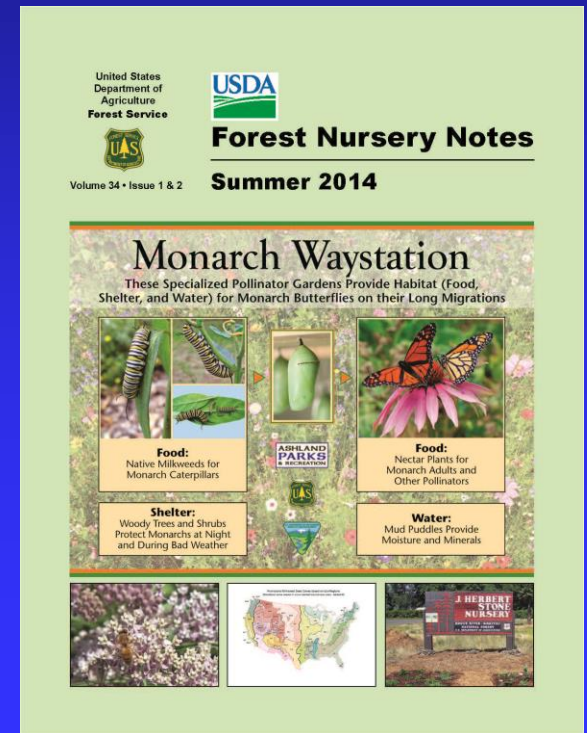
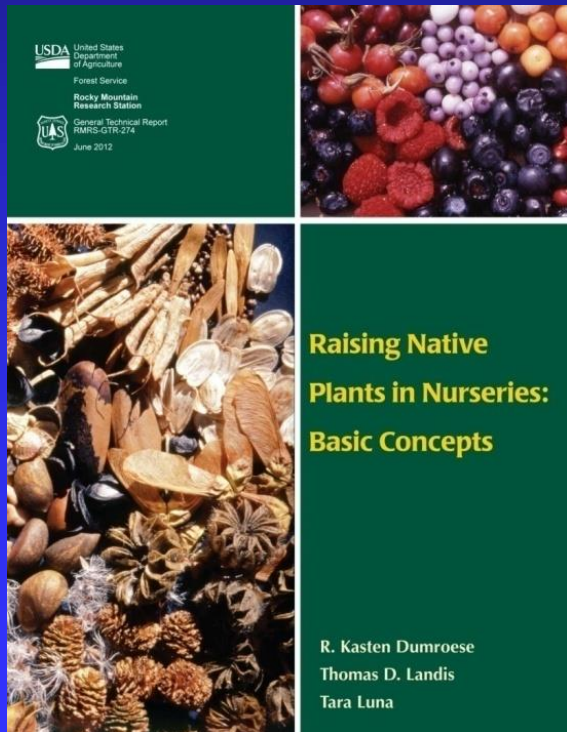


# Using Native Plants to Create Pollinator Habitat: Lessons Learned & New Perspectives



**Tom D. Landis**  
**Retired US Forest Service**  
**Nursery Specialist**

# 2013 Presentation: Propagating milkweed and nectar plants for monarch butterfly habitat restoration



The Bad  
News –  
Decline of  
Pollinators  
All Over the  
World

Bees are  
especially  
threatened

**Newsweek**

TECH & SCIENCE

**40 PERCENT OF INVERTEBRATE  
POLLINATORS FACE  
EXTINCTION ACROSS THE  
GLOBE**





# The Good News – Creating Pollinator Habitat Works!

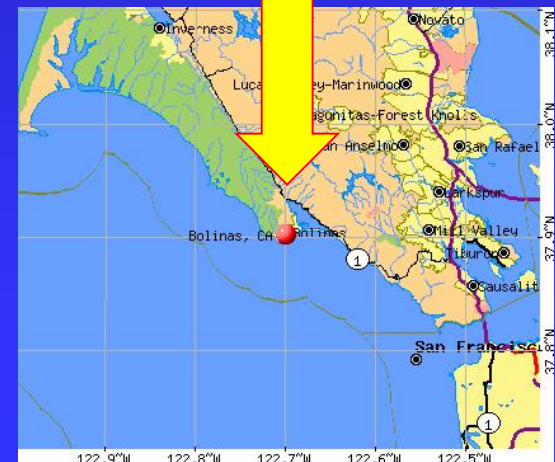


**January 1, 2016:**

Tagged monarch from Coyote Trails

Nature Center in Medford

Was Found in Bolinas, CA





# Monarch Waystation

These Specialized Pollinator Gardens Provide Habitat (Food, Shelter, and Water) for Monarch Butterflies on their Long Migrations



