DESIGNING ECOSYSTEM SERVICES METRICS AND SUPPORTING TECHNOLOGY SOLUTIONS FOR SCALEABLE IMPLEMENTATION

Erik Anderson . . . . . Monarch Habitat Quantification Tool

Environmental Incentives

Amy Merrill . . . . . Multi-Species Habitat Quantification Tool

Stillwater Sciences

Sara O'Brien . . . . . Oregon Greater Sage-Grouse Habitat Quantification Tool

Willamette Partnership

Gregg Simonds . . . . . Spatially-Explicit Technology Solutions for Greater Sage-Grouse

Open Range Consulting

Matt Deniston . . . . . Tools to Scale Conservation & Mitigation Programs

Sitka Technology Group

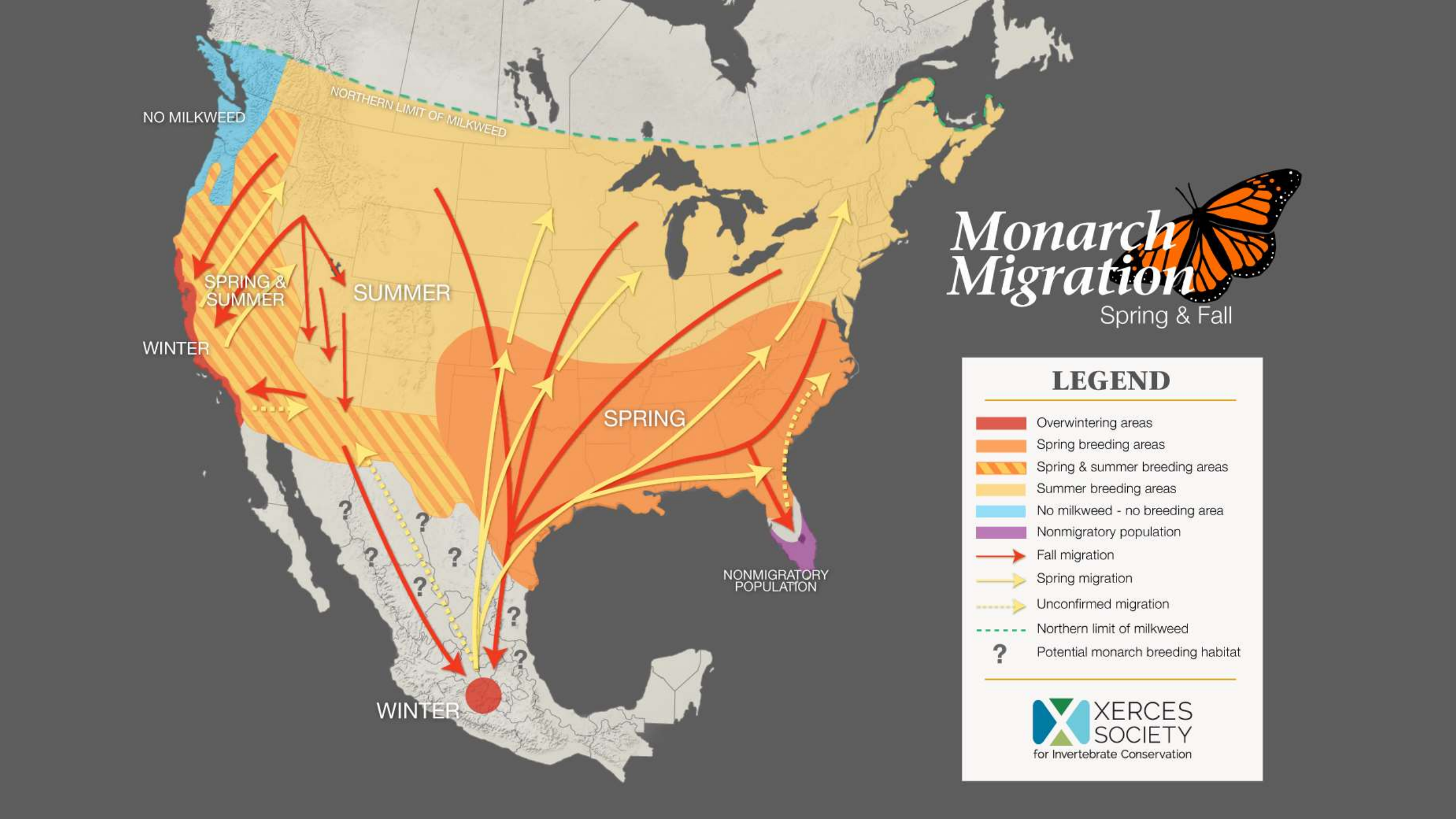
Environmental Incentives

