MONARCHS IN THE ROUGH

RESOURCE GUIDE

Resource Guide for Golf Course Superintendents

EDF Habitat Exchange and Audubon International Cooperative Sanctuary Program

EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

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Introduction

The monarch butterfly, an iconic species, is suffering due to a lack of sufficient habitat. Development, logging, and excessive herbicide usage are destroying large areas of monarch breeding, foraging, and wintering habitat, including areas in the monarch's prime migration routes. Monarchs need milkweed to survive; they lay their eggs on milkweed plants, and monarch caterpillars must eat milkweed to survive. In efforts to protect and increase monarch populations, the first step is growing suitable breeding habitat that includes milkweed and other native, nectar-producing plants.

Golf courses offer unique opportunities for monarch conservation. By undertaking habitat restoration projects in out-of-play areas, golf courses can provide much needed monarch habitat. They contain large, open areas of vegetation, and many already support pollinators like the monarch to some degree. With proper planning and management, golf courses can provide high-quality monarch habitat.

Many golf course superintendents are already searching for ways to make their courses more sustainable and environmentally-friendly. This document is intended to guide golf course staff in this process, by providing an overview of the steps necessary for creating monarch habitat on golf courses. This guide describes the process of planning a habitat restoration project, selecting the appropriate plant species, establishing milkweed and other native plants, and appropriately managing the site. It discusses planning to engage a golf course's membership, full staff, and surrounding community in the effort to create habitat. It also outlines the range of resources available, both online and through seed suppliers, native plant societies, and naturalists. Every golf course is different, and every habitat restoration site will be unique; each project should be tailored to site-specific conditions and the unique needs of project participants. This guide is meant to help program participants develop habitat restoration projects that work for both golfers and monarchs, while creating co-benefits for a range of native pollinator species.

The information in this guide is based on scientific literature, information from organizations that specialize in monarch habitat, and interviews with both native plant producers and golf course staff. It provides general guidance for undertaking a monarch habitat restoration project; more detailed, location-specific information can be obtained from seed suppliers, local naturalists, native plant societies, and the extensive resources available online. Some additional helpful resources are outlined in Appendix 1.

Resource Guide Contents

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Part 1: Planning Your Restoration Project

Site Selection

Proper site selection is a crucial component of successful habitat projects – choosing the proper sites for habitat restoration will make both establishment and long-term management easier, while allowing superintendents to create restoration sites that work for golfers, golf course staff, and monarchs.

Selecting the proper sites for monarch restoration projects helps ensure that monarchs, milkweed plants, and other nectar-producing plants can thrive. An ideal site is one that receives adequate sunlight, because most species of milkweed grow best in full sun. An ideal site is also as large as possible. Although even small patches of habitat make a difference, sites that are bigger are better – they can support more milkweeds, more monarchs, and more pollinators in general. Sites should also be located in areas where it is easy to provide some level of irrigation in the first year or two of establishment, when it is most beneficial. Sites should also be located as far as possible from areas that tend to require herbicide or insecticide applications. Ideally, sites should be chosen so that they are 100 – 150 feet away from any pesticide usage, although this may not be possible on every golf course.