**Food:**  
Native Milkweeds for  
Monarch Caterpillars

**Shelter:**  
Woody Trees and Shrubs  
Protect Monarchs at Night  
and During Bad Weather



**Food:**  
Nectar Plants for  
Monarch Adults and  
Other Pollinators

**Water:**  
Mud Puddles Provide  
Moisture and Minerals



A Milkweed Railroad for Monarchs



# Two Types of Monarch Waystations



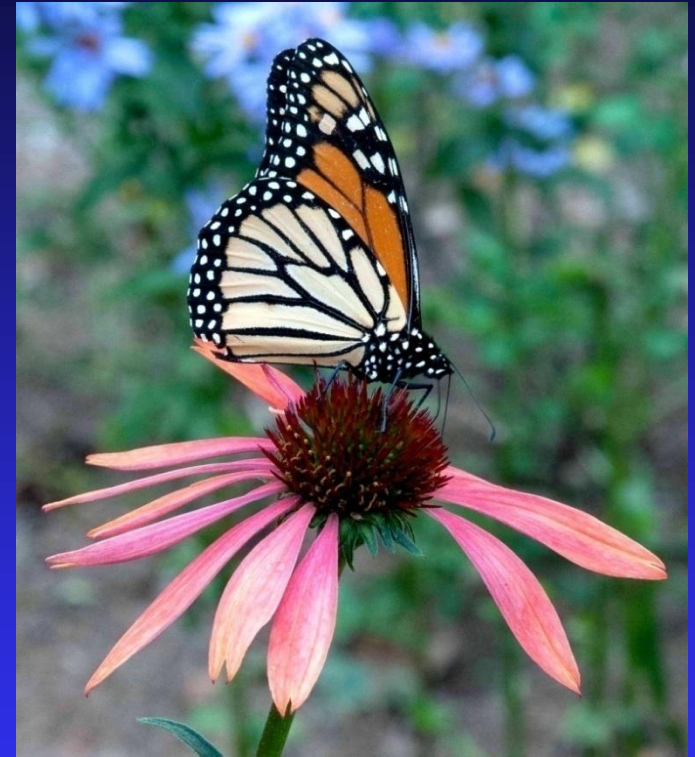
Backyard Gardens –  
Use Native  
& Introduced Plants



Natural Areas –  
Use Only  
Native Plants

# 1a. Food: Nectar Plants

Adult Butterflies Get Sugar  
from the Nectar in Flowers



- Sugar Content of Nectar Ranges from 8% to 50%
- Nectar also Contains Vitamins, Oils & Amino acids

# All Plants Have Pollen, But Not All Plants Have Nectar

California poppy has no nectar



**Pollen:** small powdery particles produced by anthers (male flower organs) that is carried by pollinators to fertilize the female flower organs and produce seeds. Pollen provides vital protein and fats; honey bees use it to make bee bread.

**Nectar:** sugary substance, produced by **some** plants to attract pollinators (bees, butterflies and hummingbirds). Sugar is metabolized for energy or stored as fats.



## 1b. Food: Host Plants



- ✓ Different butterflies have different host plants
- ✓ Monarch caterpillars eat *only* milkweed leaves
- ✓ Host plants for western tiger swallowtail belong to 8 different genera: willows, cottonwoods, birch, maple, alder and others

## 2. Shelter: Woody Shrubs & Trees

Monarch butterflies need places to rest at night & during inclement weather



Most of Our USFS Sites  
Are Surrounded  
By Natural Cover

Flowers of some woody shrubs, such as mock orange, are also good sources of nectar



Photo: Tanya Harvey



# Plant Palette for Monarch Waystations

## Milkweed for Caterpillars



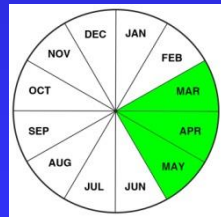
**Narrowleaf  
Milkweed**



**Showy  
Milkweed**

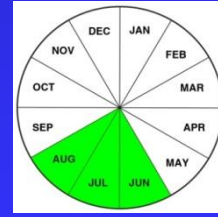


## Nectar Flowers for Butterflies



**Spring Flowering**

**Oregon grape**



**Summer Flowering**

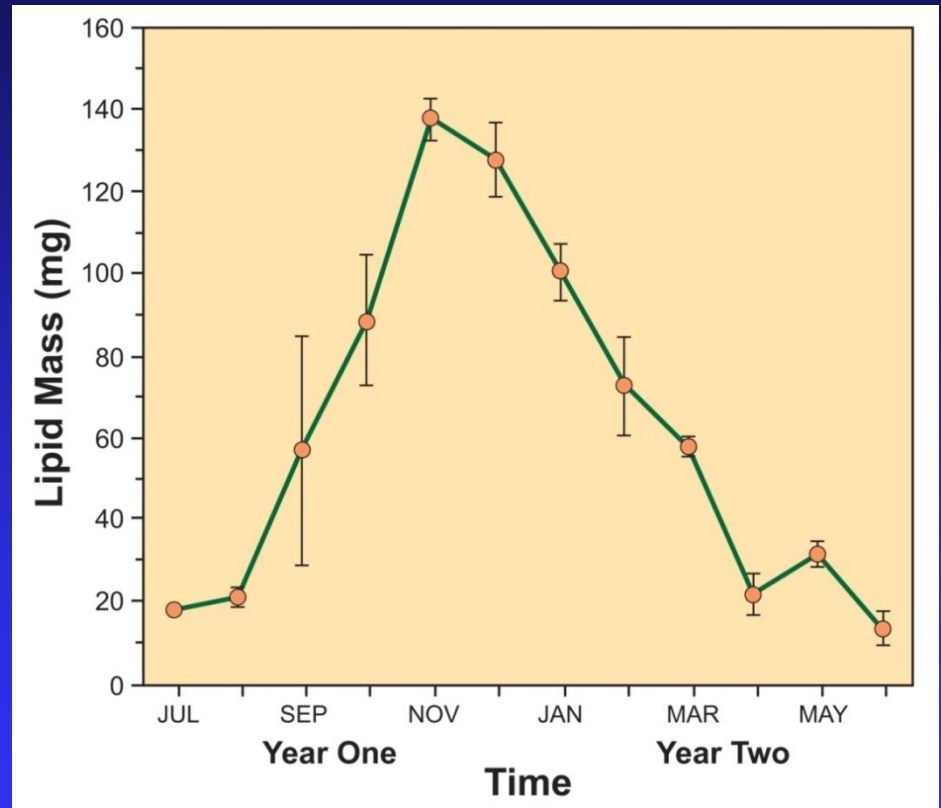
**Coyote mint**



**Fall Flowering**

**Rubber rabbitbrush**

# Nectar is Stored as Fats in Monarch Butterflies



Nectaring in Late Summer & Fall Builds Up Fat  
Reserves for Migration & Overwintering