Designing Environmental Metrics to Scale: Lessons from the Monarch Butterfly

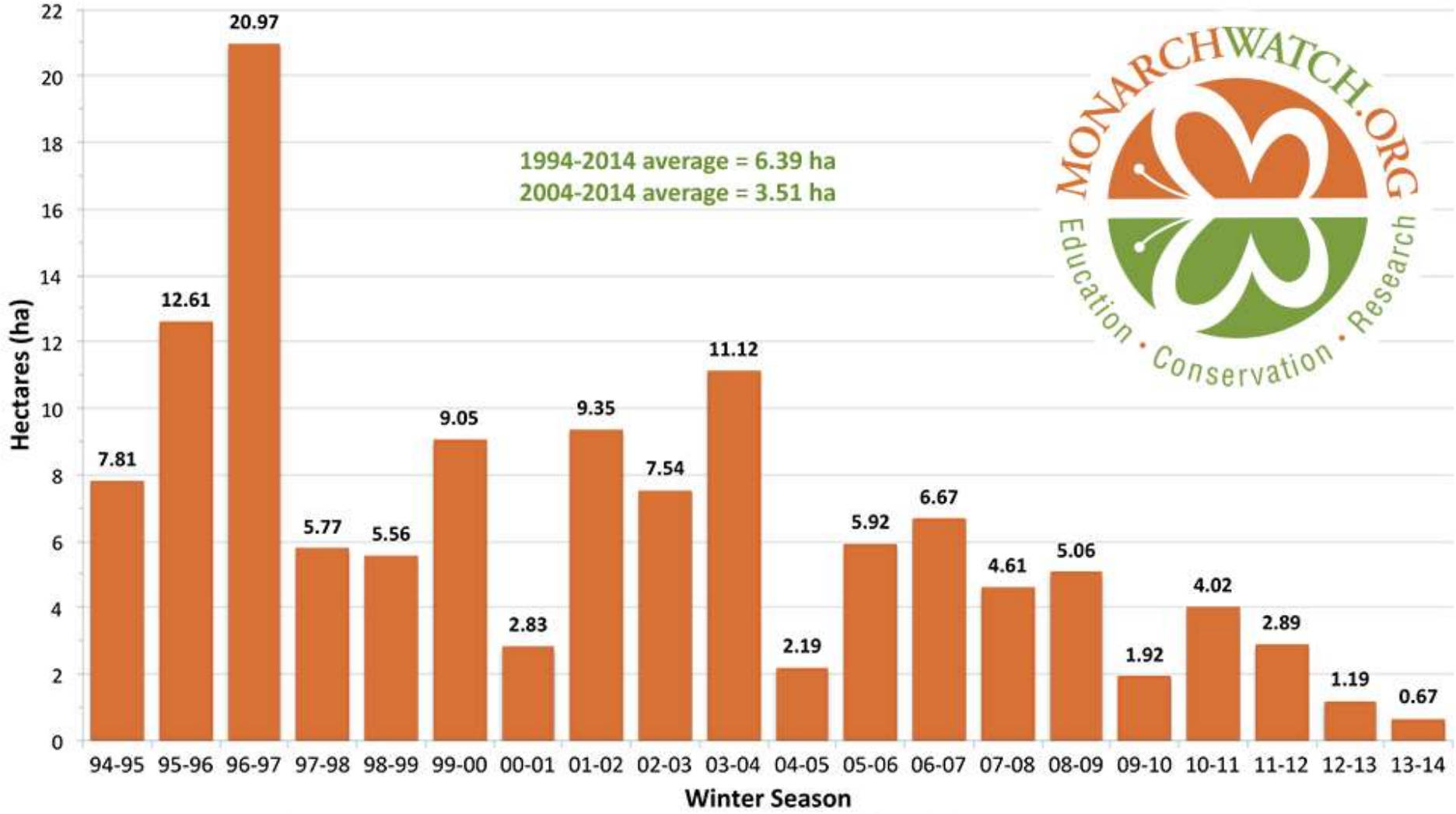
Erik Anderson

Environmental Incentives

eanderson@enviroincentives.com


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
XERCES SOCIETY
for Invertebrate Conservation

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 2003-2013 collected by World Wildlife Fund Mexico in coordination with the Directorate of the MBBR.

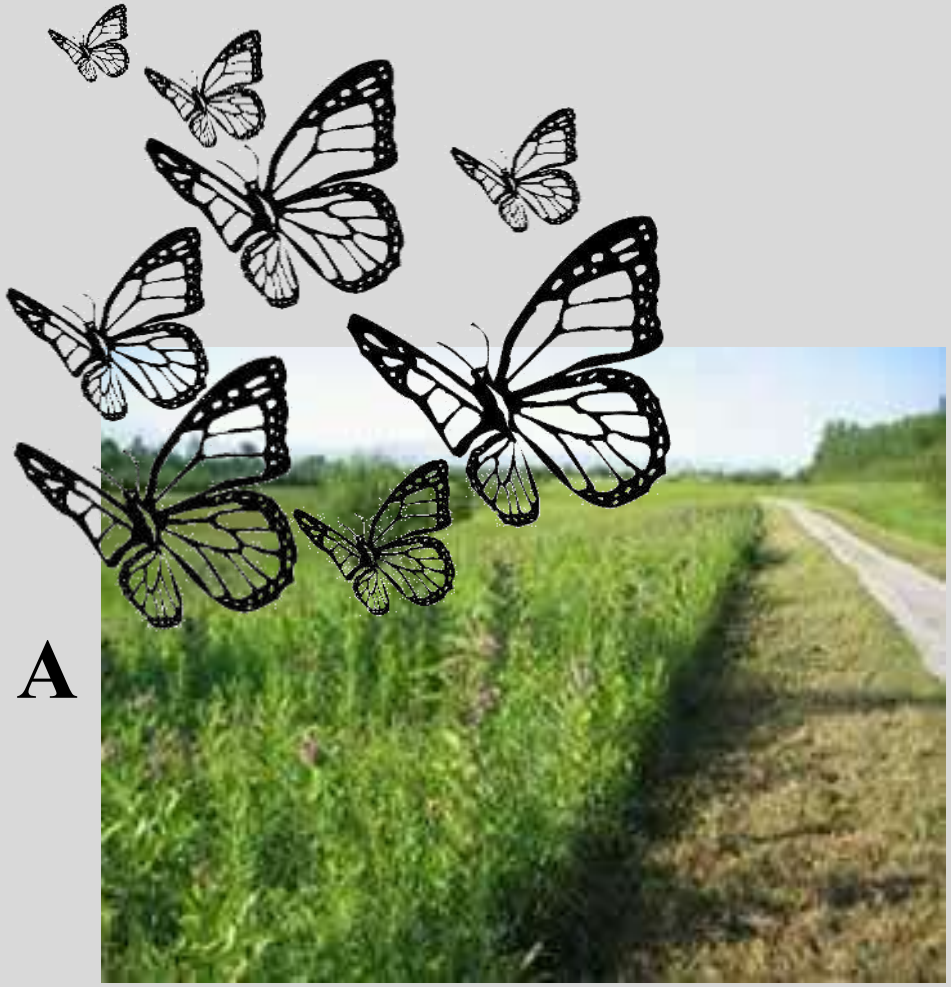
WHAT IS A HABITAT QUANTIFICATION TOOL (HQT)?

An HQT is a standardized approach to assessing habitat quality for a specific species or community.

