

Monarchs and Margaritas

5th Annual Fox River Summit

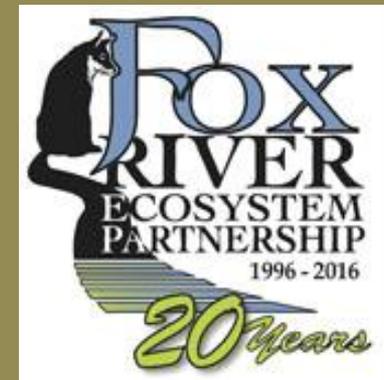
Presented by:

Vince Mosca
Senior Ecologist

Hey and Associates, Inc.

Engineering, Ecology and Landscape Architecture

Presented for:



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



MONARCH BIOLOGY



Complete Metamorphosis

- Egg
- Larva (caterpillar)
- Chrysalis
- Adult

Completely different looks at the various stages

DEPENDENT ON MILKWEED PLANTS

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 Sarikonda



EMERGENCE



ADULTS



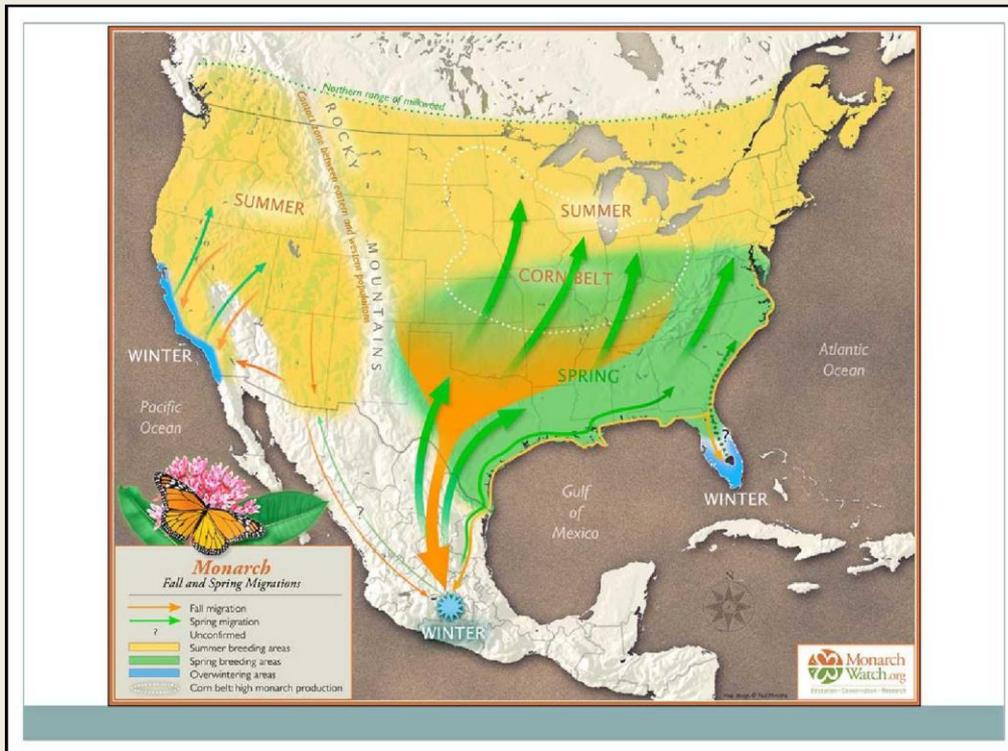
WHERE DO THE MONARCHS GO EVERY FALL?