# Native Milkweed Species

Narrowleaf milkweed  
(*Asclepias fascicularis*)

ASFA



In My Waystation, Monarch  
Females Prefer ASFA for Laying Eggs

# Native Milkweed Species

Showy milkweed, (*Asclepias speciosa*)

**ASSP**



Large leaves of ASSP are Better  
for Feeding Late Instar Caterpillars



# Native Milkweed Species

Heartleaf milkweed (*Asclepias cordifolia*)

ASCO



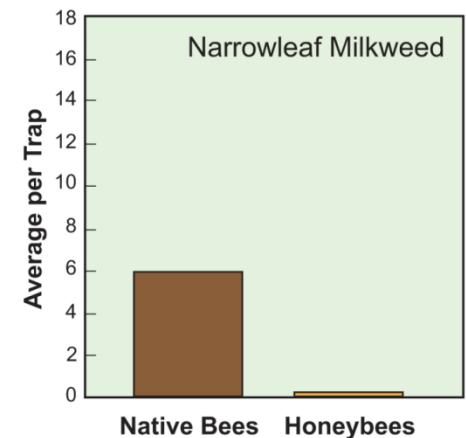
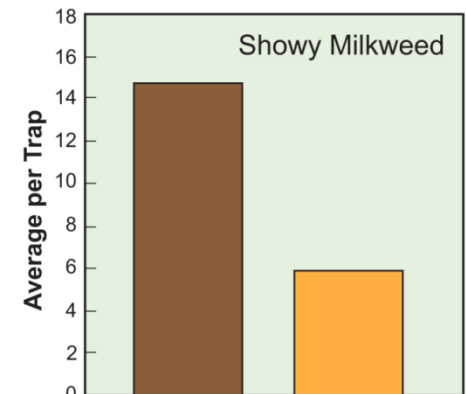
More Challenging to Propagate

# Milkweeds Are Excellent Nectar Plants



Out of 43 species of native flowering perennials, showy milkweed attracted the highest number of beneficial insects

– *David James, WSU*



James & Others (2016)



# Plant Milkweeds in Clumps

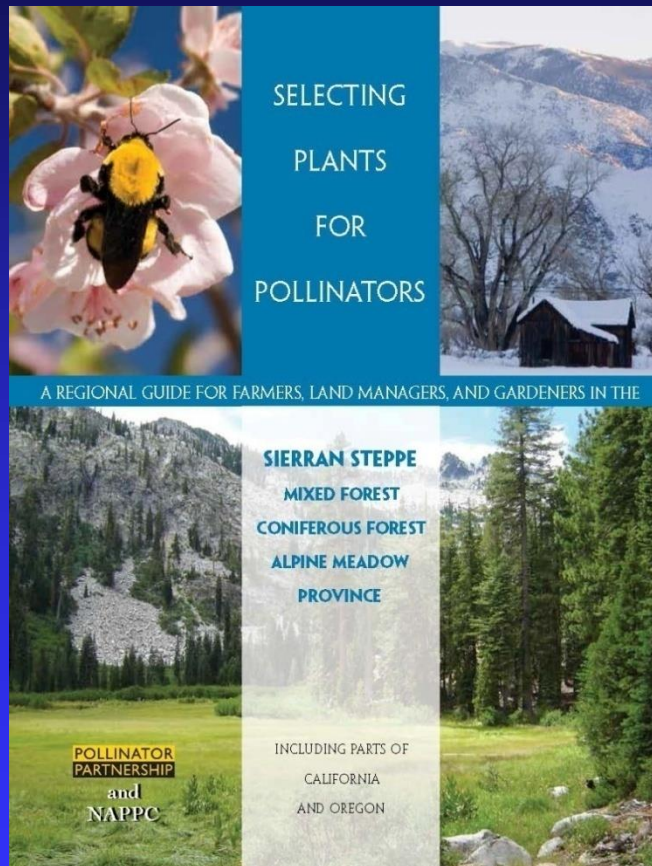


Monarchs  
Prefer to Lay  
Eggs Low  
Around the  
Perimeter Of  
Milkweed  
Clumps





