

Dwindling Numbers of a Flagship Species

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Chair, Monarch Joint Venture



Why Monarchs?

- Keystone species play a key role in an ecosystem; if they disappear, the ecosystem changes
 - Pollinators (although absence not noticed quickly in many natural systems)
 - Insects in general (food for other species, decomposers)
 - Butterflies are not great pollinators, but as a group, they probably provide significant amounts of food for other species



Why Monarchs?

- Indicator species indicate the overall health of an ecosystem
 - Stoneflies need high O₂ concentrations to survive
 - Monarchs can live almost anywhere, as long as there are milkweed and nectar sources that aren't treated with pesticides



Why Monarchs?

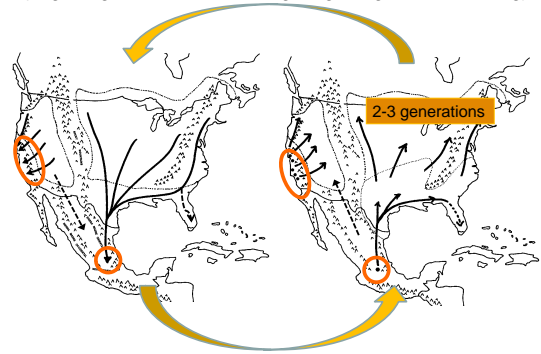
- Keystone species
- Indicator species
- Flagship species: engender interest in conservation





1. MONARCHS HAVE A COMPLEX LIFE HISTORY

Annual Cycle
(migrating south, overwintering, migrating north, breeding)



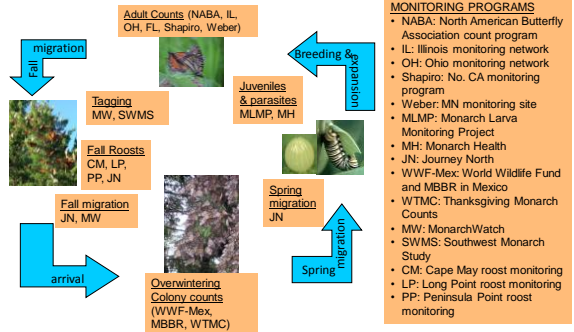
How does Complex Life History Affect Vulnerability?

- More vulnerable to anthropogenic change?
 - Depend on diverse resources across vast landscape
 - Timing of migration driven by environmental cues
- Less vulnerable to anthropogenic change?
 - Propensity to move could buffer against shifting resources

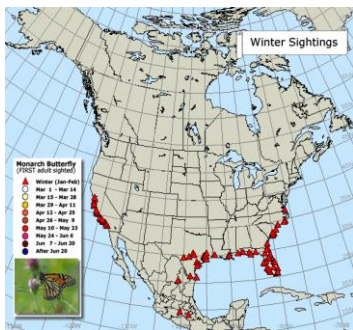




Monarchs are Intensively Monitored



Journey North Reports of First Spring Monarchs



State Insect or Butterfly of 7 States

- Alabama
- Idaho
- Illinois
- Minnesota
- Texas
- Vermont
- West Virginia

State Butterfly (1998)

Monarch (*Danaus plexippus*)

The monarch butterfly, also known as the milkweed butterfly, is one of the few that migrate north and south like birds do for winter. Approximately four generations of monarchs are born in Minnesota each summer and live roughly four weeks; the exception is the last generation of the season which survives about six months....

[Minnesota Statutes - 1.1497 State Butterfly](#)



Monarch Breeding Habitat



Education



Willingness to pay survey

People will shell out money for
 October 30, 2013
[Conservation This Week](#)

Americans Would Pay \$4 Billion
 to Help



... according to a new

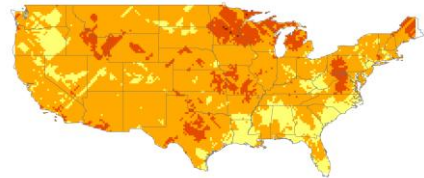


... ans Would Pay to Help

... D AM

Diffendorfer, Loomis, Ries, Oberhauser et al. 2013

How aware were you that monarch numbers
 were in decline before reading about it here?



Data from survey conducted by the National Gardener's
 Association and analyzed by L. Ries

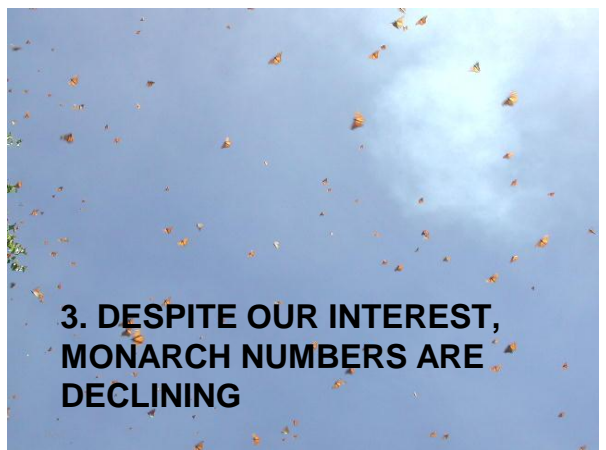


Beautiful
Interesting



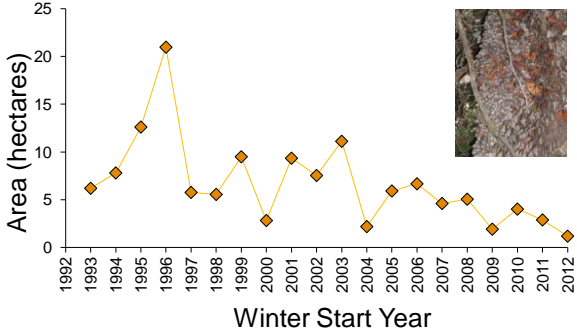
Familiar
Impressive

Why?
Monarchs are...