- 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

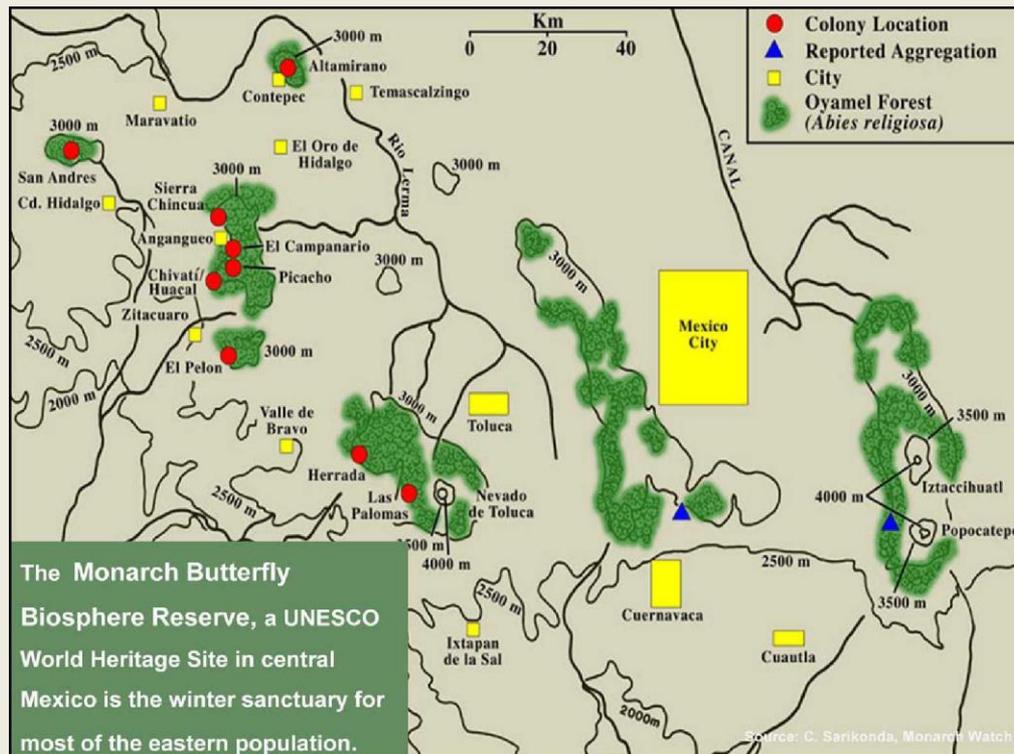


MIGRATION

- 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

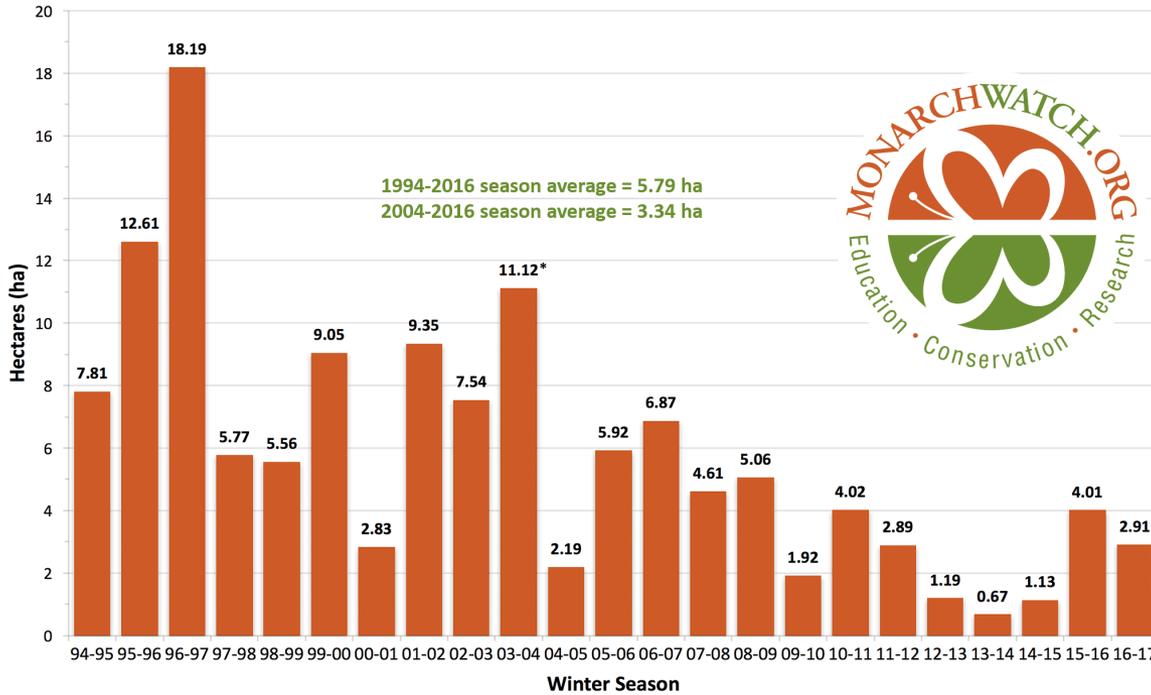
OVERWINTERING

- **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



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.

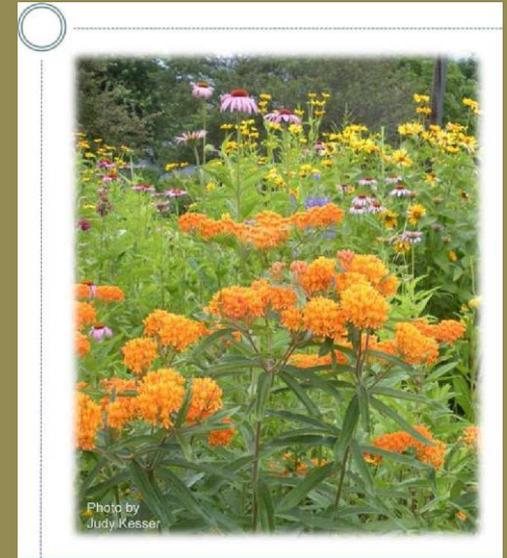
* Represents colony sizes measured in November of 2003 before the colonies consolidated. Measures