- Objective standards to promote accountability & transparency
- Inspire confidence from funders and investors
- Measure, track and report progress towards program goals
- Align incentives that motivate individuals to contribute to regional conservation goals

PURPOSE OF AN HQT

A



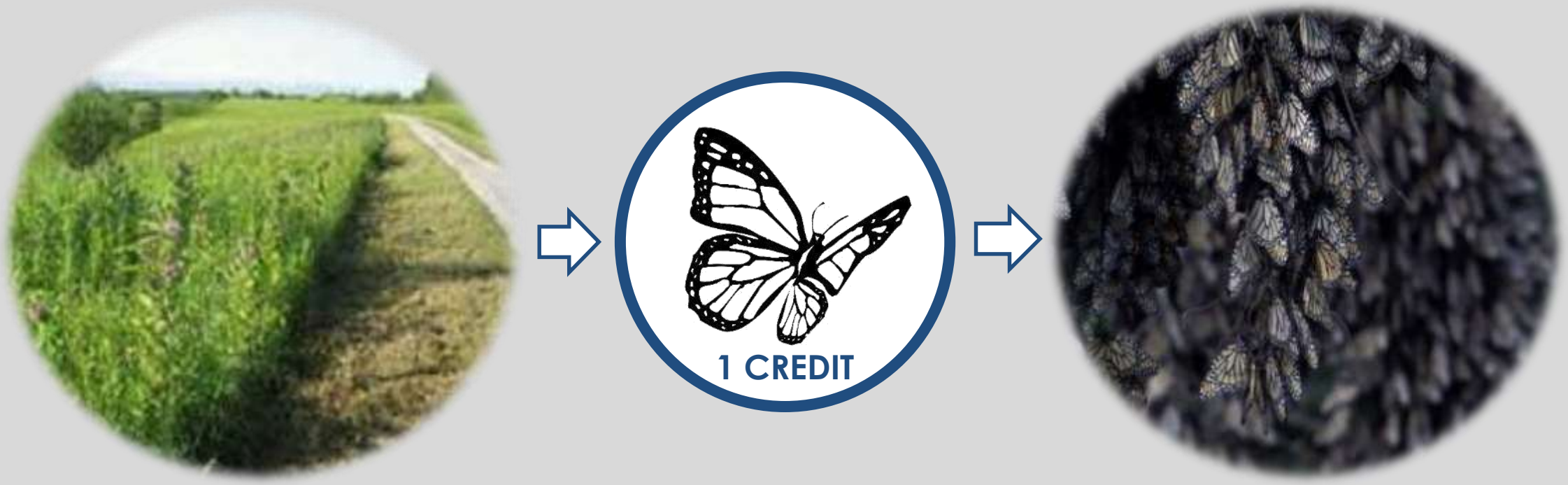
Knowlton Creek field, a monarch larva monitoring site in Duluth, Minnesota. Photo by Gail Gilland.

B

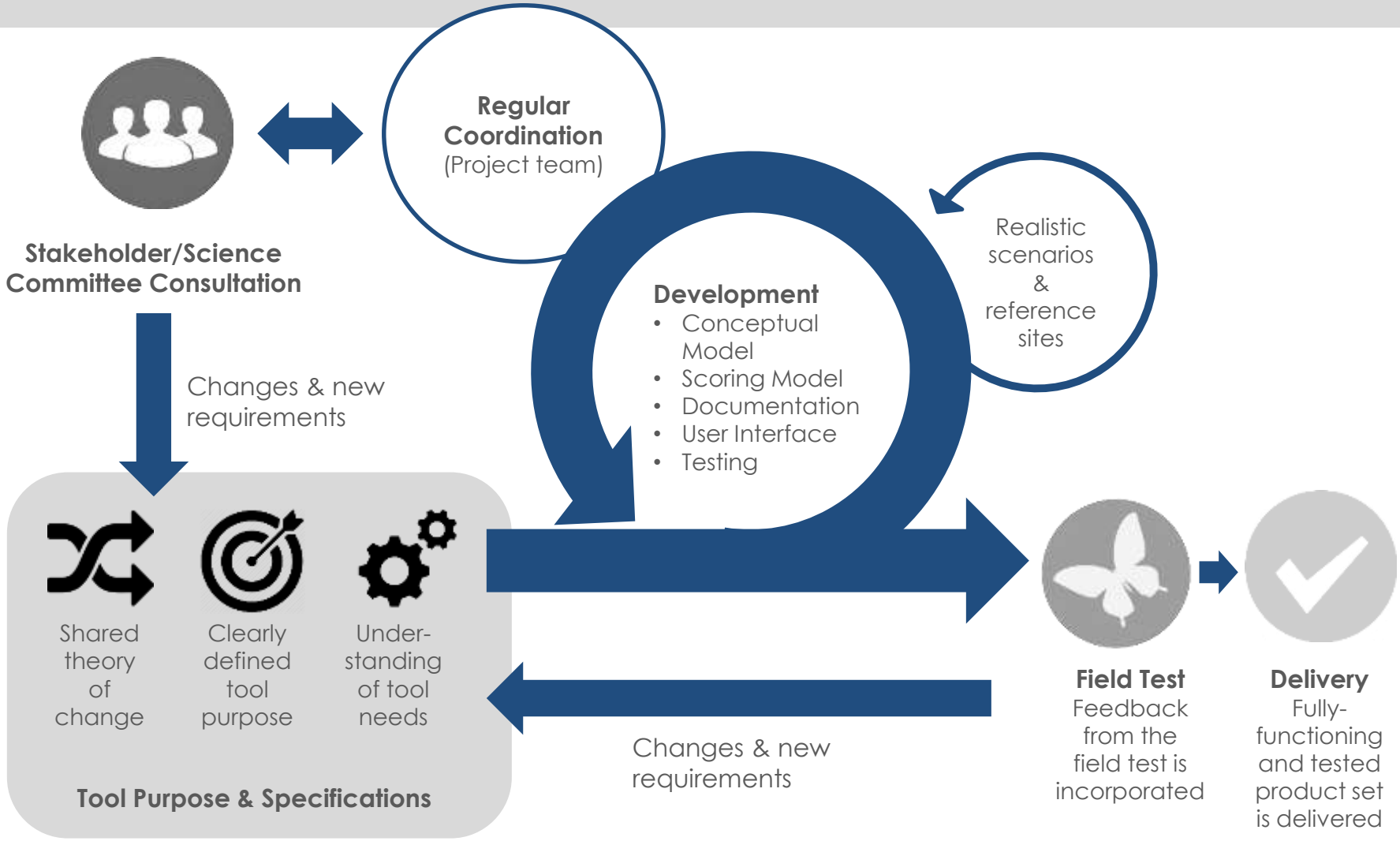
Lake Red Rock, Army Corps of Engineers, butterfly garden. Photo by Janet Mukai.