# Identifying Local Native Nectar Plants



*Agastache urticifolia*,  
Nettleleaf giant hyssop



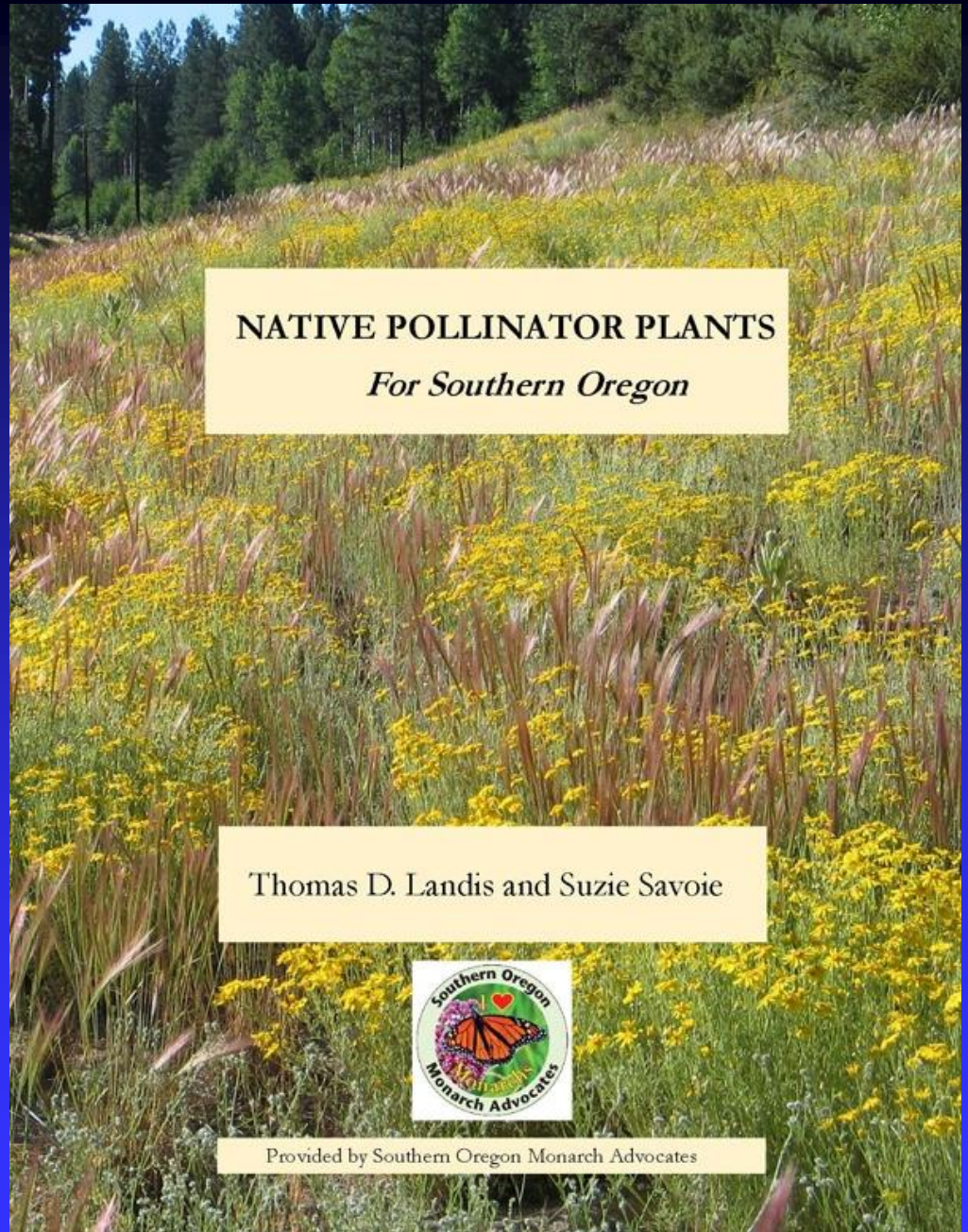
*Monardella* spp.  
Coyote mint

Use your Postal Zip Code at:  
<http://www.pollinator.org/guides.htm>



# Regional Native Pollinator Plant Publications

- Limited Hard Copies
- PDF File is Available for Printing



NATIVE POLLINATOR PLANTS  
*For Southern Oregon*

Thomas D. Landis and Suzie Savoie



Provided by Southern Oregon Monarch Advocates

# Contents for Plant Species or Group

Organized by  
Flowering  
Period:

- Early-Season
- Mid-Season
- Late-Season

**Goldenrods:** West coast Canada goldenrod, (*Solidago elongata*), threenerve goldenrod (*S. velutina*)

Goldenrods are common native plants that provide excellent pollen and nectar for bees, butterflies and other pollinator insects in the late summer and fall. Both native and honey bees use pollen from goldenrods to provision their nests, and monarch butterflies use goldenrod nectar to build up their body fats for their long migrations and overwintering.

Goldenrods are excellent late blooming nectar plants that are hardy and easy to grow



Photo: Klamath Siskiyou Native Seeds

Goldenrods are especially important for monarch butterflies as they migrate south in the fall



Photo: Bernadette Barville

**Plant Form:** Perennial herbs

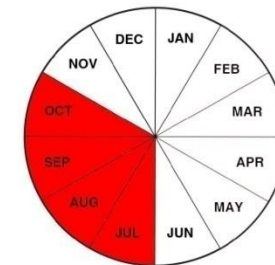
**Nectar:** Bees and butterflies

**Host Plant:** No

**Propagated by:** Seeds

**Bloom Times**

*Solidago velutina*



**References:**

Pavek, P.L.S. 2011. Plant guide for Canada goldenrod (*Solidago canadensis*). USDA-Natural Resources Conservation Service, Pullman, WA. Website: [http://plants.usda.gov/plantguide/pdf/pg\\_soca6.pdf](http://plants.usda.gov/plantguide/pdf/pg_soca6.pdf) (Accessed December 18, 2015).

Mader E, Shepherd M, Vaughan M, Hoffman Black S, LeBuhn G. 2011. Attracting native pollinators. North Adams, MA: Storey Publishing. 371p.

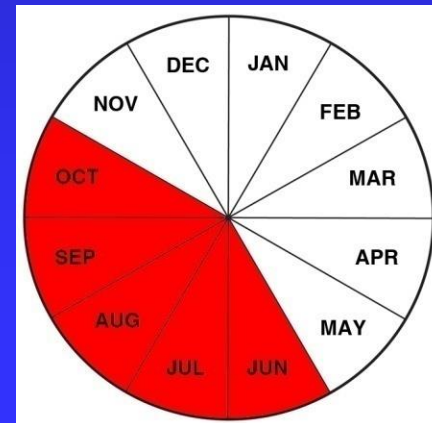


# Western Joepieweed – A New Pollinator Plant for Southern OR?



*Ageratina occidentalis*  
AGOC2

Propagated by Seeds or  
Rhizomes



# Characteristics of desirable pollinator plants: perennials are best

## 1. Problems with Annuals

- Can't Control Distribution
- Usually functional for only 1-2 years
- Can become weedy



