Monarchs and Margaritas

5th Annual Fox River Summit

Presented by:

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Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

March 10, 2017
ALTernate TITles

- The International Significance of Pollinators to Human Health and Happiness
- Bugs, Booze and What’s the Other Thing?
- Who Needs NAFTA?
- Drunk Ecology
- The World According to Vince
Complete Metamorphosis

- Egg
- Larva (caterpillar)
- Chrysalis
- Adult

Completely different looks at the various stages
Caterpillars

“Tolerates” milkweed sap but probably doesn’t require it

“Glycosides” in sap are a problem for many species
Chrysalis - Transformation

Chrysalis Formation

Photos: Candy Sanforida
EMERGENCE
Adults

Male

Female

Alar Spots

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Where do the Monarchs go every fall?

- Tagging was first used by Fred and Norah Urquhart to find out where Monarchs overwintered.
- Kenneth Brugger and Catalina Trail located the first Mexican sanctuaries in January 1975.
- Very few insects migrate, especially such long distances.
MIGRATION

- Amazing journey
- Multiple generations – both directions
WINTER VACATION

- Approx. 12 major colonies
- Monarch Butterfly Biosphere Reserve
  Core=32,000 ac
  Buffer=104,000 ac
- Communally owned by local farmers
- Changes to Reserve requires permission from many parties
- Illegal logging

The Monarch Butterfly Biosphere Reserve, a UNESCO World Heritage Site in central Mexico is the winter sanctuary for most of the eastern population.
Overwintering Monarchs cluster on trunks of fir trees in their cool, moist habitat using southwest facing mountain slopes at around 10,000 feet in altitude.
POPULATION DECLINES

Total Area Occupied by Monarch Colonies at Overwintering Sites in Mexico

<table>
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<th>Winter Season</th>
<th>Hectares (ha)</th>
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<td>7.01</td>
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<tr>
<td>16-17</td>
<td>6.01</td>
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1994-2016 season average = 5.79 ha
2004-2016 season average = 3.34 ha

Data for 1994-2003 collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Natural Protected Areas (CONANP) in Mexico. Data for 2003-2016 collected by World Wildlife Fund Mexico in coordination with the Directorate of the MBBR.
* Represents colony sizes measured in November of 2016 before the colonies consolidated. Measures obtained in January 2017 indicate the population was much smaller, possibly 8-9 hectares.

27% decrease this winter
THREATS

- Breeding habitat losses
- Overwintering habitat losses
- Climate Change
- Agricultural chemicals
- Natural predators
- “Lifestyle”
**Vulnerable**

- Very vulnerable to bad weather cycles – massive die offs from natural events
- Compounds summer habitat issues and low population numbers
- Monarchs needs protection and assistance because the threats they face are so large in scale that it has declined by **90 percent** from the 20-year average since the mid-1990s
- Like losing every living person in the United States except those in Florida and Ohio
A single winter storm in 2002 killed up to 500 million monarchs in their Mexican overwintering grounds

14 times the entire current population
VULNERABLE

- Scientists predict that climate change will increase the frequency of drought, heat waves and severe storms that cause high levels of monarch mortality.

- Could knock population below “Minimum Viable Population” numbers.

- And makes overwintering grounds susceptible to new pests.
“Puddling”
GMO CROPS AND Glyphosate

- Genetically modified crops allowed for wholesale spraying with glyphosate – killed much of the milkweeds along hedgerows
- Crop prices and ethanol production encouraged more clearing
- Lost “refugia” for larval food and adult nectar plants
**Emerging Threats**

- Systemic agrochemicals like neonicotinoids
- Spraying for other insect pests like gypsy moths and mosquitoes
- Bt corn pollen
- New invaders
TEQUILA?

- Perfect “partner” for the monarch
- Well known and very regional
- Opportunity for ecotourism and land preservation priorities
- Interesting connection between human culture and Mother Nature
TEQUILA AND MONARCHS

Map showing Tequila-producing regions in Mexico with symbols indicating Monarch Biosphere Reserve and Monarch Over-Wintering Region (Michoacán).
Interesting Tequila Facts

- Similar to the name “champagne”
- Must be from just a few Mexican states surrounding Jalisco to be called “tequila”
- All tequilas are mezcals but not all mezcals are tequila
- Only use blue agave plant (*Agave tequilana*) for tequila
**Interesting Tequila Facts**

- “Agave Landscape and Ancient Industrial Facilities of Tequila”, a UNESCO World Heritage Site
- History with tequila production since the 1500’s
- Region of Pre-Columbian Teuchitlan traditional lands
- Red volcanic soils
- Highland and lowland areas
Interesting Tequila Facts

- Take about 8-12 years to produce harvestable plants
- About 300 million plants a year are processed
- Pollinated by bats
- Blue agave contains “aquamiel” which is in the agave syrup used as a table sugar substitute
Hackmatack NWR

http://www.hackmatacknwr.org
Hackmatack NWR

- Grassland bird habitat priority
- Multiple species, terrestrial and aquatic benefit by retiring row crop agriculture to perennial cover
- Non-point pollution controls for Nippersink Creek/Fox River
- “Urban” NWR that is accessible to 12 million people
**ACTION?**

- Promote large and small scale land preservation (Hackmatack NWR)
- Native landscaping
- Support national initiatives
- Local education
- All pollinator friendly activities
- Citizen science

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APPROACHES - USFWS

Individual

Community

Agriculture

Rights-of-way
Power of the Clean Water Act

Lake Erie P Loadings
QUESTIONS?

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