Cracking The Butterfly Code
Erik Runquist, PhD     Minnesota Zoo
Insurance Populations
Minnesota:
146 Butterfly Species
2000-2500 Moth Species
Western Prairie Fringed Orchid
MN Endangered
US Threatened

Only pollinated by hawk moths
Butterflies and Moths are Indicators

Complex lifecycles:

- Require different resources at different times
- Sensitive to environmental conditions
**Indicators**

**Science News**

**Butterflies Reeling from Impacts of Climate and Development**

*ScienceDaily (Jan. 12, 2010) — California butterflies are reeling from a one-two punch of climate change and land development, says an unprecedented analysis led by UC Davis butterfly expert Arthur Shapiro.*

**Some Butterfly Species Particularly Vulnerable to Climate Change**

*ScienceDaily (June 1, 2012) — A recent study of the impact of climate change on butterflies suggests that some species might adapt much better than others, with implications for the pollination and herbivory associated with these and other insect species.*

The research, published in *Ecological Entomology*, examined changes in the life cycles of butterflies at different elevations of a mountain range in central Spain. They served as a model for some of the changes concerning warming mountain habitats.

The research focused on butterfly species that normally emerge late in the season, with a short rest period to reproduce before winter set in. The northernmost species had a longer emergence period compared to other species.

**Butterflies Respond to Climate Change by Moving North**

*Part-time butterfly watchers in Massachusetts have taken more than 19,000 expeditions over the past two decades. The result of their work: northern butterflies are becoming increasingly rare, even as southern species take their place. The likely cause: warming temperatures.*
Research: Butterflies mutated, ecology damaged by Fukushima N-leak, but humans relatively safe

Article by: ELAINE KURTENBACH, Associated Press | Updated: August 16, 2012 - 1:44 AM
1. Floral Diversity and Density
Native plants are best, but there are OK alternatives
mnzoo.org/PlantForPollinators
Purple Coneflowers
Echinacea sp.
Blazingstars - *Liatris* spp.
Black-eyed Susan (*Rudbeckia hirta*)
Spotted Joe Pye Weed – *Eutrochium maculatum*
Fragrant Hyssop – Agastache foeniculum
Goldenrods – *Solidago* sp.
Wild bergamot - *Monarda fistulosa*
Milkweeds – Asclepias sp.
2. Caterpillar Hosts
Milkweed Tussock Moth
Asters
3. Structural complexity
- Shelter, Perches, and Water
Prairie Anchors

Indiangrass
Sorghastrum nutans

Big bluestem
Andropogon geradii
Tallgrass Prairie

Heidi Natura, Conservation Research Institute
The Butterfly Code:
1. Floral Diversity and Density
2. Caterpillar Hosts
3. Shelter, Perches, and Water