

POLLINATOR PATHWAYS POSTER

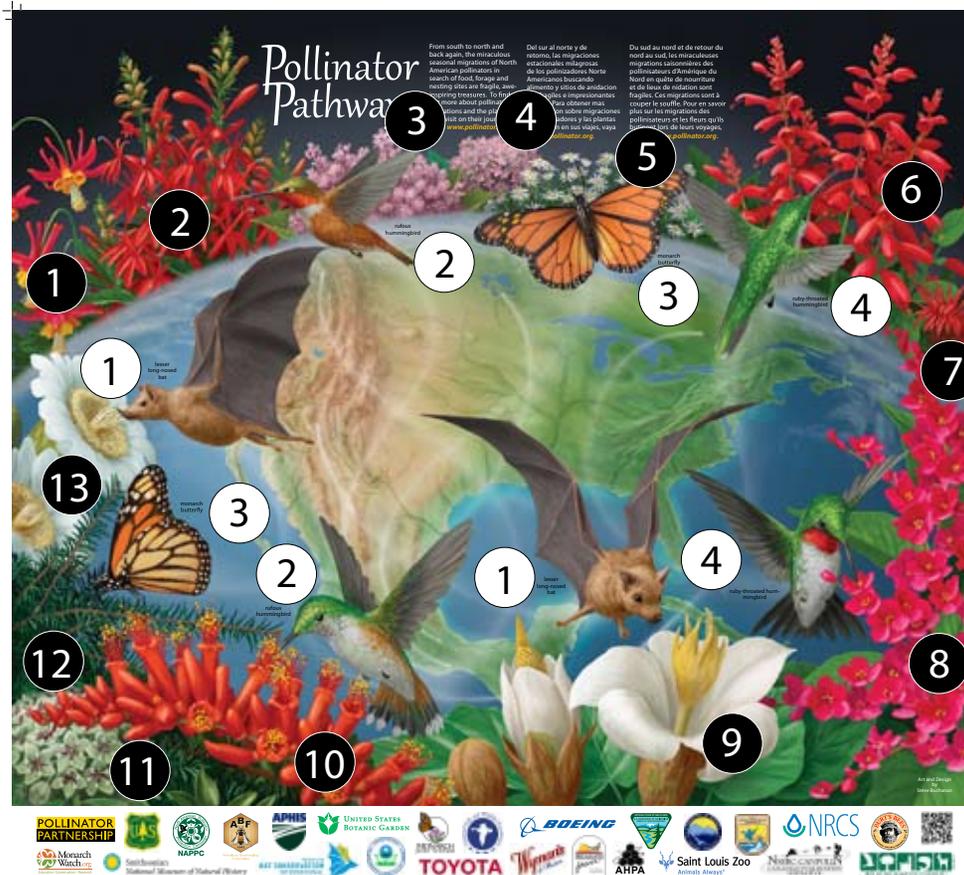
MIGRATION, POLLINATORS AND PLANT IDENTIFICATIONS

WHAT IS MIGRATION?

When animals migrate, they travel long distances in search of resources, and this is called animal migration. For example, the great herds of wildebeests and other ungulates cross the Serengeti plains of Africa in their constant search for new grasses as food.

Bird migrations are familiar behaviors to birdwatchers and naturalists. They are regular, seasonal journeys undertaken by many bird species. They occur mostly in response to changes in food availability, habitat, or weather. The long distance journeys made by birds are often called "true migration" because they are directional and occur seasonally each year along a flyway. About 2,000 of the world's 10,000 bird species are long distance migrants. Common examples include Canada Geese, Swainson's Thrush, Northern Pintail or the Bar-tailed Godwit. For northern hemisphere birds, the most common pattern involves species flying north in the spring months to breed in the temperate or Arctic summer, and returning to their starting point regions in the autumn to warmer wintering grounds in the south. Southern hemisphere migrants reverse this pattern following the seasonal availability of food. The arctic tern has the longest distance migration of any bird, up to 14,000 miles.

Even tiny hummingbirds can migrate extremely long distances as we'll learn below for the eastern



Ruby-throated hummingbird and the western Rufous hummingbird. The tremendous energetic cost of moving across hundreds or thousands of miles between breeding and feeding grounds seems to be worth the effort. Some birds migrate at night (e.g., flycatchers and hummingbirds) to minimize overheating or predation risks, and feed by day. Prior to migrating, these animals fatten up for the journey. Along the way, many individuals fall prey to predators or inclement weather, and perish.