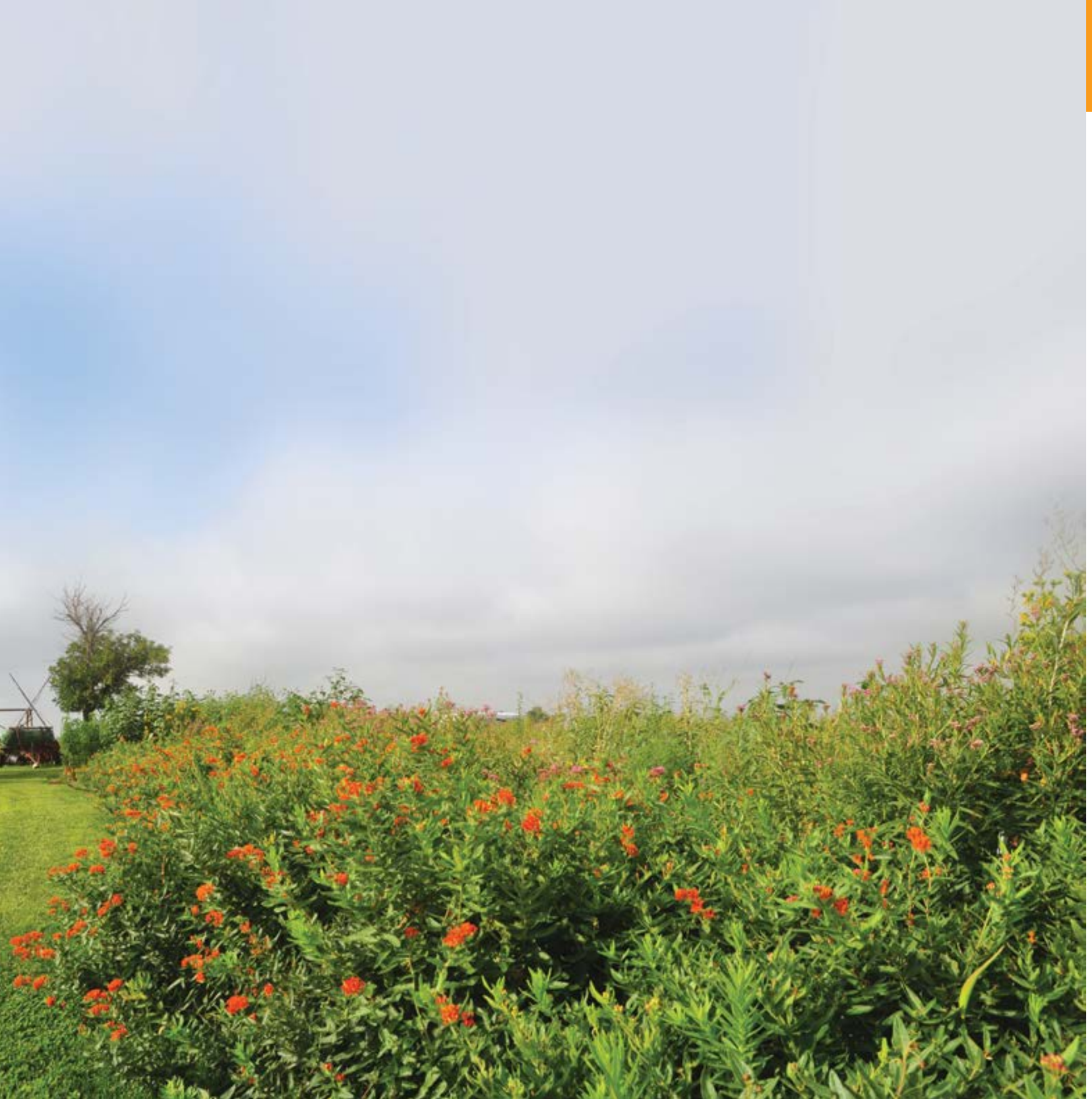
Locating restoration sites in areas away from pesticide use keeps monarch caterpillars safe and helps them survive to adulthood.

While all monarch restoration sites should be located in out-of-play areas, not all out-of-play areas are equally valuable to monarchs. Ideally, restoration sites will be located away from areas of play, and in areas that are protected from golf carts and other machinery usage. They should also be located away from common landing zones. By planning sites in areas that are unlikely to have balls hit into them, project managers can protect plants from being disturbed or trampled while preserving playability. The United States Golf Association points out areas such as, “the outside of a bend in the fairway, the inside edge of a dog leg, or the lower side when a fairway has a cross slope” as examples of areas that golfers will often need to walk or drive through (Shepherd, 2002). Golf course staff will be the best resource when it comes to choosing restoration sites that are unlikely to be disturbed. If necessary, staff can also survey the course to determine which areas golfers walk through or retrieve balls from most often.

It is also helpful to plan restoration sites so that they have large, chunky shapes, because wider sites are generally easier for golfers to notice. Unlike narrow, linear habitat areas, sites that are wide and chunky provide a larger habitat area and a smaller edge length, making the project site less prone to disturbance (Shepherd, 2002). If disturbance becomes an ongoing problem, staff can also consider roping off the habitat restoration site, especially during the establishment phase when trampling poses a greater risk to milkweed plants. Installing interpretive signage that designates the area as a habitat restoration site can also reduce instances of disturbance, while educating golfers about the environmental benefits that the course provides.