Chick lupine, *Lupinus microcarpus*  
LUMI

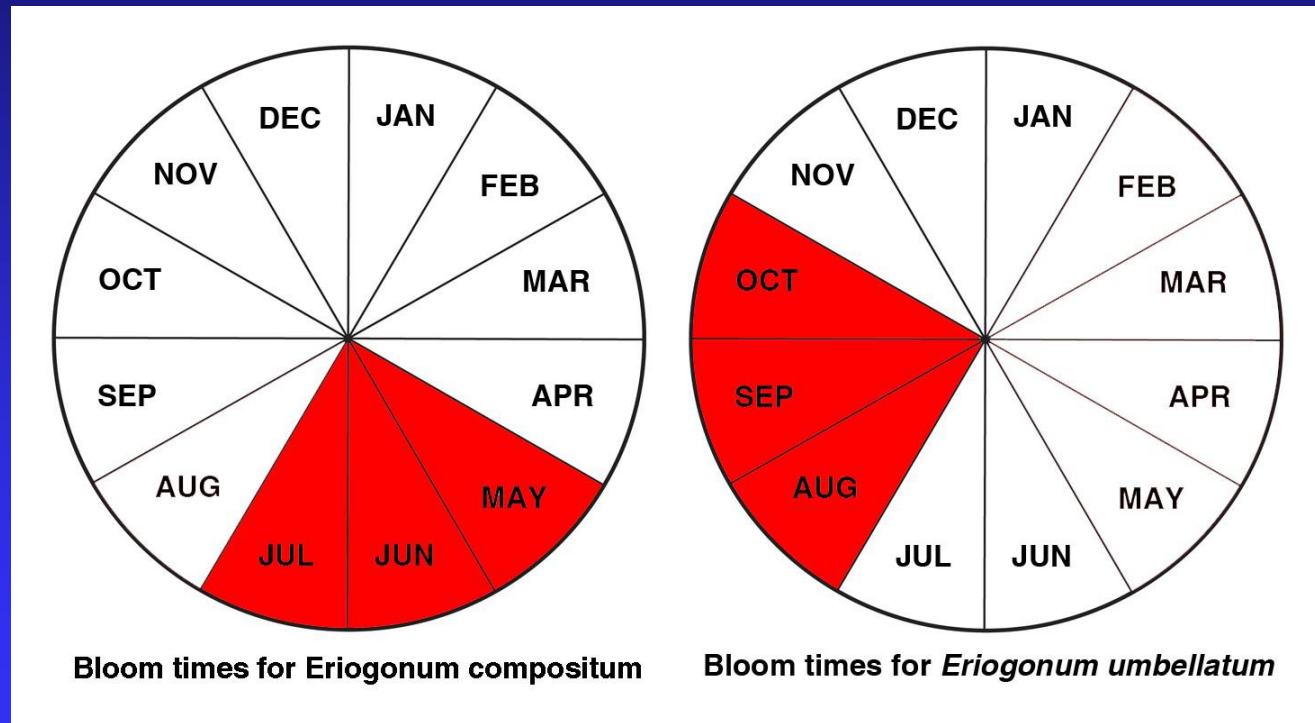


Winecup clarkia,  
*Clarkia purpurea*  
CLPU2



# Characteristics of desirable pollinator plants

## 2. Bloom Times: Early, Mid-season, Late



Blooming Periods Can Vary within Genera

# Characteristics of desirable pollinator plants

## 2. Bloom Times: Late Blooming Period

*Baccharis  
pilularis*,  
Coyote  
brush,  
BAPI



221 species of associated insects (Tilden 1951)



# Characteristics of desirable pollinator plants

## 3. Develop a Perimeter or Border of Woody Pollinator Plants



Lewis' mock orange,  
*Philadelphus lewisii*,  
PHLE4



Mountain lilac,  
*Ceanothus integerrimus*  
CEIN

# Characteristics of desirable pollinator plants

## 4. Combo Plants: Both Hosts & Nectar



Oceanspray,  
*Holodiscus*  
*Discolor*,  
HODI

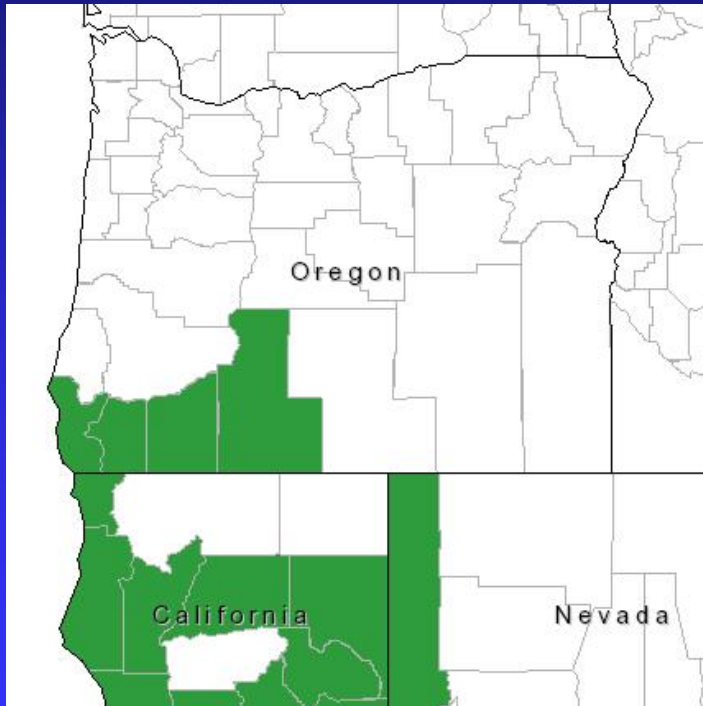
Also  
*Lupinus* spp.  
*Ceanothus*  
spp.





# Characteristics of desirable pollinator plants

## 5. What's Native?



Hummingbird trumpet,  
(*Epilobium canum*),  
EPCA3

Don't Be a Native Nazi!

