

Western Monarch Conservation



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Monarch life cycle

What do Monarchs Need?

- Breeding and Migratory habitat
 - native milkweed
 - flowering nectar plants available Spring-Fall
- Overwintering habitat
 - Usually pines and Eucalyptus trees along CA coast; eastern population use oyamel fir forests
 - Need flowering nectar plants nearby to maintain energy stores



NO MILKWEED

NORTHERN LIMIT OF MILKWEED

SPRING & SUMMER

SUMMER

WINTER

SPRING

NONMIGRATORY POPULATION

WINTER

Monarch Migration

Spring & Fall

LEGEND

- Overwintering areas
- Spring breeding areas
- Spring & summer breeding areas
- Summer breeding areas
- No milkweed - no breeding area
- Nonmigratory population
- Fall migration
- Spring migration
- Unconfirmed migration
- Northern limit of milkweed
- ? Potential monarch breeding habitat



- 1980s: Estimated 4.5 million Monarch overwintering along Pacific Coast



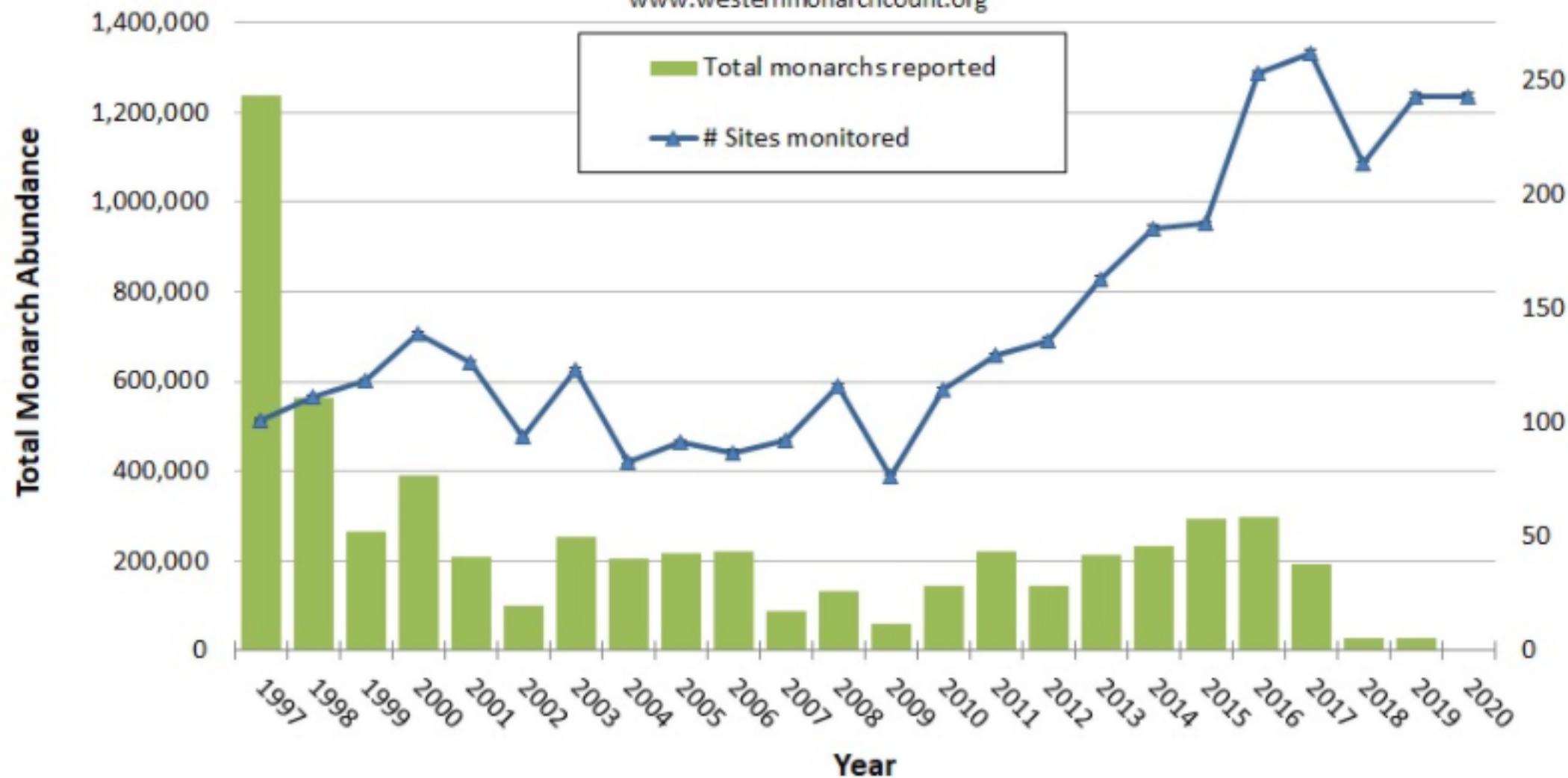
Western Monarch Thanksgiving Count

Total Abundance Estimates w/ Number of Sites Monitored
from 1997-2020

(Xerces Society Western Monarch Thanksgiving Count 2020)

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www.westernmonarchcount.org



2018	27,721
2019	29,436
2020	1,914

Why are monarchs declining?

- Loss of overwintering habitat
 - Development along coast; decline/aging of groves without regeneration
- Breeding habitat loss and degradation
 - Urban sprawl, agriculture w/ extensive tilling & pesticide use
- Pesticides
 - Mosquito control, homeowner use, nursery trade, agriculture
 - Milkweed throughout CV contaminated with pesticides
- Climate change
 - Changes in temperature/rainfall patterns affects migration and milkweed distribution
- Tropical milkweed



California native milkweed species



Narrow-leaf milkweed
Asclepias fascicularis



Showy milkweed
Asclepias speciosa

Other species:

- California milkweed (*Asclepias californica*)
- Heartleaf milkweed (*Asclepias cordifolia*)
- Woolypod milkweed (*Asclepias eriocarpa*)

Plant nectar sources

- Year-round bloom
- Diversity
- Protect from pesticides