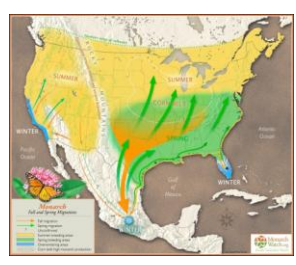
**3. DESPITE OUR INTEREST,
MONARCH NUMBERS ARE
DECLINING**

Winter Colony Area Declining: Mexico

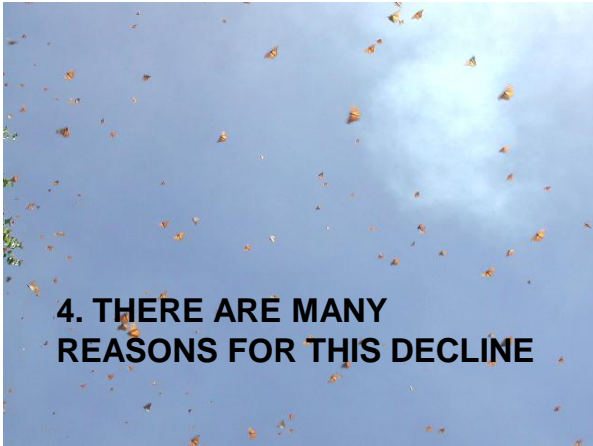


Data: WWF-Mexico & the Reserva de la Biosfera Mariposa Monarca (RBMM)

The Monarch Migration at Risk



- World Wildlife Fund: Top 10 Species to Watch (2010)
- IUCN Red List: Endangered Phenomenon listing (1983)



Breeding and Migratory Habitat

- US is losing >5000 acres per day to real estate & energy development (Land Trust Alliance 2013).
- Much of this land contained milkweed and nectar plants.

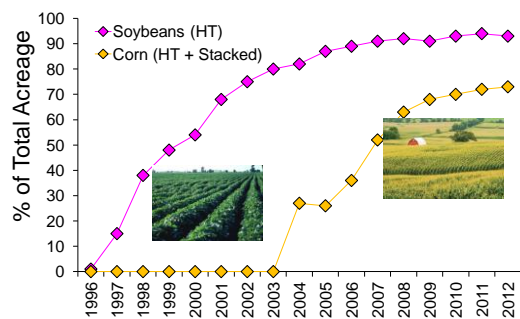


Herbicide-tolerant Crops Effectively Cause Habitat Loss

- In 2000, ~50 times more monarchs came from agricultural fields than non-agricultural areas (Oberhauser et al. 2001).
- We have lost almost all of this habitat due to herbicide use on “Round-up Ready™” corn and soybean plants.



Adoption of Herbicide Tolerant Crops



Data from USDA NASS

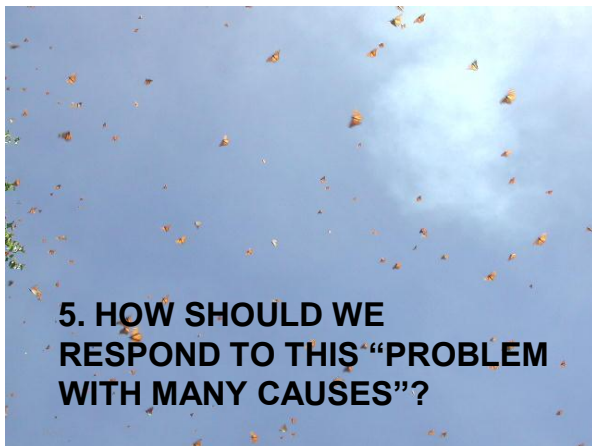
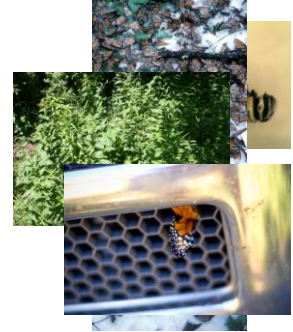
Overwintering Habitat Loss: Mexico



Photos by L. Brower

Other Factors

- Insecticides
- Climate change
- Invasive species: Swallow-worts could serve as monarch "sinks"
- Collisions with vehicles?



How We should NOT Respond

- Assume that there is nothing we can do, since addressing so many causes is impossible
- Argue about whose fault the problem is



MONARCH JOINT VENTURE



www.monarchjointventure.org

Monarch Habitat Conservation



Priority Milkweeds for each Region



Milkweed Seed Increase Project



73 native milkweed species in U.S., ~30 known to be used by monarchs. Only 3 native species commonly available commercially.

Research and Monitoring



Our Efforts will be Worthwhile

- Monarchs exist in mosaic of rare and pristine, and common and disturbed habitats shared with many other species
- Incredibly interesting organism from which we still have a lot to learn
- Monarch migration is an unmatched biological phenomenon