PURPOSE OF AN HQT

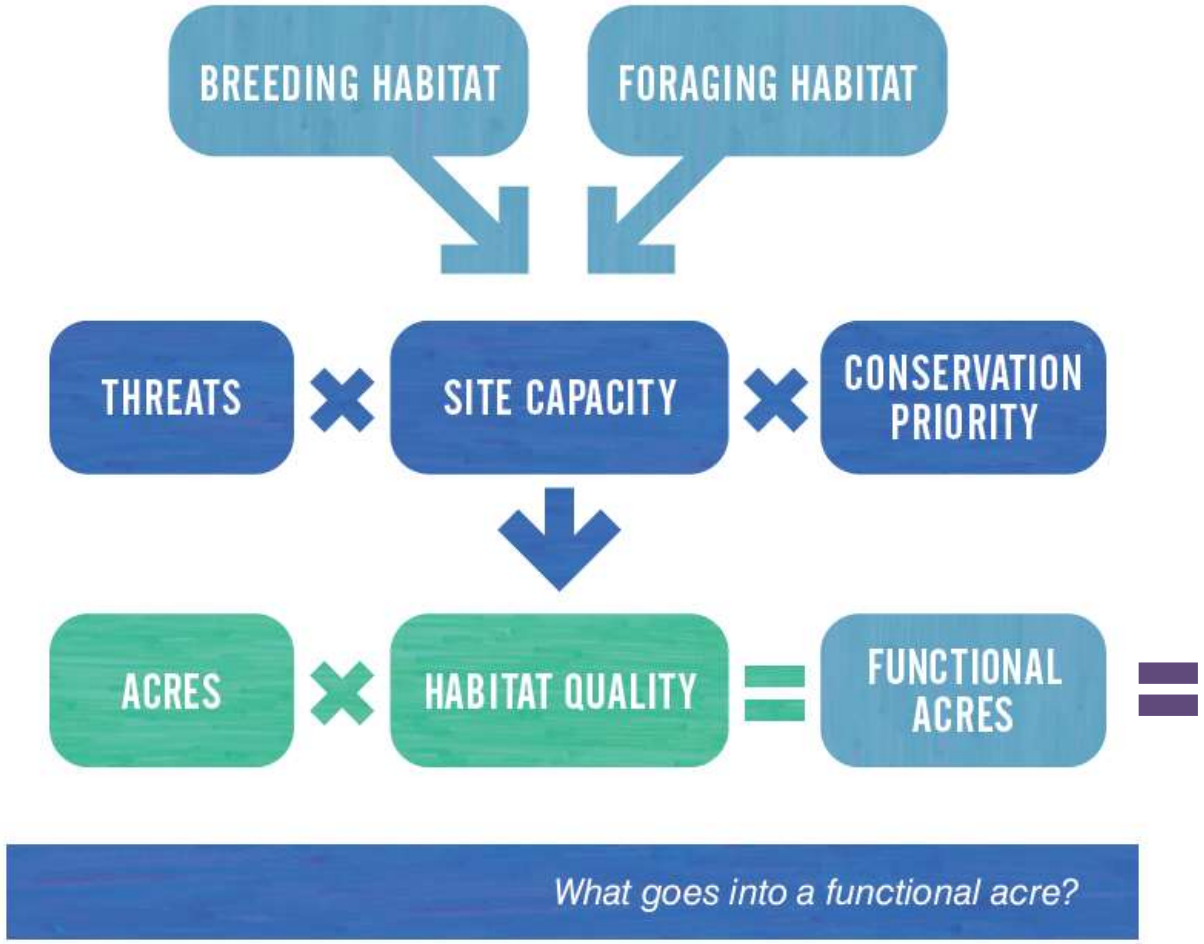
- Estimate the contribution of a given project towards regional conservation goals.



HQT DESIGN PROCESS



MONARCH HABITAT QUANTIFICATION TOOL



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Monarch Lab

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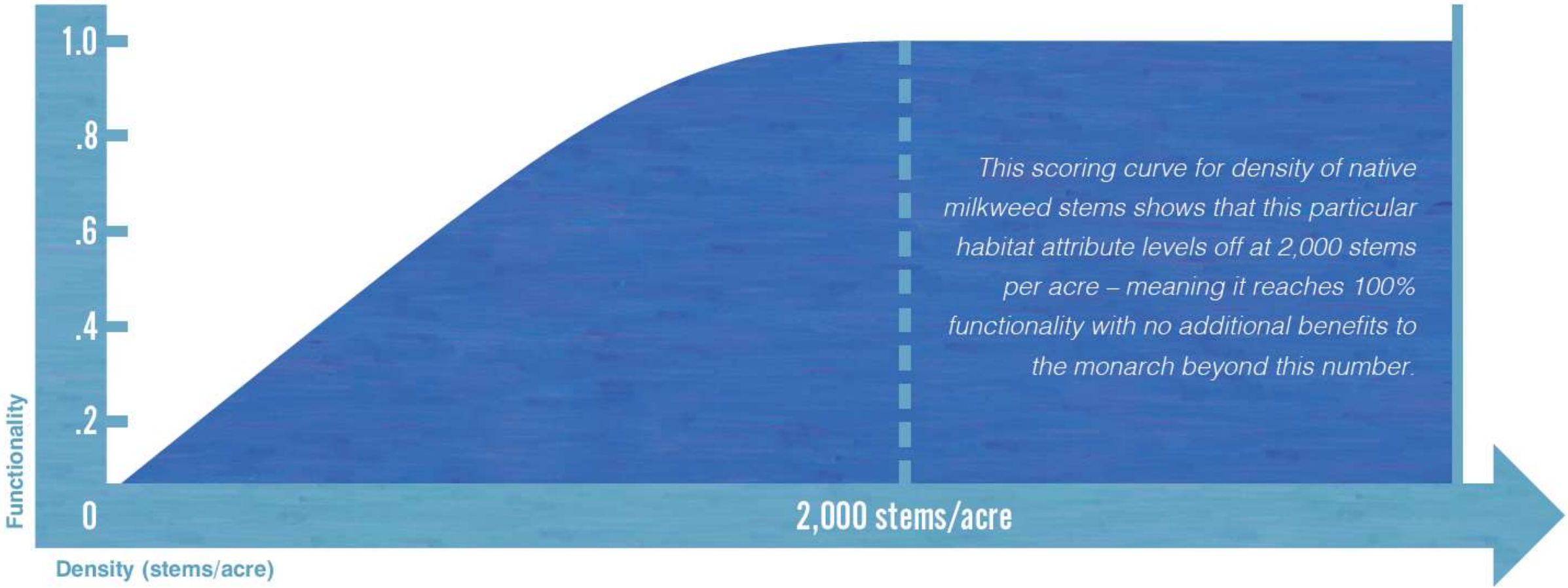
EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