- 10-10-10-10-1 rule
 - 10x10 area
 - 10 milkweed plants (same species)
 - 10 different plant species total
 - At least 1m² of each species grouped in blocks

Native Hedgerow Plants for Pollinators

	COMMON NAME	SCIENTIFIC NAME		MAX HEIGHT	NOTES
Early	Bladderpod	<i>Cleome isomeris</i>	L	5'	Tolerates salinity
	California lilac	<i>Ceanothus 'Concha'</i>	L	4'	Tolerates clay soils
	Frosty blue California lilac	<i>Ceanothus 'Frosty Blue'</i>	L	8'	Tolerates clay soils
	McMinn manzanita	<i>Arctostaphylos 'McMinn'</i>	L	5'	Tolerates clay soils
	Narrowleaf willow	<i>Salix exigua</i>	H	10'	Wetland-semi riparian species
	Oregon grape	<i>Mahonia aquifolium</i>	L	5'	Drought-tolerant; also tolerates semi-riparian conditions
	Western redbud	<i>Cercis occidentalis</i>	L	15'	Drought-tolerant; also tolerates semi-riparian conditions
Early-Mid	Red willow	<i>Salix laevigata</i>	H	20'	Wetland-semi riparian species; tolerates clay soils
	Blue elderberry	<i>Sambucus nigra var. cerulea</i>	M	15'	Host plant for the endangered Valley Elderberry Longhorn Beetle; tolerates semi-riparian conditions
	California buckthorn	<i>Frangula californica</i>	L	5'	
	Mule's fat	<i>Baccharis salicifolia</i>	M	8'	Wetland-riparian to semi-riparian species
	Showy penstemon	<i>Penstemon spectabilis</i>	L	3'	

Recommended Plants for Pollinators & Beneficial Insects

California Central Valley Region



Monarch butterfly on showy milkweed; California native wildflower field border blooming in mid-spring. (Photographs by the Xerces Society / Stephanie McKnight & Jessa Ray Cruz)

Plant Selection

The plants on this list are recommended for use in pollinator habitat restoration and enhancement projects in agricultural landscapes. These species have been selected because they are attractive to a diversity of different bee species, and provide pollen and nectar resources throughout the season, provided that a minimum of three different plant species from each blooming period (early, mid, and late season) are selected. A majority of plants recommended are native, drought tolerant, easy to establish, and don't serve as alternate hosts to crop pests or diseases.