# Questionable Native Nectar Plants

## *Achillea millefolium*, Common Yarrow



Wildlife Value	
<input checked="" type="checkbox"/>	Berries
<input type="checkbox"/>	Seeds
<input type="checkbox"/>	Nectar for hummingbirds
<input checked="" type="checkbox"/>	Nectar for butterflies
<input type="checkbox"/>	Host for insect larvae
<input type="checkbox"/>	Thickets and shelter
<input type="checkbox"/>	Thorny or protective cover



- ✓ Spreads by Rhizomes
- ✓ Quickly Becomes Invasive



# Native Plants That Are Hard to Work With

*Madia elegans*, Showy Tarweed



- ✓ An Annual
- ✓ Miserable Plant for Mechanical Seed Collection & Processing

# Maintaining Monarch Waystations



Weeding – March, JHSN

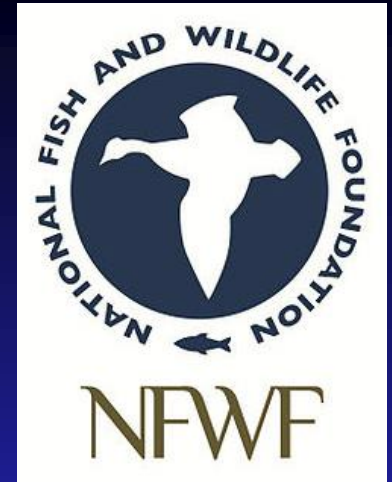
Irrigation:  
Battery-Powered  
Solenoid Valve



<http://www.dripworks.com/>



# National Fish & Wildlife Foundation Grant for Southwest Oregon Pollinator Cooperative



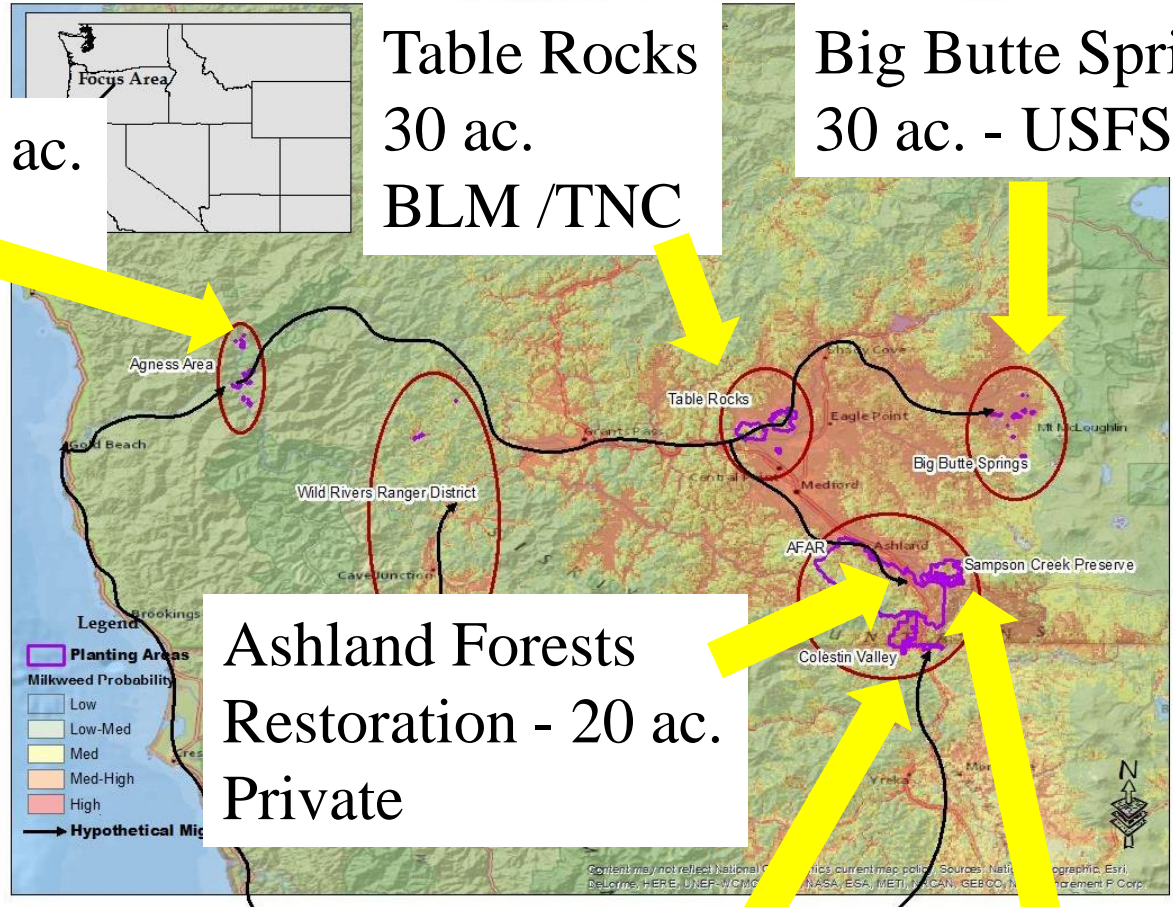
- \$193,000 to restore and enhance 300 acres of Western monarch habitat
- Only Western Grant of \$3MM Monarch Fund
- Administered by Lomakatsi Restoration Project
- Two year Project – Most Work Done in 2017
- Partners Include USFS, USF&WS, BLM, SOMA, Selberg Institute

# NFWF Monarch Grant for Southern Oregon - Project Areas

Agness 30 ac.  
USFS

Table Rocks  
30 ac.  
BLM /TNC

Big Butte Springs  
30 ac. - USFS



Ashland Forests  
Restoration - 20 ac.  
Private

Colestin Restoration  
Projects - 20 ac.  
Private

Sampson Creek  
Preserve - 20 ac.  
Selberg Institute



# Applying the Target Plant Concept in Pollinator Projects

1. Objectives of Outplanting Projects

2. Type of Plant Material

3. Genetic Considerations

4. Limiting Factors on Outplanting Site

5. Timing of Outplanting Window

6. Outplanting Tools and Techniques



Concept Originated from Forester's Site Prescriptions

# NFWF Grant Deliverable: 50 Milkweed Plants per Acre



ASSP Nursery  
Plants on  
Ochoco NF

What Type  
of Plant  
Material is  
Best?