SCORING CURVE



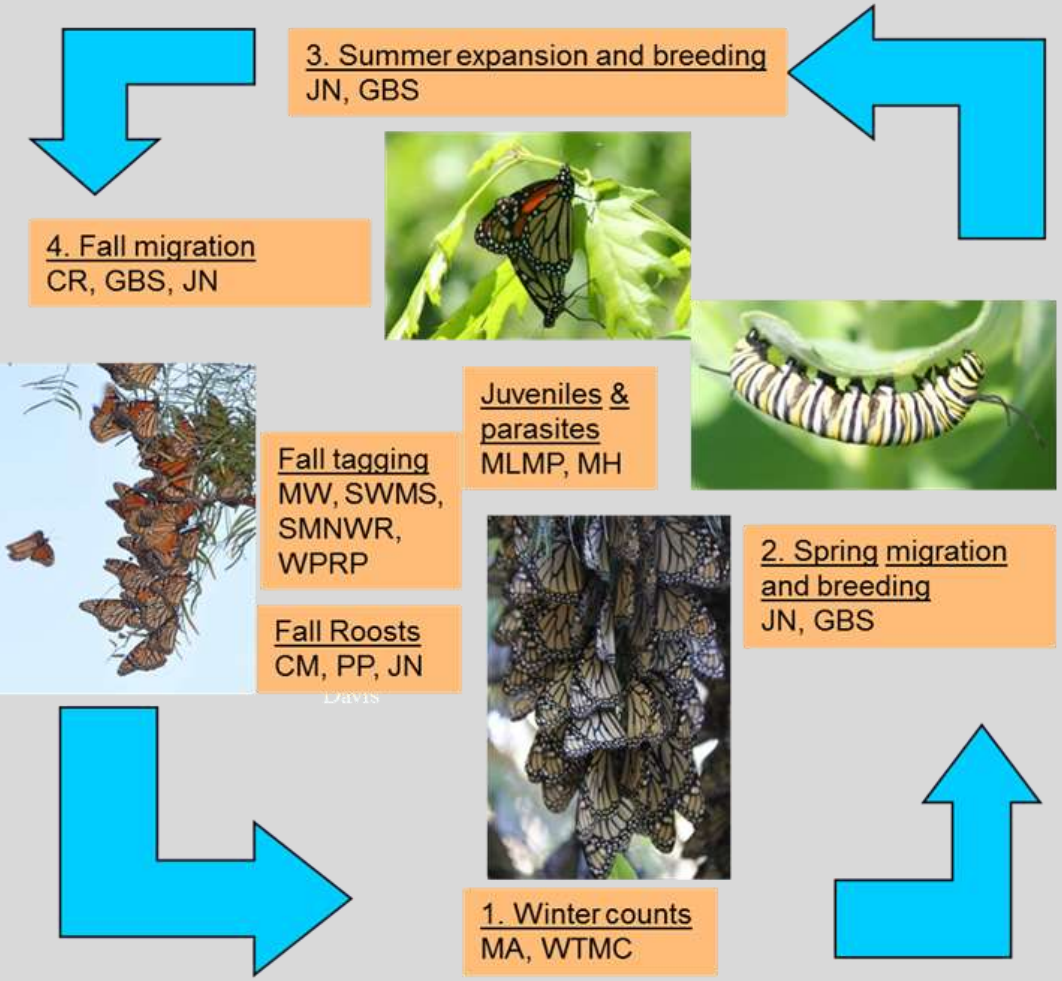
How do we design a tool that can be useful at such a large scale?

CITIZEN SCIENCE

- Started in 1950s
- 17% of peer-reviewed literature on monarchs utilized citizen science data
- Over 35,000 volunteer hours dedicated each year
- Multiple programs span entire annual cycle of monarch butterflies

PROGRAM ACRONYMS
CM: Cape May Monitoring Program
CR: Correo Real
JN: Journey North
MA: Monarch Alert
MH: Monarch Health
MLMP: Monarch Larvae Monitoring Project
MW: Monarch Watch
PP: Peninsula Point roost monitoring
SMNWR: St. Mark's National Wildlife Refuge
SWMS: Southwest Monarch Study
WPRP: Washington Prisoner Release Program
WTMC: Western Thanksgiving Monarch Counts
GBS: General butterfly surveys (multiple programs are listed in Table 2)

