

Monarch Joint Venture Implementation Plan, Updated November 2014

Goal 1: Monarch Habitat Conservation, Maintenance and Enhancement

Strategy 1: *Asclepias* and nectar resource development for habitat enhancement on public and private lands

Action	Implementation Strategy
H-1: Milkweed distribution database	Develop milkweed species distribution database to guide selection of appropriate species for habitat enhancement work.
H-2: Milkweed plant materials inventory	Assess commercial availability of native, regionally sourced milkweed seeds and plants.
	Continuous development/improvement of Xerces Milkweed Seed Finder, Monarch Watch Milkweed Market vendor list, and other partner milkweed supplier resources.
H-3: Native milkweed seed collection or purchase for distribution and restoration projects	Coordinate native seed collection efforts in key locations and collaborate with nurseries or other native plant producers to grow and sell milkweeds.
	Continuation/expansion of Monarch Watch Milkweed Market, including solicitation, receipt, and cleansing of seeds, and growing and distribution of milkweed plugs.
	Connect restoration projects with volunteer individuals and organizations for seed collection.
	Purchase milkweed and nectar plant seeds for use in restoring prairie habitat in prime breeding areas.
H-4: Build commercial milkweed seed industry, including wholesale capacity	Provide support and resources to encourage native plant growers to propagate native milkweeds, increasing overall commercial availability of milkweed plant resources for habitat enhancement projects.
	Promote installation of milkweed seed increase plots to create long-term sources of milkweed seeds in prime monarch breeding areas.
H-5: Develop and promote seed mixes for monarchs	Develop and promote regionally specific seed mixes for monarch breeding habitat, including regionally appropriate milkweed species and nectar plants.
	Develop relationships with potential seed suppliers and growers, particularly in priority ecoregions and ecoregions with limited milkweed availability.

Strategy 2: Create, restore, enhance, and maintain habitat on public lands.

H-6: Develop butterfly habitat management guidelines	Develop a comprehensive set of guidelines for butterfly habitat creation, enhancement, maintenance, and monitoring for breeding and migration habitat for different audiences.
	Disseminate habitat guidelines through MJV and partner websites and through a training program for different audiences.
H-7: Promote monarch-friendly management by public agencies	Outreach to land management agencies (USFWS, USFS, BLM, NPS, TPWD, other state agencies, etc.) to encourage/recognize monarch-friendly habitat management practices and monitoring opportunities.
	Develop and implement a strategy to include monarchs and their breeding, migrating, and overwintering habitats in state and national conservation plans (e.g., State Wildlife Action Plans).
H-8: Promote monarch-friendly roadside management	Develop relationships with state DOTs and wildlife-friendly roadside management programs to encourage inclusion of monarch and pollinator friendly management along roadsides.
	Develop recommendations and best management practices to encourage habitat establishment along roadsides and provide resources necessary to successfully restore monarch habitat along roadsides.
	Encourage the inclusion of pollinator/butterfly gardens and promotional signs or materials in rest areas adjacent to roads.
	Support "Monarch Highway" (I35 corridor) project as a pilot/model project for roadside management and monarch awareness.

Strategy 3: Improve & maintain habitat on private lands.

H-9: Increase planting of small garden habitats for monarchs	Facilitate expansion of MJV Success Stories, Monarch Waystation, Wild for Monarchs, NABA Butterfly Habitat, NWF certified habitats, and other programs throughout breeding range.
	Provide support for creation of schoolyard gardens by working through existing granting programs.