Native Species for Pollinators and Beneficial Insects

SCIENTIFIC NAME	COMMON NAME	BLOOM	LIFE	FORM	SUN	WATER	SOIL TEXTURE	ADDITIONAL DETAILS
<i>Achillea millefolium</i>	Common yarrow	Mid	P	F	L	Any		Butterfly, bee, moth, specialist bee
<i>Agastache urticifolia</i>	Nettleleaf giant hyssop	Mid-Late	P	F	M	Medium-Coarse		Butterfly, bee, moth, specialist bee
<i>Arctostaphylos densiflora 'McMinn'</i>	McMinn manzanita	Early	P	W	L	Medium		Butterfly, bee, moth, specialist bee
<i>Asclepias eriocarpa</i>	Woollypod milkweed	Mid	P	F	M	Any		Butterfly, bee, moth, specialist bee
<i>Asclepias fascicularis</i>	Narrowleaf milkweed	Mid	P	F	M	Any		Butterfly, bee, moth, specialist bee
<i>Asclepias speciosa</i>	Showy milkweed	Mid	P	F	M	Medium-Coarse		Butterfly, bee, moth, specialist bee
<i>Atriplex lentiformis</i>	Big saltbush	Mid-Late	P	W	L	Any		Butterfly, bee, moth, specialist bee
<i>Baccharis pilularis</i>	Coyotebrush	Late	P	W	L	Any		Butterfly, bee, moth, specialist bee
<i>Baccharis pilularis 'Pigeon Point'</i>	Dwarf coyotebrush	Late	P	W	L	Any		Butterfly, bee, moth, specialist bee
<i>Baccharis salicifolia</i>	Mule's fat	Early-Mid	P	W	M	Any		Butterfly, bee, moth, specialist bee
<i>Berberis aquifolium</i>	Oregon grape	Early	P	W	L	Any		Butterfly, bee, moth, specialist bee
<i>Ceanothus 'Concha'</i>	California lilac 'Concha'	Early	P	W	L	Medium-Coarse		Butterfly, bee, moth, specialist bee
<i>Ceanothus 'Frosty blue'</i>	Frosty blue California lilac	Early	P	W	L	Any		Butterfly, bee, moth, specialist bee
<i>Cephalanthus occidentalis</i>	Common buttonbush	Mid-Late	P	W	M	Any		Butterfly, bee, moth, specialist bee
<i>Cercis occidentalis</i>	Western redbud	Early	P	W	L	Any		Butterfly, bee, moth, specialist bee
<i>Clarkia unguiculata</i>	Elegant clarkia	Early-Mid	A	F	L	Any		Butterfly, bee, moth, specialist bee
<i>Clarkia willamsonii</i>	Fort Miller clarkia	Early-Mid	A	F	L	Medium		Butterfly, bee, moth, specialist bee
<i>Collinsia heterophylla</i>	Chinese houses	Early	A	F	M	Any		Butterfly, bee, moth, specialist bee

KEY: LIFE Cycle—Annual, Biennial, Perennial; FORM—Tree, Shrub, Grass; WATER Needs—Low, Medium, High; SUN—Full sun, Partial sun, Partial shade; ADDITIONAL DETAILS: Monarch nectar plant, Larval host (butterfly, moth, specialist bee), Attracts beneficial insects, Bumble bee plant, Nest site, Fire resistant, Deer resistant.

requires good drainage
can be an alternate host of fire blight
extremely drought-tolerant
tolerates clay soils; drought-tolerant; also tolerates semi-riparian conditions; can be a host for spotted wing drosophila
requires good drainage
requires good drainage
tolerates clay soils; tolerates wet or dry conditions
tolerates clay soils; can be extremely drought-tolerant
wetland, riparian, or semi-riparian species; tolerates clay soils
tolerates wet or dry conditions
tolerates clay soils; tolerates wet or dry conditions
tolerates clay soils; tolerates wet conditions
tolerates clay soils; tolerates wet or dry conditions
tolerates clay soils; tolerates wet or dry conditions
extremely drought-tolerant
extremely drought-tolerant