Migratory birds typically follow geographic indicators including coastlines or mountain ranges while avoiding large expanses of open water. The specific routes can be learned to some degree or may be genetically programmed. It's believed by some scientists that intracellular magnetite crystals may help migrating birds and some insects follow the faintest magnetic flux lines along the earth from north to south. Others seem to have built in roadmaps.

In mammals, herding ungulates, some whales, and a few bat species are migratory. Whales, like the humpback, calf in waters off Baja, Mexico and feed in Alaskan waters. Nectar bats follow "nectar corridors" from southernmost Arizona, Texas and California to areas in northern and central Mexico, moving annually between breeding and feeding areas.

Among insects, most are sedentary, but there are some champion migrants. The monarch butterfly is the most famous example, migrating from across Canada and the United States southward, in a multi-generational migration ultimately leading to secluded and protective fir forests in the highlands of central Mexico. Similarly, painted lady butterflies migrate, along with some dragonflies and even a flower-visiting fly (Syrphidae) in the UK and Europe. For bees, only the Asian honey bee (*Apis dorsata*) is known to migrate, or emigrate from place to place.

POLLINATOR IDENTIFICATIONS



1. *Leptonycteris curasoae yerbabuena*
(Lesser long-nosed bat)

Few of the world's 1,240 bat species visit flowers for nectar and even fewer make long distance migrations. During early summer across the Sonoran desert of Arizona, New Mexico and Sonora, Mexico, hundreds of thousands of charismatic Lesser long-nosed bats visit the blossoms of giant cacti including the Saguaro, Organ Pipe and Cardon, in turn, pollinating them.

These fast-flying flower visitors also visit the blossoms of century plants. When the fruit of these cacti ripens in June, white-winged doves and nectar bats gorge themselves on the tasty red fruits. The Lesser long-nosed bat is federally listed as an endangered species by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973. Their use of only a few maternal roosting caves that are under habitat pressure, along with human disturbance, pose real risks for these gentle flower-visiting animals. Pregnant females give birth to a single pup in May. They spend the winter in central Mexico where mating also takes place. They roost in caves or abandoned mines. "Nectar bats" feed on the nectar and pollen of columnar cacti in Arizona and Sonora. In Tucson and a few other cities in southern Arizona, hummingbird feeders are visited by day by hummingbirds while bats work the night shift!



2. *Selasphorus rufus*
(Rufous hummingbird)

These hummingbirds are pugnacious and tirelessly chase away other hummingbirds from their favored plants and perches, even during migration. In the spring, these colorful and feisty little birds migrate up the Pacific coast of the United States, passing through California from February to May. The migrating birds reach British Columbia in April, and Alaska by mid-April. During migration, they can be found as high as 12,000 feet, feasting on nectar from montane wildflowers. Some migrating Rufous also reach sites in Idaho and Montana around late April. Departure dates are often in October. The greatest distance covered by some Rufous individuals is nearly 4,000 miles. The hummingbirds are "following the bloom" along nectar corridors consisting of tubular, mostly red and yellow nectar-rich blossoms. They also stop and drink at manmade hummingbird feeders offering sugar water. When not sipping nectar from blossoms, they feed on protein and oil-containing small insects including fruit flies.



3. *Danaus plexippus*
(Monarch butterfly)

Monarch butterflies are truly long distance migrants, up to 3,000 miles. In all the world, no other butterflies migrate like the Monarchs of North America. Like a wave 1,000 miles wide, from South Dakota to New York, Monarchs arrive in the spring and early summer in a massive northward migration out of central Mexico. There is a western population in California that does not migrate as far south, stopping in central California. Even more amazing is the fact that the usual Monarch migration is made up of individuals of several generations.

In March, the spring migration begins. Tens of millions of Monarchs will overwinter in Oyamel fir trees in the mountains north of Mexico City. They leave en masse and head north, feeding on nectar and laying eggs along the way. They live off their adult fat reserves all winter. There are only 12 mountaintops in the world where these colorful orange, black and white butterflies overwinter. The butterflies returning to Mexico or California each fall are the great-great-grandchildren of the butterflies that left the previous spring. It remains a mystery how the butterflies navigate, homing to find the precise mountain locations, and even the same trees in Mexico where they spend their winter months.