obtained in January 2004 indicated the population was much smaller, possibly 8-9 hectares. CT



27% decrease this winter

THREATS

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



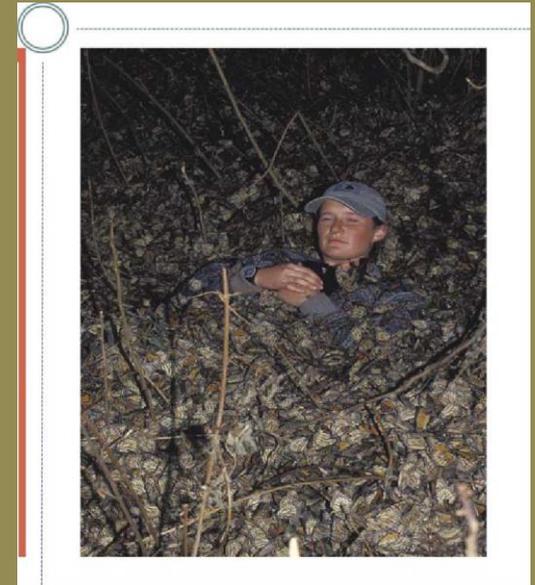
VULNERABLE

- 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



VULNERABLE

- **A single winter storm in 2002 killed up to 500 million monarchs in their Mexican overwintering grounds**
- **14 times the entire current population**