CITIZEN SCIENCE



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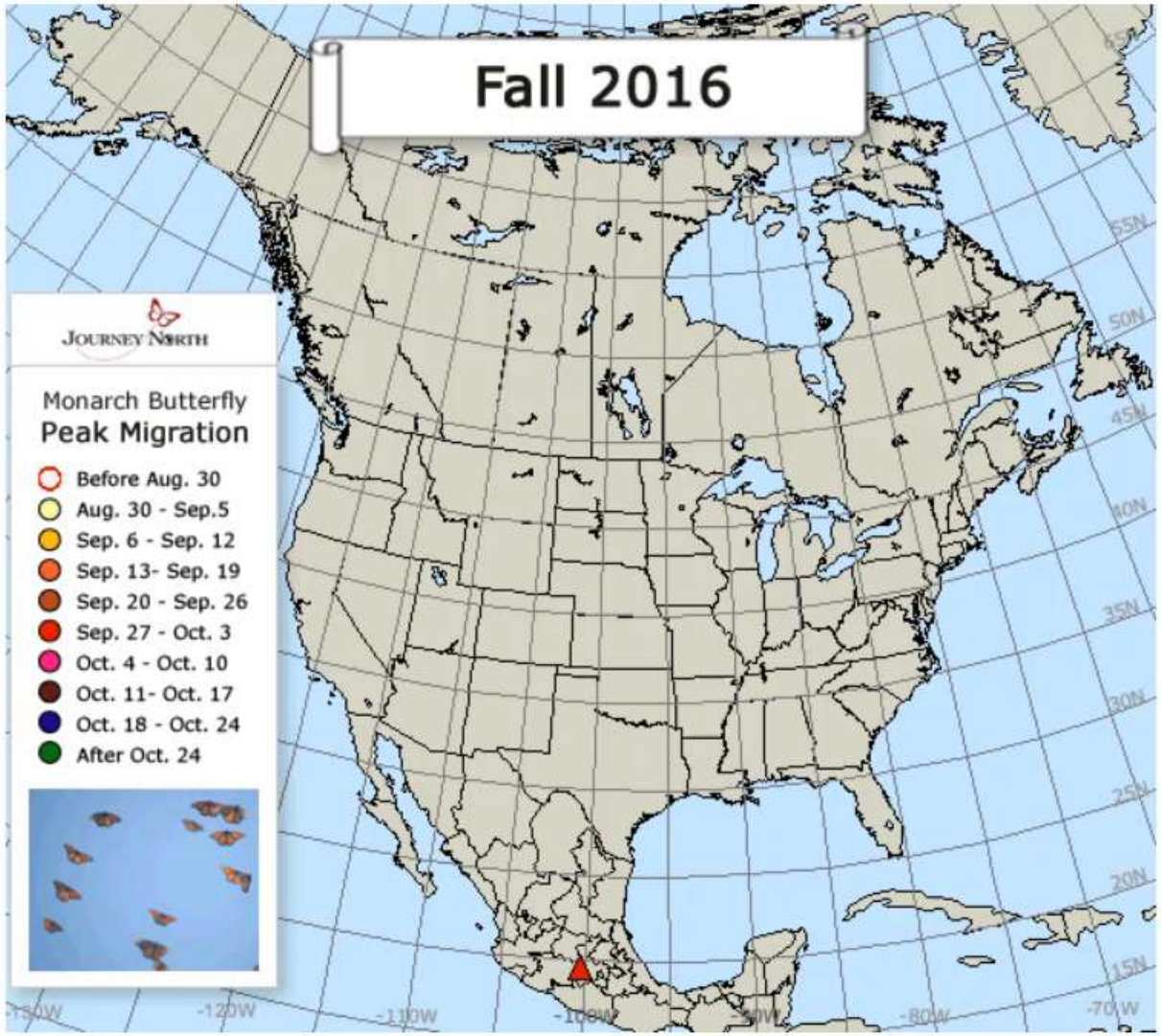
Monarch Butterfly Peak Migration



Print Map

Maps

- Adult Butterfly Sightings
- Peak Migration
- Overnight Roosts
- Eggs and Larvae
- None/Few Monarchs
- Captive-reared & Other