Selecting Appropriate Milkweed Species

Only native milkweed species should be included in restoration efforts. There are about 20 milkweed species native to the U.S. for which commercial seed is generally available. Restoration sites should be planted with species that are native to the project’s region. Planting non-native, introduced milkweed species can have a negative effect on the ecosystem, due to their potential to compete aggressively, become weedy, or disturb native species interactions (Borders, 2014). Additionally, native plants are typically best-suited for supporting important native pollinators. In Appendix IV of Milkweed: A Conservation Practitioner’s Guide, the Xerces Society provides a region-by-region summary of milkweed seed availability, priority species for use in habitat restoration, and an overview of monarch population dynamics (Borders, 2014). This guide can be used to identify native species to plant in habitat projects. The Pollinator Partnership’s Ecoregional Planting Guides are another helpful



resource for determining which native plants to include, and can be found at http://www.pollinator.org/guides.htm. Native plant societies can also provide locally appropriate guidance on species selection, siting, and planting in order to help plan a successful and ecologically-beneficial restoration project. The American Horticultural Society has compiled a list of native plant societies, which can be found at http://www.ahs.org/gardening-resources/societies-clubs-organizations/native-plant-societies.

Habitat restoration sites in the U.S. should not be planted with tropical milkweed. It is often available in nurseries because it is colorful and easy to grow. However, it is not native to the United States and Canada (Alitizer, 2015). Tropical milkweed can harm monarch populations by impacting migrations and breeding; when tropical milkweed is available, monarchs sometimes do not migrate, and breed in the winter. This often leads to higher mortality due to a lack of food sources, freeze events, and the infection by parasites (Alitizer, 2015).

Different milkweed species have different characteristics, and managers should try to select native milkweed species that have attributes that will help them thrive in the specific conditions of the project site. The UDSA's Fact Sheets and Plant Guides, found at http://plants.usda.gov/java/factSheet, contain detailed information about the species-specific characteristics of many milkweed species.

Seed Mix Formulation

The Xerces Society recommends planting milkweed seeds in habitat sites alongside a diverse, native seed mix (Borders, 2014). There are many benefits associated with planting milkweed with other native, nectar-producing plants; diverse seed mixes tend to establish sites that are more resilient to disease, weed encroachment, and damage from specialist herbivores. Planting a diverse seed mix also maximizes benefits for other important native pollinators, while keeping the cost of milkweed seed from becoming prohibitively expensive.

For restoration projects, the Xerces Society planted restoration sites with 0.1% to 14% milkweed. We suggest planting milkweed in the higher end of this range; greater numbers of milkweed plants can support greater numbers of monarchs, and larger numbers of plants have been associated with higher survival rates for caterpillars due to decreased competition for food and decreased risk of disease (U.S. Fish and Wildlife Service, 2016). For Monarchs in the Rough pilot sites, we recommend planting milkweed seed at a rate of about 10% of the total seed planted. For those who wish to design custom seed mixes (rather than using a pollinator mix with their milkweed seeds), the Xerces Society has developed a useful seed calculator spreadsheet. It can be downloaded at http://www.xerces.org/xerces-seed-mix-calculator/.

The total quantity of seed needed (both milkweed and non-milkweed) is dependent on several factors, including project area size and desired plant

density. Anywhere from 3 to 10 lbs. of seed is needed to plant a 1 acre site, depending heavily on both site location and on which species are being planted (The Xerces Society for Invertebrate Conservation, 2016). Due to the wide variance in application rates, it is best to consult a seed vendor for specific advice on the appropriate amount of seed for your site.

Sourcing Plant Materials

Milkweed seeds and plugs are generally only available through suppliers that specialize in native plant materials. Because commercial vendors can be scarce, the Xerces Society has developed the Milkweed Seed Finder, a helpful web directory of milkweed seed suppliers. The Milkweed Seed Finder can be found at http://www.xerces.org/milkweed-seed-finder/. Many seed suppliers can sell and ship both milkweed seeds and plugs, so be sure to ask about the availability of plugs if transplanting is your planting method of choice.

It is ecologically best to use milkweed plant materials that are both locally native and locally sourced. The more locally sourced plant materials are, the better—many restoration projects even try to use seeds sourced from the same county or watershed as the project site. Project managers should decide to what extent they want to prioritize local sourcing for seeds, depending on factors like availability and budget. Buyers of milkweed seeds should be sure to ask vendors about the origin of plant materials.