Lying in dead Monarchs

VULNERABLE

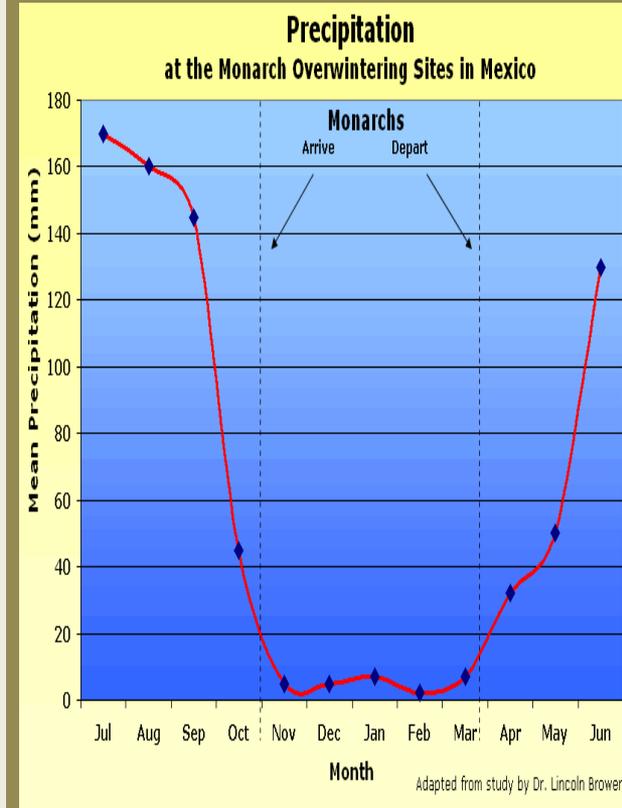
- Scientists predict that climate change will increase the frequency of drought, heat waves and severe storms that cause high levels of monarch mortality
- Could knock population below “Minimum Viable Population” numbers
- And makes overwintering grounds susceptible to new pests



VULNERABLE - DROUGHT

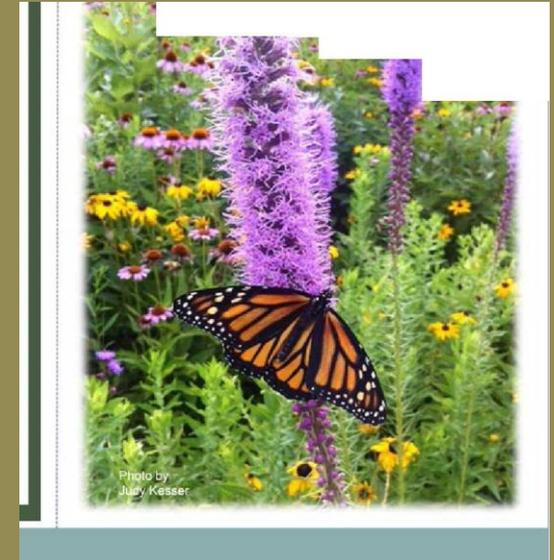


“Puddling”