- Animation
- Archives
- All JN Maps

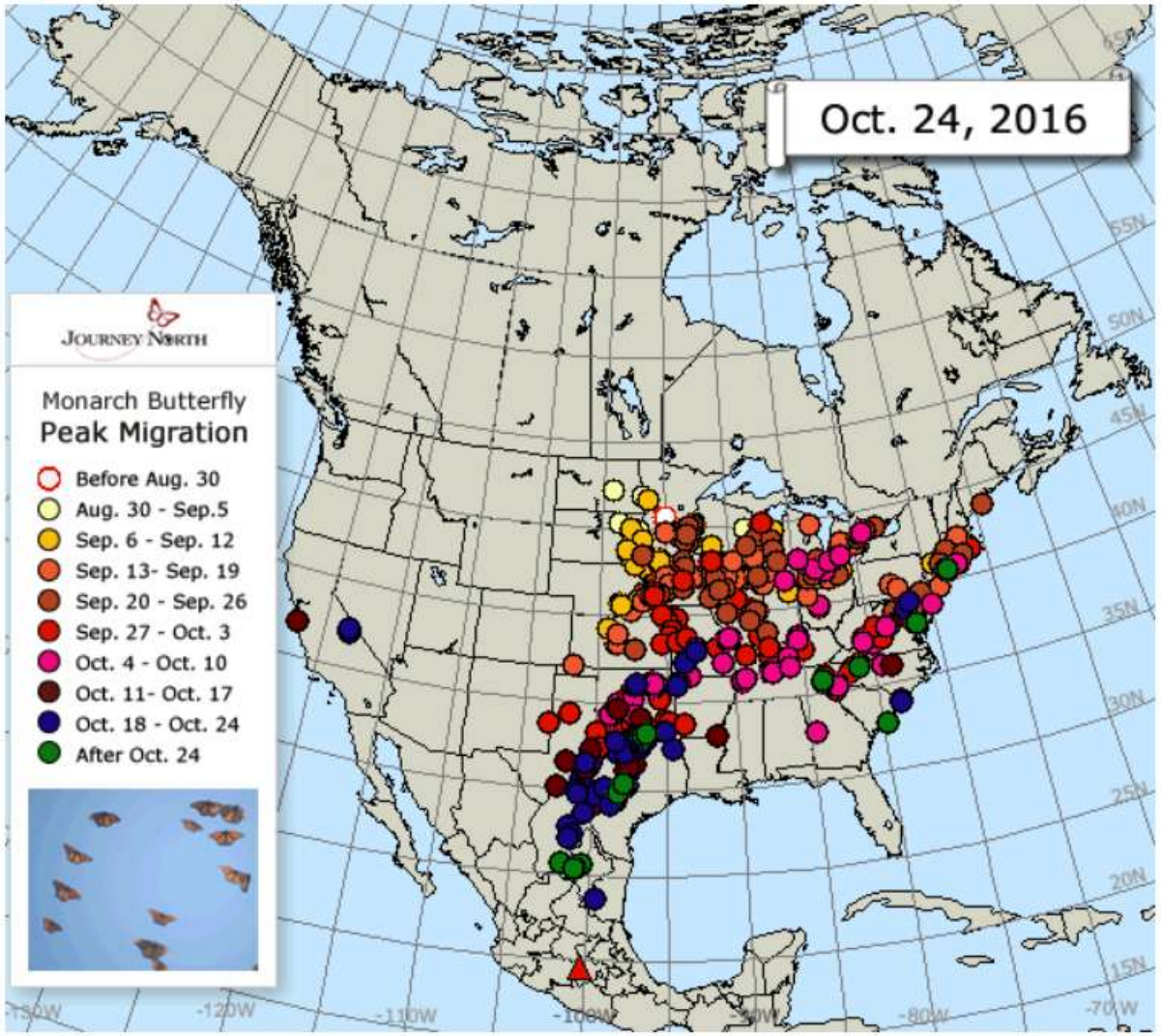
Sightings

- What to Report
- Report
- View List
- My Sightings

Monarchs

- Home

Monarch Butterfly Peak Migration



Print Map

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Sightings

What to Report
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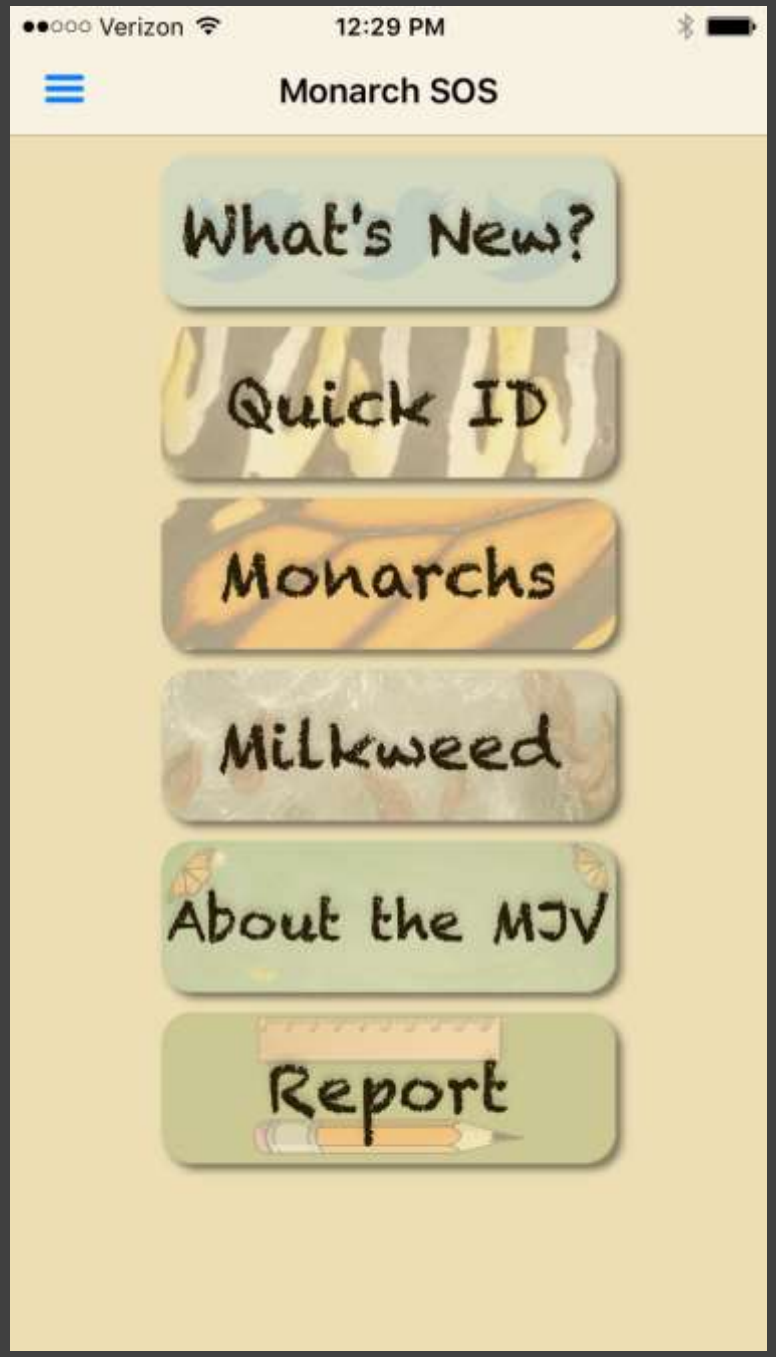
News

JOURNEY NORTH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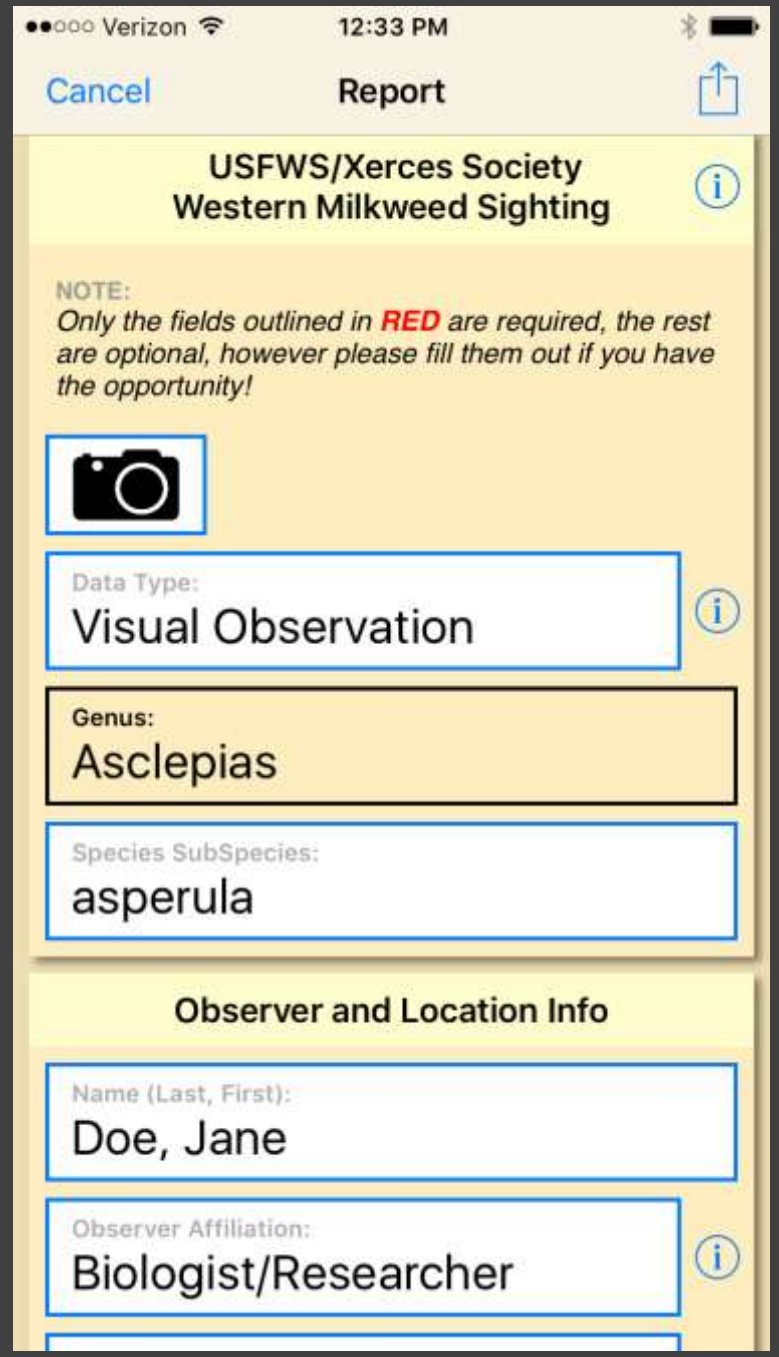
Monarch SOS
What's New?
Quick ID
Monarchs
Milkweed
About the MJV
Report