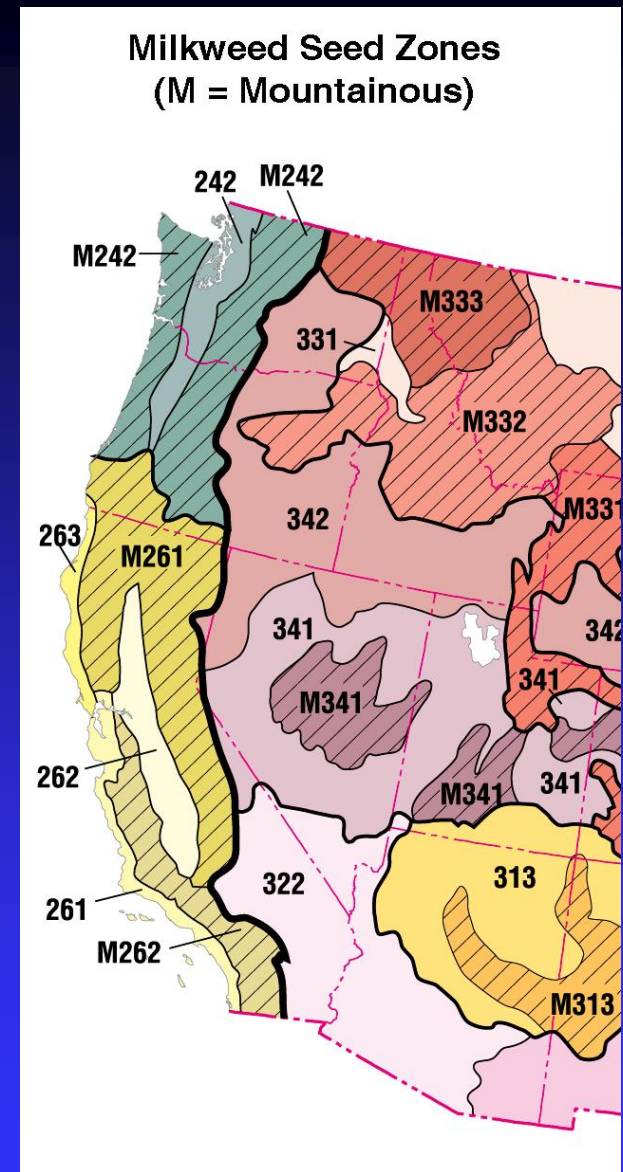
ASSP Rhizomes  
on Rogue River-  
Siskiyou NF



## 2. Type of Plant Material: Seeds

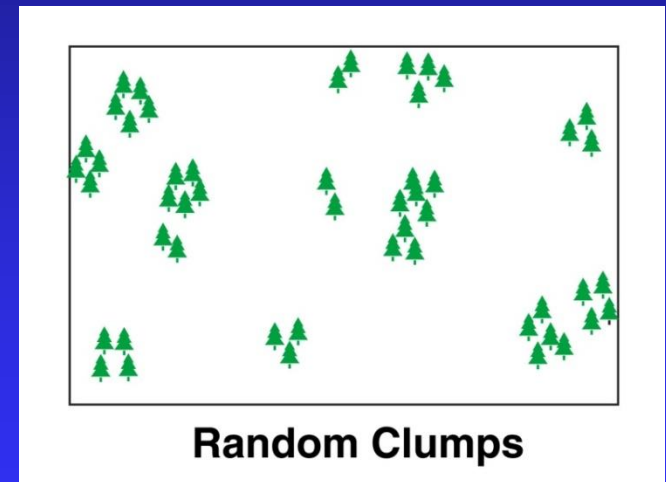
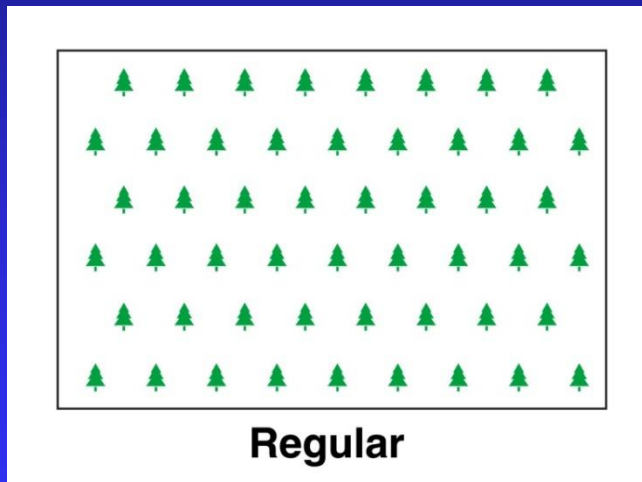


SOMA has Collected  
Source-Identified,  
Locally-Adapted Seeds  
of Native Milkweeds