difficult to transplant than seed 🦋 Monarch butterfly host plant

							
Bloom	Common Name		Scientific Name	Flower Color	Max. Height	Water Needs	Notes
	Forbs				(Feet)	Low, Med., or High	PLEASE NOTE: In general, milkweed should not be planted within 5 miles of the coast north of Santa Barbara, nor within 1 mile of the coast from Santa Barbara south. These areas are generally outside of milkweed's historical range and planting milkweed too close to overwintering sites may interfere with monarch migration and overwintering behavior.
Spring to Summer	1	Nettleleaf giant hyssop	<i>Agastache urticifolia</i>	Purple/red	2	L	All species perennials, unless otherwise noted. Monarchs can be found year-round in California.
	2	Yarrow	<i>Achillea millefolium</i>	White	3	L	Establishes better from transplant than seed. Tolerates clay soil and wet or dry conditions.
	3	Coastal sand verbena	<i>Abronia latifolia</i>	Yellow	1	L	Tolerates clay soil and wet or dry conditions. Attractive to many insects.
	4	Gumplant	<i>Grindelia camporum</i>	Yellow	4	L-H	Tolerates salt spray and prefers sandy soils. Can bloom year-round.
Spring to Fall	5	Milkweed 🐛❗	<i>Asclepias</i> spp.	Pink/white/purple	2-4	L/M	Tolerates clay soil and wet or dry conditions.
	6	Oregon gumweed	<i>Grindelia stricta</i>	Yellow	5	H	Monarch caterpillar host plant. ❗🐛 Likely entire genus is attractive to monarchs.
	7	Western vervain	<i>Verbena lasiostachys</i>	Purple	3	L	Wetland / riparian.
	8	Coyote mint	<i>Monardella villosa</i>	Pink/purple	2	L	Good butterfly plant. Tolerates seasonal flooding, sand and clay. Can be used for erosion control.
Summer	9	Indian hemp	<i>Apocynum cannabinum</i>	White/pink	6	M/H	Requires good drainage.
	10	Mountain monardella	<i>Monardella odoratissima</i>	White/purple	1	L	Poisonous to humans, pets and livestock.
	11	Pacific aster 🐛	<i>Symphotrichum chilense</i>	Yellow/violet	4	L	Does best at mid to high elevations. Attracts many species of butterflies.
	12	Goldenrod 🐛	<i>Solidago</i> spp.	Yellow	3	L	Tolerates clay soils and wet or dry conditions. 🐛 Likely entire genus is attractive to monarchs.
Summer to Fall	13	Smooth beggartick	<i>Bidens laevis</i>	Yellow	3	H	Important late-season forage for bees, butterflies, wasps, beetles, and more. 🐛 Likely entire genus is attractive to monarchs.
	14	Sunflowers 🐛	<i>Helianthus</i> spp.	Yellow	5-8	M	Prefers wet areas and can be used in bioswales. Attracts beneficial insects and butterflies in the fall.
	15	Western goldentop	<i>Euthamia occidentalis</i>	Yellow	6	H	Excellent butterfly nectar plant. Attractive to many insects. 🐛 Likely entire genus is attractive to monarchs.
Winter to Spring	16	Bluedicks	<i>Dichelostemma capitatum</i>	Purple	3	L	Wetland-riparian. 🐛 Likely entire genus is attractive to monarchs.
Winter to Summer	17	Seaside fleabane	<i>Erigeron glaucus</i>	Purple	2	L	Attracts bees, butterflies, and hummingbirds. An early spring bloomer.
Shrubs and Trees							A great butterfly plant.
Year-round	18	Coyotebrush, mulesfat, desertbroom 🐛	<i>Baccharis</i> spp.	White/yellow/pink	6-10	L	
Spring to Summer	19	Black sage	<i>Salvia mellifera</i>	Blue/purple	6	L	Easy to grow and attractive to many insects. 🐛 Likely entire genus is attractive to monarchs.
	20	Desert sage	<i>Salvia dorrii</i>	Purple	4	L	Important butterfly and hummingbird plant. Quail eat the seeds.
Summer to Fall	21	Common buttonbush	<i>Cephalanthus occidentalis</i>	White	6	H	Very drought tolerant.
	22	Rabbitbrush, goldenbush, mock heather 🐛	<i>Ericameria</i> spp.	Yellow	4-8	L	Fragrant, showy flowers that attract butterflies.
Winter to Spring	23	Manzanita 🐛	<i>Arctostaphylos</i> spp.	Pink/white	1-30	L/M	Great late season nectar source for bees and butterflies. Very drought tolerant. 🐛 Likely entire genus is attractive to monarchs.
	24	Willow 🐛	<i>Salix</i> spp.	White	20-50	H	Some species/varieties are very drought tolerant. 🐛 Likely entire genus is attractive to monarchs.
							