It is also important to confirm with vendors that milkweed plant materials (and any other plant materials used at the restoration site) have not been treated with systemic insecticides. Systemic insecticides are absorbed into plant tissues and affect a broad spectrum of insects, so it is best to use plant materials that have not had contact with them, especially when transplanting milkweed plugs (Borders, 2014).

Cost of Plant Materials

Milkweed seed can usually be purchased in bulk, and prices vary widely based on location and milkweed species. For example, in California milkweed seeds generally cost between $260 and $350/lb. (Hedgerow Farms), while in Iowa seeds typically cost between $200 and $400/lb. (Ion Exchange, 2016; Farms, 2016). Even within the same ecoregion, the price of milkweed will vary from retailer to retailer, fluctuating based on factors such as availability, commercial milkweed yields, and yearly growing conditions. When budgeting for a restoration project, multiple seed suppliers should be contacted to gain an accurate, up-to-date quote for milkweed seed costs.

With accurate pricing information, calculating the cost of milkweed seeds for a restoration site is fairly simple. Mixing 1 lb. of milkweed seed with a 10 lb. bag of pollinator mix results in a seed mix that is approximately 10% milkweed, which is in the higher end of Xerces' typical range. In many cases, this will be sufficient to plan about one acre of land. This means that in California, including milkweed in restoration plantings would cost approximately $260 - $350 more than it would cost if only a pollinator mix were planted.

The cost of other native plant materials will vary depending on the region and which native plant species are included. A 10 lb. bag of pollinator mix (western or eastern) can seed approximately an acre, and typically costs between $500 and $600 (Seedland). There are also options available for procuring free seeds – Syngenta's Operation Pollinator program provides farmers and golf course managers with targeted seed mixes, free of charge. Syngenta's seed mixes are tailored to local conditions and to the needs of native insects.

Planning for Engagement

By creating monarch habitat on their golf courses, superintendents are also creating opportunities to involve the course's staff, membership, and surrounding community in their habitat restoration efforts. Engaging with these groups can help superintendents tell a story about the benefits that their golf courses are providing, a story that goes beyond the boundaries of the golf course to benefit communities and ecosystems. This is especially true because monarchs are migratory—by supporting monarchs, golf courses become a crucial part of a larger network of monarch habitat sites, which work together to make the survival of monarchs possible.

When planning restoration projects, superintendents should consider how best to involve staff, golfers, and the wider community through education and outreach. All monarch restoration efforts should engage with the course's full staff and membership in some way. This helps ensure that monarch habitat is ingrained into the fabric of the course, and can foster an increased sense of community through pursuit of a positive, shared goal. It can also contribute to the success of restoration efforts; staff and golfers who are knowledgeable about the habitat efforts underway are empowered to get more involved, and to avoid disturbing restoration sites.

Schools and other local community organizations can also get involved in the installation and maintenance of monarch habitat. Monarchs are an iconic species, and are often used as an educational tool; many of us can remember learning about the monarch's transformation from caterpillar to butterfly when we first learned about life cycles in elementary school. By involving schools and other local groups, superintendents can provide a valuable, unique educational opportunity while receiving help with simple maintenance and monitoring activities. There is also potential for long-term engagement with schools and local groups, as they watch the restoration site grow and thrive over time.

Interpretive signage is another important component of successful engagement, and can help golf courses show off the efforts that they have made to improve the environment. Signage can highlight the course's achievements, or provide educational information about the monarch butterfly. It can describe the monarch's life cycle, or the monarch's migration and the links between the golf course and the broader network of monarch habitat sites. Signage can also describe the plants used and the importance of milkweed, and motivate golfers to install monarch-friendly gardens at their own homes and businesses. Signage should be installed in high-visibility areas either on the course, in the clubhouse, or both.

Part 2: Establishing Milkweed

Timing of Establishment

Planting milkweed seeds in the fall is the most effective way to increase rates of successful germination; this ensures that seeds undergo stratification, which is exposure to cold, moist conditions (The Xerces Society for Invertebrate Conservation, 2016). Stratification stimulates the germination process, and occurs naturally during winter if seeds are planted in the fall. Consult your seed vendor for advice on the timing of planting in your region, because the optimal timing varies regionally; for example, it is best to plant in late fall in California (The Xerces Society for Invertebrate Conservation, 2015), and in some colder regions it may be possible to plant in early spring (The Xerces Society for Invertebrate Conservation, 2016).