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



Kynny via Getty Images

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



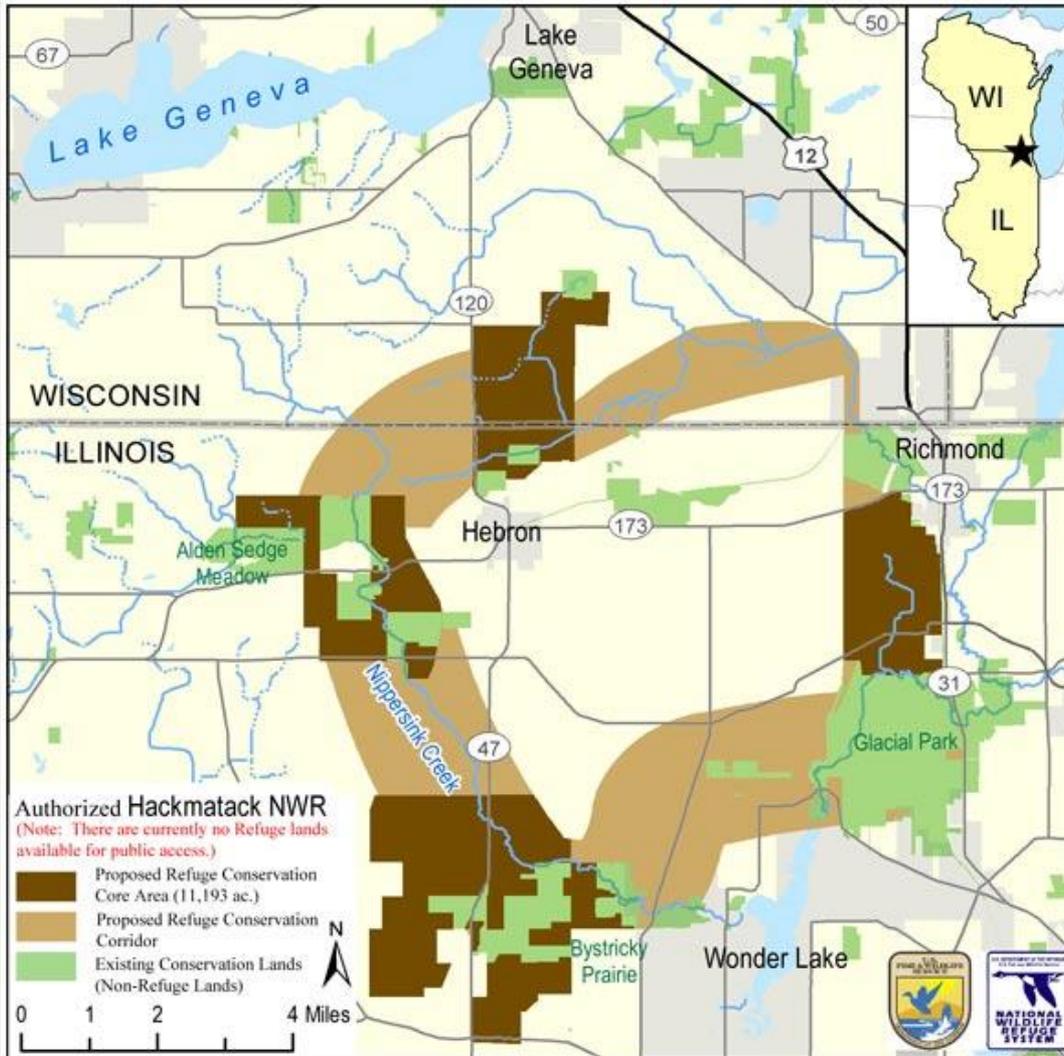
INTERESTING TEQUILA FACTS

- 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>



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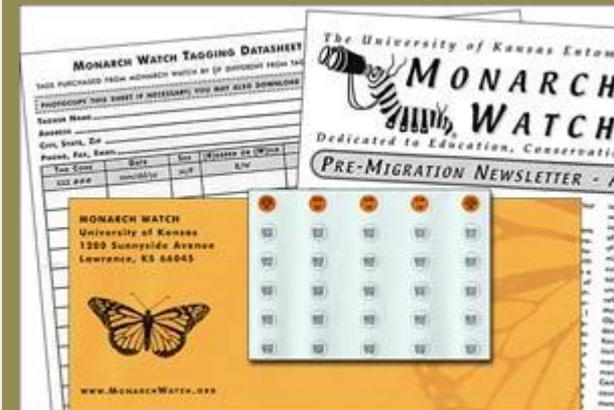
HACKMATACK NWR

- 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



APPROACHES - USFWS

Individual



Community



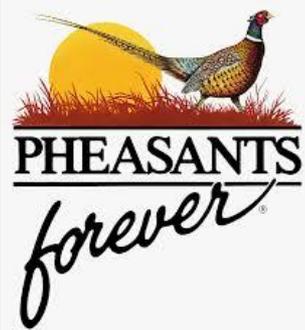
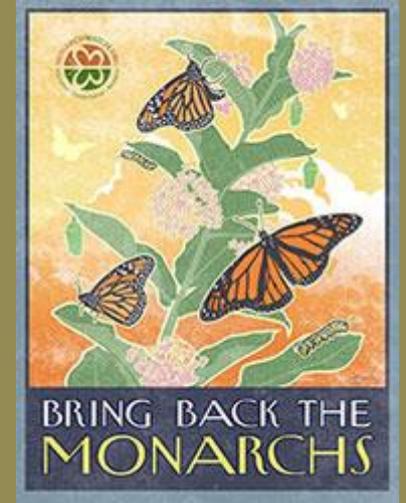
Agriculture