Source: Monarch Watch

## 2. Seeds: Desired Plant Spacing & Distribution Pattern



- ✓ Broadcast Seeding
- ✓ Hydroseeding

- ✓ Spot Seeding



## 2. Type of Plant Material – Container Stocktypes

### DeePots



### Q-Plugs



### Earthpots



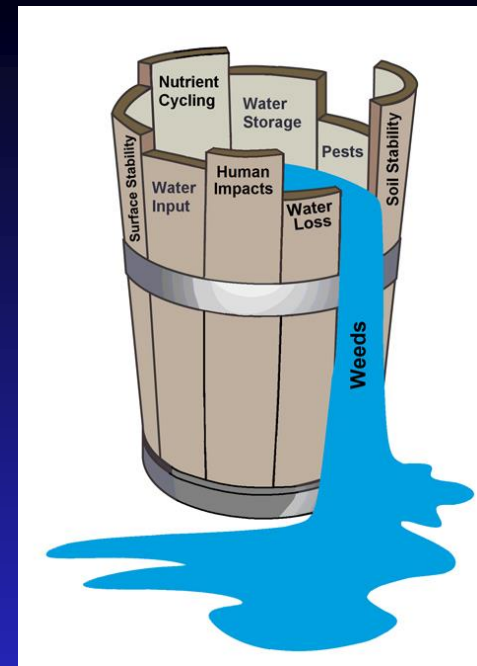
### Deepot Cells



# Container Type vs. Soil Depth



Deep  
Meadow  
Soil



Shallow Rocky Soil





## 2. Type of Plant Material: Rhizomes



**Propagation**

**ASSP  
Rhizome**



**Direct Outplanting**

# NFWF Grant Deliverable: “Documented Monarch Use”



Photo: Robert Coffan

Challenging:  
Eggs Are  
Tiny &  
Caterpillars  
Hide

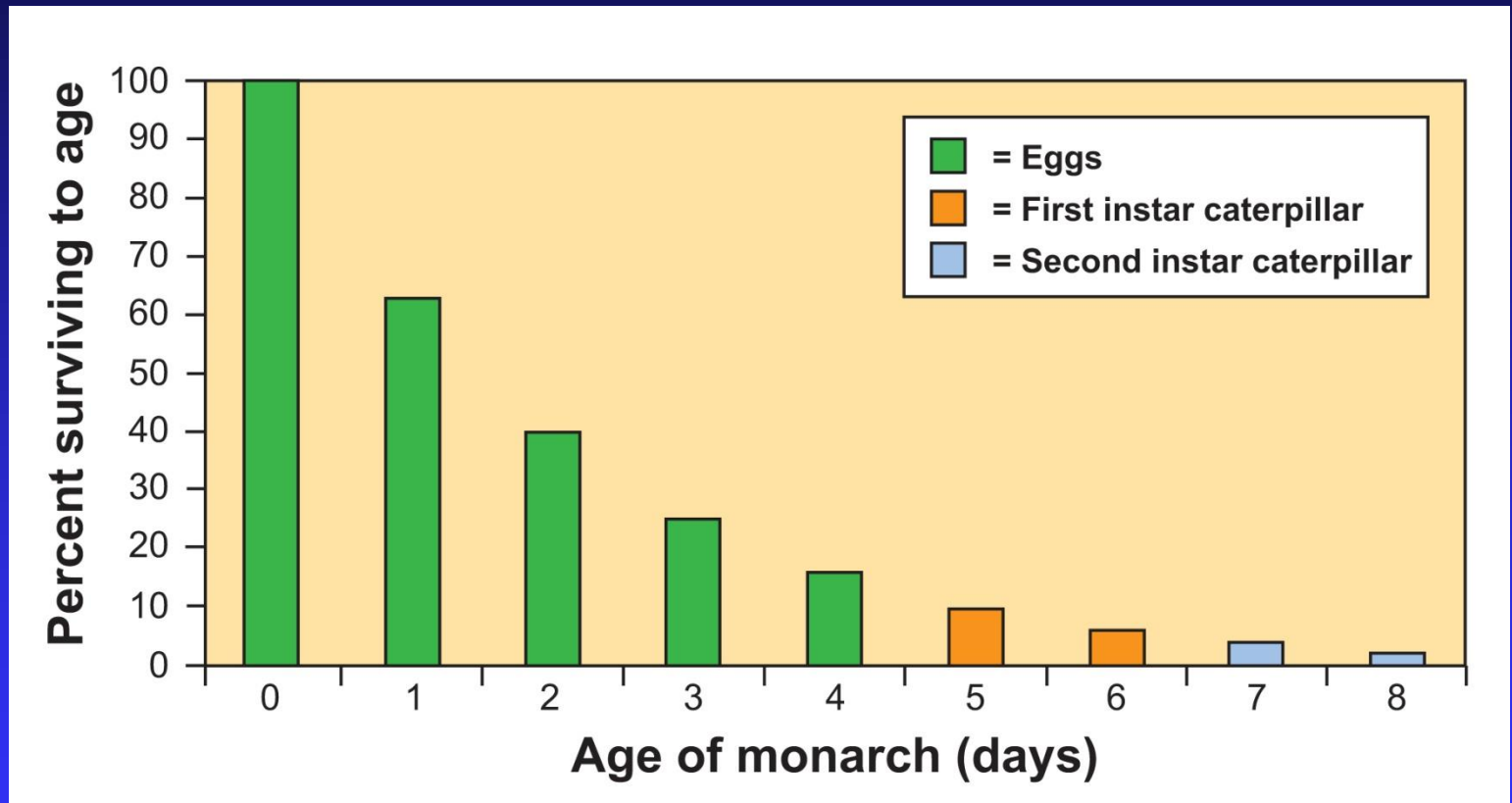


Photo: Suzie Savoie





# Complicating Factor: High Predation of Monarch Eggs & Caterpillars



From De Anda & Oberhauser (2015)

95% Loss of Eggs & Caterpillars in the First Week

# In Conclusion: Pollinator Projects Get People Interested in Native Plants



Tallamy, D. (2014) Gardening for Life





**Thomas D. "Tom" Landis**

**Native Plant**

**Nursery Consulting**

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**Southern Oregon Monarch  
Advocates (SOMA)**

**<http://www.somonarchs.org/>**