A monarch caterpillar feeds on a milkweed plant. Monarch caterpillars need milkweed to survive.

If it is not possible to time planting so that stratification occurs naturally, seeds can be stratified artificially. Artificial stratification simulates the process of natural stratification, and can be achieved by combining seeds with a dampened, sterile media and storing in a chilled location for 4 – 6 weeks. The Xerces Society offers more detailed information about the artificial stratification process in Milkweeds: A Conservation Practitioner's Guide.

Planting Methods

Milkweed seeds should be planted separately from the rest of the seed mix (Borders, 2014). While many pollinator-friendly plants can be broadcast-seeded, milkweed often exhibits lower rates of successful germination if it is mixed into and planted with a seed mix (Hedgerow Farms, 2016). Planting milkweed seeds separately allows for the use of planting methods that increase seed-to-soil contact, which increases rates of successful germination. In restoration plantings, an easy way to plant separately is to plant milkweed in distinct rows across the project site, the rest of which is planted with a diverse seed mix (Borders, 2014).

The Xerces Society's Milkweeds: A Conservation Practitioner's Guide outlines three main methods for planting milkweed. Two of these methods, drill seeding and hand-sowing, are used to plant seeds. The third method, transplanting, is used to plant milkweed plugs. Below are brief descriptions of each method. Project managers should check with their seed vendors before choosing a milkweed seeding method.

DRILL SEEDING

For most golf course restoration projects, drill seeding will be the best method for establishing milkweed from seed (Borders, 2014). Drill seeding utilizes a seed drill to plant milkweed seeds just below the soil surface, ideally at a depth of ¼ to ¾ inches; seedling emergence tends to be negatively impacted when seeds are sown at greater depths. Drill seeding minimizes the time and labor required, and is cost-effective when used to plant larger sites with

sizable amounts of seed; the Xerces Society sets this benchmark at sites of over ¼ acre and quantities of seed greater than ½ lb. (Borders, 2014). Most golf courses will plant over ¼ acre as part of their restoration efforts, so drill seeding will be the most low-effort, cost-effective planting option.

While drill seeding is cost-effective at large enough scales, it does require obtaining an appropriate seed drill. Specialty native seed drills or wildflower drills are the best option, but a vegetable seed drill can serve as an effective alternative, especially if it is designed to plant vegetable seeds that have a similar size and shape as milkweed seeds. Examples include seed drills for sunflower, cucumber, cucurbits, and melon seeds (Borders, 2014). Project managers should consult their seed suppliers about the proper equipment, to ensure that their seed drill is suitable for planting milkweed or to find out where the right seed drill can be rented.

HAND-SOWING

Hand-sowing doesn't require any specialty equipment. However, it is a much more labor-intensive option because it involves planting seeds by hand. Hand-sowing is best suited for planting smaller-scale projects that require small amounts of milkweed seed. It is generally used when a seed drill is unavailable and growing and planting transplants would require too much time, labor, or resources. To hand-sow milkweed seeds, the Xerces Society suggests using a rake to incorporate seeds into the upper inch of soil (Borders, 2014). Soil should then be tamped down, either by walking over the planting site or with a turf roller; this helps create the same kind of direct seed-to-soil contact that is achieved by using a seed drill (Borders, 2014).

TRANSPLANTING

Transplanting requires growing or purchasing milkweed seedlings, then planting the seedlings in the restoration site. This method involves planting seedlings that have already made it past the germination stage. This is an advantage if limited seed is available, as it is easier to ensure that a greater number of plants survive (Borders, 2014). Compared to seeds, seedlings are also better able to compete with weeds and other plants (Borders, 2014).

Transplanting requires either purchasing milkweed plugs, or growing them in a greenhouse or similar environment. Purchasing milkweed plugs can be expensive; Monarch Watch's Milkweed Market, found at http://monarchwatch.org/milkweed/market/, sells flats of 32 plugs for $74 per flat. Growing plugs requires time, access to a greenhouse or other appropriate site, and the proper equipment and expertise. Seeds should undergo artificial stratification before being planted, and plugs should be transplanted after the last frost (Borders, 2014). It is also important that the plugs do not have any contact with insecticides. More detailed information on both growing and installing transplants can be found in the Xerces Society's Milkweeds: A Conservation Practitioner's Guide.