	Expand education/outreach strategy for schools and provide training or necessary resources for teachers to implement monarch conservation/education in classrooms and on school grounds.
H-10 : Increase monarch habitat in and surrounding farm areas	In regions of greatest concern develop best management practices for minimizing the susceptibility of livestock to accidental milkweed poisoning, while maintaining usefulness of the habitat to monarchs.
	Promote prairie on farms as a means to restore monarch habitat in agricultural landscapes. Create and utilize demonstration sites based on this model.
	Connect landowners with opportunities or incentives through Farm Bill Conservation programs to create, enhance, or manage lands to support monarchs.
	Identify existing and potential agricultural production systems that are compatible with monarch habitat, and devise strategies to maintain and expand these systems (e.g., cost sharing, market incentives, and certification programs) to create markets for ecosystem services.
H-11 : Increase monarch habitat on corporate lands	Identify corporate partners and encourage the inclusion of monarch-friendly habitat areas within their property.
	Provide training and resources necessary to properly establish and maintain monarch habitat on corporate lands.
H-12 : Improve PR for Milkweeds	Develop materials to share information about milkweeds, and to address concerns about weediness and toxicity held by some portions of the general public.
	Develop and distribute promotional materials describing the importance of milkweed to monarchs.
H-13 : Monarch nectar plant recommendations	Develop regional recommendations regarding optimal nectar plants for monarchs for inclusion in various resources. Recommendations should include species to support spring migration, summer breeding, and fall migration.
H-14 : Right-of-way habitat management	Develop guidelines for monarch habitat creation, enhancement, maintenance and monitoring in utility or railroad ROW areas.
	Identify potential rights-of-way partners and encourage monarch-friendly management on their land. Provide information and resources necessary to be successful in creating, enhancing, or maintaining monarch habitat in these areas.
Strategy 4: Address overwintering habitat issues in California.	
H-15 : Overwintering site condition assessment and management	Identify microclimate requirements of overwintering monarchs in California.
	Provide information (e.g., number and location) about current and historic monarch overwintering sites in California and present to agencies tasked with approving development projects to promote protection of those sites.
	Promote specific management actions regarding tree maintenance at California overwintering sites to restore habitat and evaluate the effectiveness of those actions.
	Develop and disseminate technical guidelines and training for assessment, conservation, enhancement, restoration, and maintenance of California overwintering sites.
	Consider special designations in land use plans to protect overwintering sites in California (for example, the California Coastal Commission could designate all overwintering sites within the Coastal Zone as Environmentally Sensitive Habitat Areas).
	Support continued habitat quality assessment and monitoring of overwintering sites throughout California and adapt monitoring protocols to assess the effectiveness of conservation actions.
	Determine impacts of insects and diseases on overwintering habitat quality in California. This includes but is not limited to pitch canker on Monterey pine and leaf beetle on Eucalyptus.
GOAL 2: Education to Enhance Awareness of Monarch Conservation Issues & Opportunities	
E-1 : Website development	Maintain an easy-to-use website to increase awareness of monarch conservation issues; provide access to relevant media to facilitate conservation efforts
	Provide up-to-date information on current status of eastern and western monarch populations, links to other monarch programs, and other relevant information that will support monarch conservation.
E-2 : Print and web material development and distribution	Develop and distribute print and web materials to promote partners, monarch awareness and conservation guidelines for different audiences.
	Provide Spanish versions for materials, based on demand for those materials.

E-3: Highlight MJV via online resources	Strengthen MJV partnership via online promotion of partnership efforts.
E-4: Outreach at conferences, meetings and in the media	Attend various stakeholder meetings to engage different audiences in monarch conservation. Aid in development of messaging to engage different audiences reached at these events.
E-5: Outreach to Native Plant Societies	Continued outreach by all partners to native plant societies as opportunities arise to promote and encourage the inclusion of native milkweed and nectar plants important for monarch habitat restoration efforts.
E-6: Migration map (and video)	Google Earth tour to demonstrate monarch migration and to highlight MJV projects.
E-7: Expand communication to different audiences	Develop targeted communications and outreach strategies for different audiences. Implement those strategies to reach audiences and engage a larger group in monarch conservation efforts.
GOAL 3: Research & Monitoring to Inform Monarch Conservation Efforts	
Strategy 1: Development or evaluation of monarch habitat or population assessment and monitoring protocols	
R-1: Overwintering habitat assessment protocol development	Create habitat assessment protocol to be implemented during California Thanksgiving counts.
R-2: Document known monarch breeding areas in the western U.S. and engage agencies and land managers in protecting milkweed stands.	Distribute the existing online milkweed survey to a broader base of recipients, compile data received, map locations of milkweed/breeding sites in western states using GIS.
	Use GIS to analyze primary landowners of key breeding sites, work with these entities to protect and enhance existing monarch breeding areas
R-3: Breeding habitat assessment protocol	Develop breeding habitat assessment protocol for use by land managers and volunteers.
	Field test and finalize breeding habitat assessment tool and develop database for tracking completed assessments.
R-4: Develop demographic model	Measure population vital rates to determine where within the annual cycle or life cycle the greatest threats occur (e.g., adult summer survival and reproduction; larval survival; adult migration and winter survival) and use them to develop a demographic model (that includes monarchs in western North America) to evaluate whether restoration actions are effective.
R-5: Assess and improve western monarch overwintering population measurement protocols	Conduct analyses to determine whether existing monitoring protocols (e.g. the Western Monarch Thanksgiving Count) adequately estimate monarch population size and adjust existing or develop new protocols if necessary.
Strategy 2: Research to improve creation of monarch breeding, migrating, and overwintering habitats on different scales.	
R-6: Determine role of small-scale habitat creation in monarch conservation	Evaluate the potential role of small-scale habitat restoration in promoting an increase in the overall monarch population. Document and evaluate contributions of citizen conservationists to monarch habitat restoration.
R-7: Increase understanding of relative habitat quality	Investigate whether there are optimal milkweed densities and spatial distributions across the breeding range and provide recommendations to promote habitat productivity through habitat restoration and management.
	Determine the relative value of different milkweed species to reproductive success (considering geographic regions).
	Determine how different habitat characteristics (i.e., forage species, milkweed species, patch size, connectivity, etc.) influence productivity and survivorship across habitats and geographic regions.
	Conduct research to inform the development of improved seed mixes for habitat enhancement throughout the monarch range.
	Use movement, population dynamics and modeling studies to establish regionally appropriate targets for the spatial distribution and abundance of larval host plants and nectar plants and landscape scale habitat restoration.

