create on-the-land examples of environmental improvement suitable for replication.

unique opportunity for IVM practitioners to maintain resilient monarch migratory corridors.

Just as agricultural interests are stepping up to the plate to strategically improve habitat within the nooks and crannies of the agricultural landscape, several utilities are doing likewise though IVM research and demonstration. These efforts support not only monarchs, but also the broad array of pollinators that are crucial to agricultural production and ecosystem health.

As stated by Dr. Chip Taylor, professor at Kansas University and founder of Monarch Watch: "We don't need millions of acres of land for pollinator habitat. What we need is millions of small patches of habitat along the thousands of miles of flyways." Utilities need not restore habitat on all acres under their influence, but rather on a collection of strategic locations within ROWs and adjacent to power plants, substations, valves, and offices across the nation.

Farmers are important utility customers, and leveraged action between agricultural and energy industries can make the difference in turning around the decline of a culturally valued species, while simultaneously improving broader habitat objectives. "I have yet to meet a person who doesn't like monarchs," said Rick Hellmich, research entomologist with the USDA-Agricultural Research Service and collaborator with the Iowa Monarch Conservation Consortium. "Nearly everybody wants to help. In some ways, the monarch can be the flagship species to help butterflies, bees, birds, and other animals."

To this end, Sand County Foundation is collaborating with utilities, farmers, trade associations, science and conservation groups, and state and federal agencies to support monarch recovery. We work to inform key partners about solutions and demonstrate effective land management changes to cost effectively meet habitat requirements. Like all Sand County Foundation projects, this effort engages a wide variety of partners who, working together, can achieve large-scale change.