You can help conserve and protect Monarchs by planting milkweeds in your garden and not using herbicides or insecticides that could harm the feeding caterpillars or adults.



4. *Archilochus colubris*
(Ruby-throated hummingbird)

Ruby-throated hummingbirds are the most commonly encountered hummingbirds in the eastern United States, commonly appearing to feed on colorful red garden flowers, or at sugar feeders on patios. They are eastern North America's sole breeding hummingbird. By early fall, they're bound for wintering sites in southern Mexico or Central America.

Many of these living jewels cross the Gulf of Mexico (30 to 50 miles wide) in a single flight! Citizen scientists are banding Ruby-throats and Rufous to learn about their comings and goings.

Just so you know....

White-winged doves (*Zenaidura macroura*) are extremely common birds in our southwestern deserts through Mexico, Central America, and the Caribbean. With increasing urbanization and backyard feeding, their range has expanded into Texas and Louisiana. Most populations are migratory, wintering in Mexico and Central America. They feed on various seeds, grains and fruits. They are particularly fond of the large white blossoms, and red fruits, of the saguaro cactus. While often mentioned as saguaro pollinators, it is more likely that the majority of pollination is due to the foraging activities of honey bees and cactus bees by day, and nectar bats at night; the latter being more common in the southern portions of the range of the saguaro.

PLANT IDENTIFICATIONS



1. *Aquilegia formosa* (western columbine)

Western columbine is native throughout north western North America and attracts a variety of pollinators with its brilliant red and yellow flowers including the rufous hummingbird featured here.



2. *Lobelia cardinalis* (cardinalflower)

Cardinalflower provides much needed nectar for the hummingbird migration in middle to late summer. The large stalks of bright red successively blooming flowers are hard to miss and support multitudes of hummingbird along their journey.



3. *Eupatoriadelphus maculatus* (spotted joe pye weed)

Spotted joe pye weed is native throughout much of the United States and Canada and supports adult monarchs with the nectar they need to migrate thousands of miles every year.



4. *Asclepias incarnata* (swamp milkweed)

Swamp milkweed, like many other milkweeds, provide an essential larval food resource to young monarch butterflies and nectar to adult monarchs preparing for their migration.



5. *Symphotrichum ericoides* var. *ericoides* (white heath aster)

White heath aster displays dense white daisy-like flowers and provides nectar to numerous butterfly species (including migrating monarchs) and is a larval host for the pearl crescent butterfly.



6. *Salvia splendens* (scarlet sage)

A native to Brazil, scarlet sage's attractive red flowers provide nectar to the ruby-throated hummingbird and is used throughout North and South America as an ornamental garden plant.



7. *Monarda didyma* (scarlet beebalm)

Not only are hummingbirds attracted to scarlet beebalm, but it is valued by humans too. Scarlet beebalm contains a high concentration of the active ingredient in many commercial mouthwashes.



8. *Antigonon leptopus* (coral vine)

Coral vine is native to Mexico (considered invasive in the US) and can thrive in variety of soil and light conditions, making it a perfect garden plant in Mexico to welcome hummingbirds and support their migratory journey north from Mexico.



9. *Ochroma pyramidale* (West Indian balsa)

West Indian balsa is native to southern Mexico, Central and South America and attracts bats, like the lesser long-nosed bat (featured here) that are attracted to its large white flowers.



10. *Fouquieria splendens* (ocotillo)

Native to the deserts of North America, ocotillo's bright redish-orange flowers attract the migratory rufous hummingbird.



11. *Asclepias asperula* (spider milkweed)

Spider milkweed has evergreen leaves and like many other milkweeds supports monarchs both in larval stage of life and through adulthood.



12. *Abies religiosa* (oyamel fir)

Eastern monarchs overwinter in Mexico and use oyamel forests as their winter home. Monarchs form large colonies that can reach into the millions in oyamel forests, sometime populations return to the exact site their relatives used the winter before.



13. *Carnegiea gigantea* (saguaro)

The giant and majestic saguaro cactus can live hundreds of years and provide habitat and shelter to numerous inhabitants of North America's deserts. However, without pollinators this iconic plant would not be able to reproduce. The nocturnal lesser long-nosed bat, featured here, pollinates the saguaro's fragrant white flowers at night since they are closed during the day.