Verizon LTE 6:19 PM 84%
Report
All Reports
Summary
Programs
Journey North
Monarch Larva Monitoring Project (MLMP)
Monarch Alert
Cal Poly
PROJECT MONARCH HEALTH
Monarch Watch.org
Education • Conservation • Research
SOUTHWEST MONARCH STUDY
XERCES SOCIETY
XERCES SOCIETY
for Invertebrate Conservation

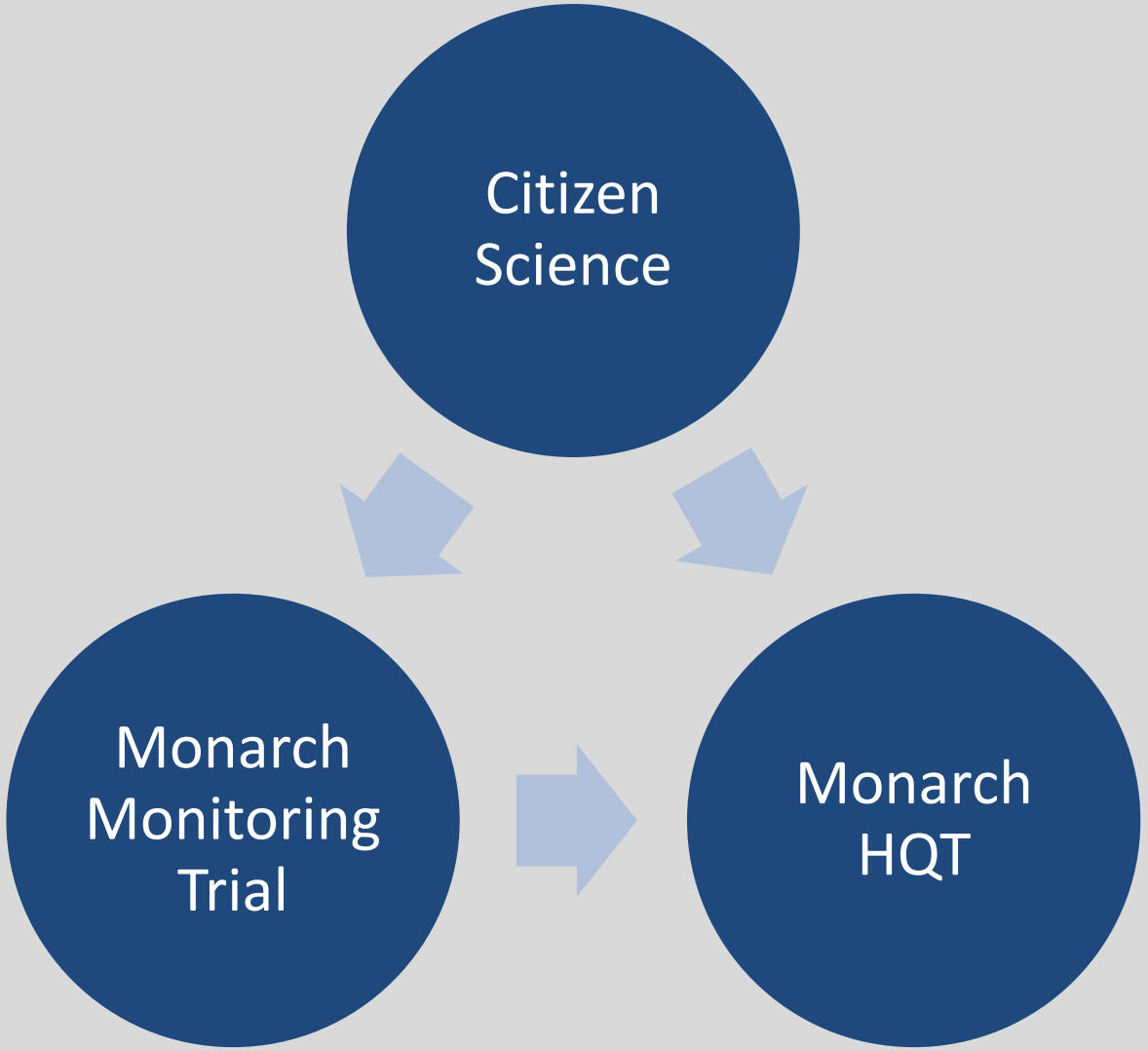

Verizon 12:33 PM
Cancel
Report
USFWS/Xerces Society
Western Milkweed Sighting
NOTE:
Only the fields outlined in RED are required, the rest are optional, however please fill them out if you have the opportunity!
Data Type:
Visual Observation
Genus:
Asclepias
Species SubSpecies:
asperula
Observer and Location Info
Name (Last, First):
Doe, Jane
Observer Affiliation:
Biologist/Researcher

MONARCH MONITORING TRIAL

- **Monarch Conservation Science Partnership** - Department of Interior working groups supported by the John Wesley Powell Center for Analysis and Synthesis, funded by the U.S. Geological Survey.
- Using **citizen scientists** to assess and monitor monarchs and monarch habitat
- **Sample design** based on North American Bat Monitoring Program (Generalized Random Tessellation Stratified sample design)
- **Sample methods** derived from existing citizen science efforts
- **Field tested** methods in 2016

KEYS TO SUCCESS

- Shared metrics
- Common measurement method
- Compatible sample design
- Data sharing & collaboration



LESSONS LEARNED

- Collaborate!
- Be mindful of scale
- Leverage the public
- Use technology to facilitate coordination & data collection

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eanderson@enviroincentives.com

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