Site Preparation

The importance of good site preparation cannot be overstated. By properly preparing the restoration site before planting, project managers can increase the chances of successful establishment and minimize the impact of problems like weed encroachment.

Elements of good site preparation include removing existing vegetation, reducing the weed seedbank in the soil, and creating a smooth soil surface (The Xerces Society for Invertebrate Conservation, 2013). The biggest obstacle to successful establishment is often competition from weeds (The Xerces Society for Invertebrate Conservation, 2013). By killing any existing weeds, project managers can reduce competition from fast-growing seeds and improve the likelihood of successful germination and seedling survival. Methods of weed elimination include herbicide application, smothering, and solarization (Borders, 2014). If possible, it is also helpful to reduce the amount of weed seed in the soil; this can be done by allowing weed to germinate or encouraging germination, and then destroying weeds once they emerge (University of Manitoba, n.d.). However, seedbank depletion can take multiple seasons, and may not be a realistic option for some projects.

While the severity of weed problems will vary from site to site, weed encroachment is often one of the most difficult problems faced when planting native plants, both during establishment and in the long-term life of the habitat restoration site. By taking strong, early action to kill weeds and reduce the weed seedbank, both establishment and long-term management will be made simpler and less labor-intensive.

Irrigation during Establishment

While many milkweeds are fairly drought-resistant once established, irrigation during establishment tends to improve survival rates. If possible, milkweed plants should be irrigated during establishment, according to species-specific water needs and site conditions. Irrigation needs should be taken into account during the initial planning of the site; establishment will be easier if any restoration projects are located in areas of the golf course that can be irrigated easily. An efficient, cost-effective option is installing habitat restoration projects over areas that already have existing irrigation, such as areas of turf or rough that superintendents would like to stop maintaining. After establishment, any irrigation lines can be removed, to help conserve water resources.

The needs of different species vary, and can be checked by referencing the USDA's Plant Guides. For example, it is recommended that narrow-leaved milkweed is irrigated during the first year; by the second year, the root system should be established, making the plant more drought-tolerant and able to survive without irrigation (USDA NRCS National Plant Data Center, n.d.). Most milkweed plants benefits from being irrigated for the first 1 – 2 years after planting.

Part 3: Adaptive Management

If the project has been planned with care and the site was adequately prepared, restoration projects should require minimal management after establishment. Best management practices will vary depending on project-specific characteristics, but through regular monitoring and an adaptive approach, projects can be managed in a way that is responsive and cost-effective. Project managers should be proactive about asking for additional information about best management practices for monarch habitat sites – local naturalists and native plant societies are an extremely helpful resource.

Monitoring Milkweed Health

Restoration plantings should be regularly monitored for overall health. Any signs of disease, age-related plant decline, or other damage to milkweeds should be noted and appropriately managed. Disease is rare in biodiverse restoration plantings, and little is known about native plant diseases. However, it can helpful to check milkweed plants for any strange coloring or spots. Age-related plant decline occurs naturally over time and can be offset by planting some additional milkweed plants.

Managing Weeds

Any weed encroachment that occurs should also be managed, as without management weeds can overwhelm the beneficial native plants in your site. The strongest defense against weed encroachment is proper site preparation, in which weeds have been eliminated from the project area. Also, sites with a healthy, dense, biodiverse stand of vegetation will be naturally resilient to weed encroachment (Borders, 2014). If possible, herbicides should not be used in the restoration site, as they may harm milkweed and other native pollinator plants. If herbicide applications are deemed absolutely necessary, every effort should be made to avoid impacting milkweeds; minimal amounts of herbicide should be used in a targeted way, under dry conditions to avoid any run-off. If weed problems are extremely persistent, pre-emergent herbicides can be used in mature, established fields—however, application should be avoided in the spring, when new milkweed seedlings may be emerging (Borders, 2014).

Minimizing Fertilizer Use

Planting a monarch restoration site can help golf courses use less fertilizer, as native plants typically don't benefit from fertilizer applications. Run-off of nitrogen or other fertilizer can actually stunt native plant growth, or help weeds outcompete beneficial native plants. It is generally helpful to minimize the amount of fertilizer used near the restoration site, and to try to apply fertilizer under dry conditions to prevent run-off.