R-8: Increase understanding of milkweed propagation and habitat establishment	Determine best management practices for newly seeded habitat to maximize the rate of milkweed establishment and vigor.
	Determine ratio and density of milkweed to other plants to maximize milkweed longevity within a restoration planting.
	Evaluate efficacy of establishing milkweed using plugs versus seeds in a restoration planting, including the timing of planting.
	Identify the natural factors that limit milkweed distribution (elevation, soil, light, latitude) to better inform region-specific and site-specific seed mixes.
Strategy 3: Expansion of monarch monitoring efforts, data exchange, and data analysis to inform conservation efforts	
R-9: Monitoring data portal development and data analyses to inform conservation work	Continue development and implementation of monarch monitoring data aggregation, standardization, and analysis (incorporating programs that monitor monarch breeding, migrating, and overwintering numbers and survival), i.e. Monarch Net.
	Coordinate data analysis and reporting and encourage exchange of monitoring data among researchers and stakeholders.
R-10: Monitoring trainings and program support to address data gaps and engage more people in monitoring monarchs	Fill temporal and spatial data gaps in existing monarch and butterfly monitoring programs to better enable reliable regional estimates of monarch populations and trends in the U.S. and Canada.
	Encourage use of appropriate effectiveness assessment tools (such as pre- and post-training surveys) to enable improvement of training efforts.
	Promote and facilitate monarch monitoring training programs to recruit volunteers for existing citizen science programs in data gap and key monarch breeding, migrating, and overwintering areas.
	Use “train-the-trainer” model to encourage education sharing and further expansion of monarch conservation awareness and monitoring.
R-11: Tagging data preparation and analysis	Enter, clean, and analyze tagging data.
	Use tagging data analyses to inform conservation efforts in migratory corridors.
R-12: Develop monarch monitoring smartphone app.	Develop user-friendly smartphone apps for monarch monitoring programs.
R-13: Western overwintering site database	Address data sensitivity issues to develop version of western overwintering site database that can be shared online with the general public.
	Create a web portal for citizen scientists to upload monitoring data directly online.
R-14: Western monarch monitoring data assessment, population trend estimate, and monitoring protocol recommendations	Evaluate utility of Thanksgiving Count data for detecting population trend, working with Monarch Alert data to evaluate need for increased data collection.
	Quantify western monarch population trend, seeking IUCN listing if appropriate. If data are not adequate to estimate population trend, provide recommendations regarding modifications to protocol.
Strategy 4: Research on the effects of diseases, non-native species, and changing environment on monarchs and their habitat	
R-15: Explore effects of non-native milkweed on monarchs	Document milkweed in gardens near selected overwintering sites in CA and southern U.S., recording their management regimes (cutting back milkweed or not).
	Develop management recommendations to limit year-round breeding of monarchs in CA and the southern U.S.
	Assess prevalence of O.e. in monarchs in these managed gardens and provide recommendations to minimize spread of disease.
	Determine whether non-migratory behavior is becoming more common for monarchs in the southern U.S. and coastal CA.
R-16: Explore impacts of large-scale monarch production and release	Determine and prevent the effects of large-scale production, distribution, and release of monarchs on population health and abundance. This may involve a system to certify disease/parasite control and prevention.
	Assess effects of captive breeding operations on genetic diversity and implications of genetic impacts on monarchs.
	Assess the effects of monarch releases on biogeographic data collection and understanding of spatial and temporal distribution.
R-17: Assess impacts of <i>Vincetoxicum</i> spp. on monarch populations, control	Assess <i>Vincetoxicum</i> spp (e.g. <i>Cynanchum louisea</i> , <i>Cynanchum rossicum</i>) abundance, attempted use by monarchs, and possible control methods in areas where it is currently located and provide recommendations to MJV for distribution.

methods, spread, etc.	
R-18: Assess impacts of non-native herbivores on milkweed habitat	Assess and control herbivores (e.g. <i>Aphis nerii</i>) that negatively impact monarchs or their habitat.
R-19: Assess milkweed disease impacts	Assess extent and impacts of milkweed diseases and condition (e.g., milkweed yellows phytoplasma) on monarchs and provide recommendations for management.
R-20: Assess impact of weather and climate conditions on monarchs and their habitat	Determine influence of topography, weather, microclimate and other abiotic factors on monarch populations and movements.
Strategy 5: Research socioeconomic factors influencing monarch conservation	
R-21: Determine ecosystem services and ecological role of milkweeds and monarchs	Identify ecosystem services provided by monarchs (potential role as pollinators, role in the food chain, and social value to people) and the ecological role of milkweed to promote support for the conservation of both monarchs and milkweed.
GOAL 4: Monarch Joint Venture Program Development	
P-1: Evaluate and assess the effects of conservation actions on monarch distribution and abundance	
P-2: Fundraising	
P-3: Partnership growth	
P-4: Communications/outreach	
P-5: Quantify and track accomplishments	