Other ways you can help

- Avoid pesticide use, especially systemic insecticides – can persist in plant, water, & soil for months to years
- Exercise purchasing power – organic produce; nursery stock
- Protect overwintering sites
 - Advocate for overwintering sites – find on westernmonarchcount.org
- Volunteer for citizen science projects
 - Report observations (especially in spring)– Western Monarch Milkweed Mapper
 - Get involved with Thanksgiving and New Year Counts
- Donate

Programs to help

NRCS Programs

- EQIP – Environmental Quality Incentives Program
- Conservation Stewardship Program
- Agricultural Conservation Easement Program

NRCS Practices

- Wildlife habitat planting
- Conservation Cover
- Hedgerow planting
- Riparian Herbaceous Cover

Contact local NRCS office for more information

Project *Apis m.* Seeds for Bees

Provides cover crop seeds for landowners and growers (especially almond orchards)

Technical assistance



Planting for Western Monarchs

Seeds for Bees® encourages the use of cover crops and habitat to increase the density, diversity, and duration of bee and pollinator forage in California orchards, farms, and vineyards, while improving soil health. The seed mixes available through Seeds for Bees are designed to bloom at critical times of the year when natural forage is scarce but pollinators are active.

For the Butterflies and Native Bees

The lack of access to diverse forage is an issue that plagues all pollinators. Cover crop seed mixes have been very successful at providing resources for honey bees while they pollinate California's specialty crops, like almonds. Native bees and butterflies also use seasonal cover crops, but this is limited due to their ephemeral nature. They rely on more permanent habitat to maintain healthy populations. In order to provide the nutrition and habitat that is required to adequately address the issues facing California's resident pollinators, landowners and growers must manage native habitat for pollinators independently from other resources like cover crops. Project Apis m. has developed a new seed and plant mix to target the needs of pollinators like monarch butterflies and native bees.

Location: This seed mix and plugs are intended to be used on ground that is adjacent to farmed land. It is not intended to be planted as a cover crop on orchard floors or in-between row crops. The plot selected for this mix will remain a viable habitat 12 months out of the year. It will be managed independently from land that is in production.

Seed Rate: 15 lbs./acre

Ground Prep: Plant in the fall before the winter rains (September-October). Before planting, the site should be managed for weeds throughout the entire growing season with either multiple herbicide applications or solarized for at least 6 months. Remove as much dead plant matter as possible before planting. A fine seed bed is desirable since most of the seeds are very small. The soil surface (3-5 inches deep) should be lightly hand-raked or harrowed to break-up clods of soil and create an even, smooth surface. Do not disc.

Planting Methods: Ideally, seed will be planted with a drill. Alternatively, it can be distributed with a hand-held broadcaster on small areas. Milkweeds can be planted adjacent to, or within the seed plot.

When to Plant: Optimal estimated window to plant is Sept. 10th through Nov. 10th, while soil is still warm (above 55°). Plant no more than 1/8" deep.

Irrigation: Because adequate rainfall isn't guaranteed, irrigation will drastically increase the chance of success. If the whole plot (seed and plants) isn't able to be irrigated installing a drip line on only the milkweeds plants is required.

Milkweed Plant Details: This mix does not contain milkweed seed. Due to milkweed's difficulty establishing in the hot and dry climate of California, planting milkweed plug plants (small seedlings which have been grown in trays for 14-16 weeks) may ensure a much higher rate of success.



The PAm Monarch Mix combines a specially designed, high quality seed mix with milkweed plugs for optimum pollinator supportive habitat

Project Apis m.

Supporting Pollinator Health and Nutrition in California in Partnership With:



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Wynter Vaughan

Regional Pollinator Habitat

Specialist

[Monarch Joint Venture](http://MonarchJointVenture.org)

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Resources

- Xerces Society
- Monarch Joint Venture
- MonarchWatch.org
 - Monarch waystation habitat
- Handouts and webinars provided by WCB and CARCD
 - Conserving Monarchs on Rangelands
 - Carbon Farming for Pollinators
 - Milkweed planting guide