Mowing and Disturbance

Mowing needs for habitat projects will vary from site to site, based on location and the plant species planted. Golf course managers should consult with naturalists, their seed suppliers, and/or native plant societies to determine what kind of mowing regime (if any) would be beneficial. Mowing or any other disturbance should be avoided when monarchs are present, especially during the egg, caterpillar, and chrysalis stages of the life cycle, when monarchs are less mobile. If mowing is necessary, it is best to mow during the late fall or winter, when monarchs have migrated to their overwintering sites.

When mowing is necessary for the benefit of the habitat site, mowing should be done only as needed, and wildlife-friendly practices should be used. Such practices include:

- Using a flushing bar and cutting at reduced speeds, so that insects can escape
- Using a minimum cutting height of 8 – 12 inches
- Avoiding mowing when monarchs are present, especially during the egg, caterpillar, and chrysalis life cycle stages
- Avoiding mowing at night, when it is more difficult for insects to escape
- Mowing in patches so that monarchs and other beneficial pollinators can easily find refuge and recolonize; ideally, only one third or one fourth of a site should be mowed in a year

Protecting Monarchs from Insecticides

- Insect problems and insecticide usage will vary from golf course to golf course, depending on the location and management of each course. Protecting monarchs and other native pollinators from exposure to insecticides is a crucial component of any restoration project; monarchs and other pollinators are dependent on the habitat that restoration sites provide, and will die if exposed. Every effort should be made to protect monarchs from insecticide exposure.
- Insecticides should never be applied to the restoration site. If insecticides must be used on adjacent land, several measures should be taken to protect monarchs by reducing pesticide drift as much as possible:
- Pesticide applicators should be certified, and should be sure to follow any relevant regulations, label restrictions, or guidance for proper application conditions.
- Applicators should use the smallest amount of insecticide possible.
- Aerial applications and mist blowers should not be used. If insecticides are absolutely necessary, they should be applied directly.
- Insecticides should only be applied when wind is minimal.
- Insecticides should not be applied in rainy conditions.
- An insecticide-free buffer zone should be established. The larger this buffer zone is, the better. Ideally, there wouldn't be insecticide use within 100 – 150 feet of the restoration site, although a buffer of that size may not be workable on every golf course.
- Systemic insecticides should not be used; due to their long residual toxicity, they have a high potential to harm monarchs and other beneficial pollinators (Borders, 2014).

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Appendix 1: Additional Resources

- The Pollinator Partnership's Ecoregional Planting Guides: each guide contains information about selecting plants for native pollinators, specific to each ecoregion. http://www.pollinator.org/guides.htm.
- The Xerces Society's Milkweeds: A Conservation Practitioner's Guide: contains detailed information about propagating milkweed at larger scales. Much of the information is geared towards growing milkweed for large-scale seed production, but most of this information is relevant to restoration practitioners and land managers who want to incorporate milkweed into their revegetation efforts. It can be found at http://www.xerces.org/milkweeds-a-conservation-practitioners-guide/.
- Syngenta's Operation Pollinator. This program provides golf course managers and farmers with targeted seed mixes for pollinators, free of charge. http://www.operationpollinator.com/.
- The Monarch Joint Venture's Monarch Breeding Habitat Assessment Tool. While this program offers its own monitoring methodology, this tool offers some helpful, easy-to-understand suggestions for improving any monarch breeding habitat site.
- The USDA's Fact Sheets & Plant Guides. These provide detailed information about a range of milkweed species. Plant Guides include species-specific information about status, establishment, management, and propagation. http://plants.usda.gov/java/factSheet.
- The Xerces Society's Pollinator Conservation Resource Center provides regional habitat conservation guides, plant lists, and monitoring resources. http://www.xerces.org/pollinator-resource-center/.
- The Xerces Society's Pollinator Habitat Installation Guides. These guides provide instruction for establishing pollinator meadows from seed, and also offer practical, regional guidance on the installation and maintenance of pollinator habitat. http://www.xerces.org/pollinator-conservation/agriculture/pollinator-habitat-installation-guides/.
- The American Horticultural Society has a list of Native Plant Societies, organized by state. This list can be found at http://www.ahs.org/gardening-resources/societies-clubs-organizations/native-plant-societies. Native Plant Societies are a valuable resource for locally-appropriate species and planting information.

To ask questions, or learn more about Monarchs in the Rough, please contact:

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