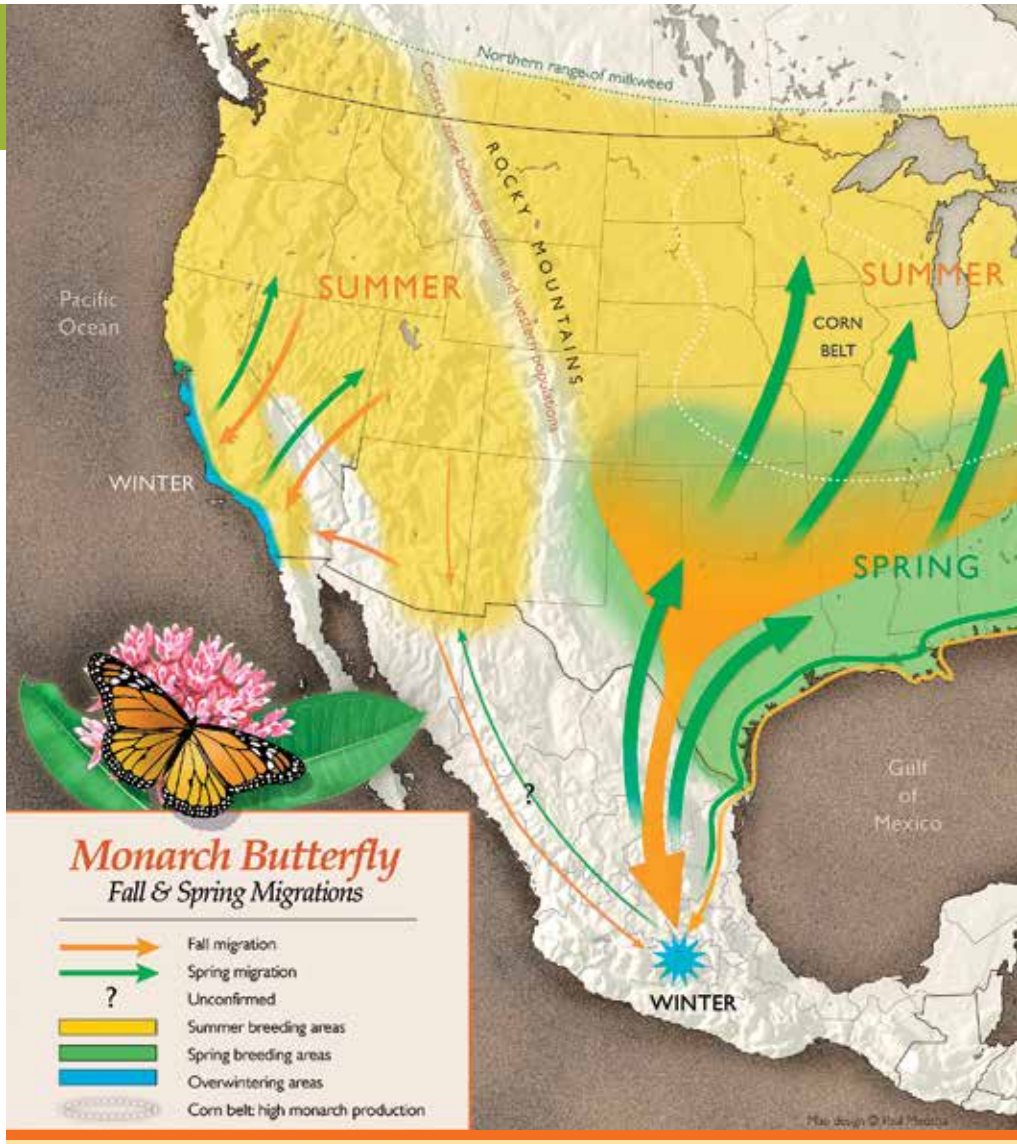

Figure 1. Monarch Populations and Migration in North America

Monarch Migration

Monarchs are native to North America and are the only butterfly species known on earth to perform a multiple-generation migration. In other words, no single butterfly completes the migration itself; rather, each generation "passes the baton," so to speak, in a migratory relay race. In North America, monarchs are generally divided into two populations—"eastern" and "western"—divided by the Rocky Mountains (see Figure 1). While the western population is facing threats, the eastern monarch population has experienced a much more precipitous decline.

For the eastern population, the fall migratory generation arrives to the mountains of central Mexico in November, where the butterflies form dense clusters on oyamel fir trees at only a few high-altitude sites. They overwinter here, and then return northward in March and April to breed in the southern United States. A subsequent generation then moves further north to reproduce in the agricultural heartland of the Midwest. A third and sometimes a fourth non-migrating generation expand the population through the summer until August and September, when juvenile butterflies begin the southward migration back to Mexico.

The western monarch follows a similar migratory pattern, wintering along the Pacific coast in California. They usually arrive in October, and begin a breeding and migratory pattern in mid-February to other locations in California, Nevada, and the Pacific Northwest.

What's All the Buzz? Pollinator Conservation Strategies Embrace Rights-of-Way (ROWs)

By Iris Caldwell, Research Engineer, The University of Illinois at Chicago

The monarch butterfly is a flagship species that draws a lot of attention to the need for pollinator conservation.

The admiration surrounding this particular insect partially comes from its monumental migratory journey taken each spring and fall.

The map above depicts the spring and fall migratory paths as well as key breeding areas, which include the Midwest corn belt.

Image courtesy of Monarch Watch.

Bees, butterflies, and other pollinators continue to make headlines as the science community and policy makers grapple with their severely declining populations and champions from school children to city mayors commit to help save the monarch butterfly.

Recognizing that the loss of pollinators has broad and potentially long-term consequences for U.S. food security, economy, and health of natural resources and biodiversity, President Obama issued a memorandum in June 2014 that established the Pollinator Health Task Force to directly address the issues facing pollinator populations. The task force in turn issued the *National Strategy to Promote the Health of Honey Bees and Other Pollinators* in May of 2015. In addition to other landscapes, the task force's strategy specifically targets rights-of-way (ROWs) for habitat restoration and enhancement due to their expansive footprint and other beneficial habitat characteristics.

ROWs are important for pollinator habitat restoration for several reasons. First, they crisscross the country and, in doing so, intersect a variety of other landscapes, connecting remnant habitat areas to other favorable landscapes that can support pollinators. The linear nature of ROWs also benefit migrating pollinators, such as the monarch butterfly.

Particularly, if planted with a diverse mix of plants, ROWs can provide important sources of food, shelter, and breeding habitat for pollinators. In some cases, this is a far better option than what is offered by adjacent lands, which may be intensely managed or developed—an effective desert from the pollinators' perspective.

ROWs are generally free of major disturbances, especially when thoughtfully managed through techniques such as integrated vegetation management (IVM). They are also somewhat protected from future development, at least in comparison to much of their surroundings. A recently published literature review performed by The Xerces Society for Invertebrate Conservation on behalf of the Federal Highway Administration found that plant species selection and management techniques designed for IVM generally meet both functional requirements of ROW VM *and* pollinator habitat. The literature review also notes several studies that suggest pollinators can thrive in these environments.[1]

The opportunities for ROWs to play an important role are many. There are tens of millions of acres of ROWs along roads, utility transmission lines, and railroads across the U.S. In some states the number of acres of ROWs is comparable to the total acres of protected land, or registered Conservation Reserve Program (CRP). In Wisconsin, for instance, the number of acres of

[1] Hopwood, J., S.H. Black, E. Lee-Mäder, A. Charlap, R. Preston, K. Mozumder, and S. Fleury. (2015). *Literature Review: Pollinator Habitat Enhancement and Best Management Practices in Highway Rights-of-Way.* Prepared by The Xerces Society for Invertebrate Conservation in collaboration with ICF International. Washington, D.C.: Federal Highway Administration. (Available at: *https://www.environment.fhwa.dot.gov/ecosystems/documents/pollinators_BMPs_in_highway_ROW.asp*)