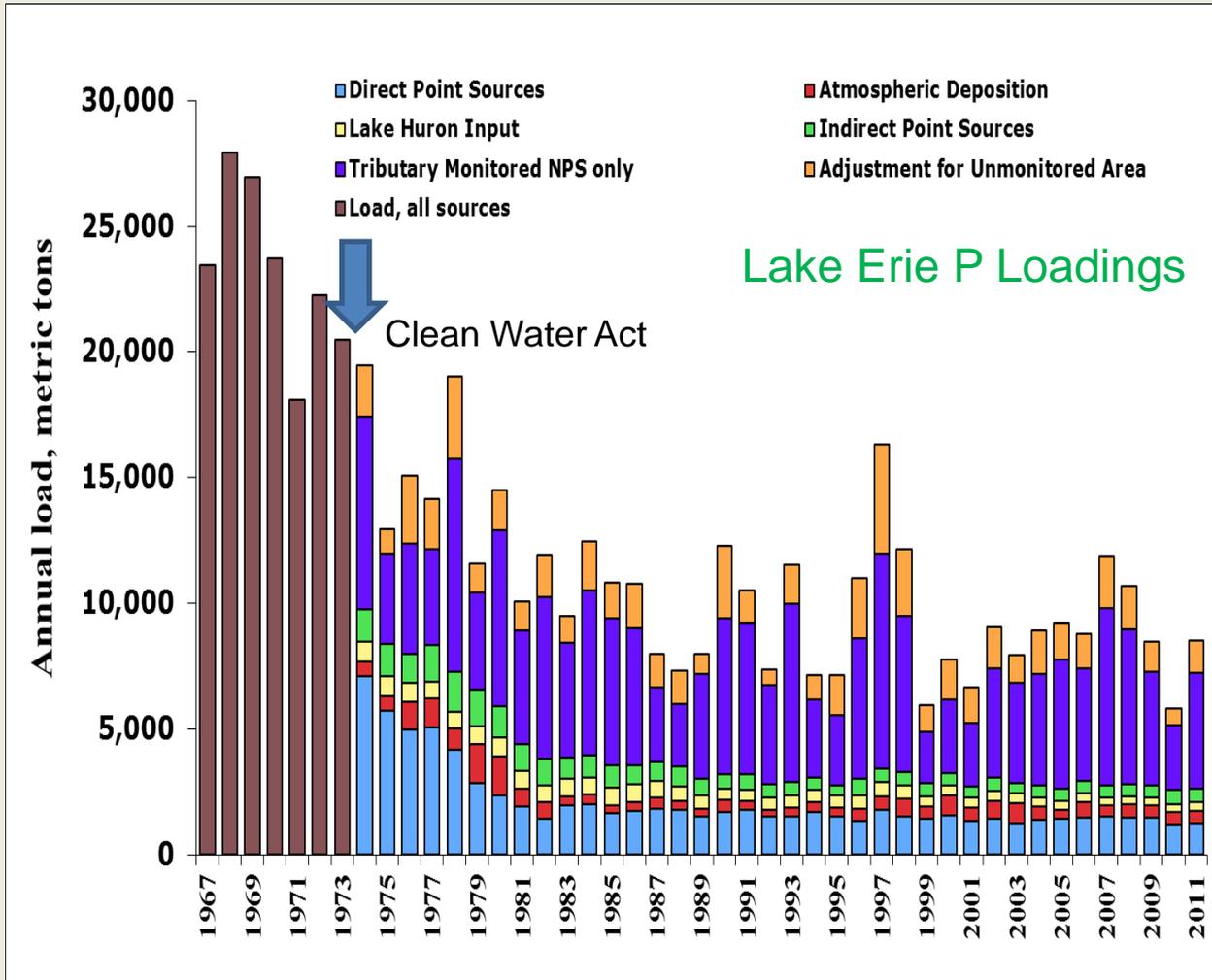
Rights-of-way

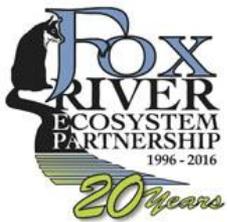


NORTH AMERICAN INITIATIVES

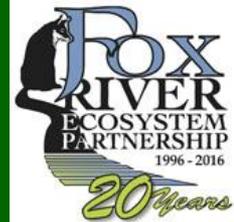


POWER OF THE CLEAN WATER ACT





QUESTIONS?



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