



# Science *of the* Seasons:

Explore and connect with *your* natural world through this

June 15, 2015. 8 A.M. to 5 P.M.

Sequoia National Park. Foothills Rec Hall

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Great for educators and nature enthusiasts, this free workshop explores **phenology**, *the study of seasonal biological events like migrations and flowering*. Learn how you can connect your students or community to science and the natural world through observation and data collection .

Register for free through TCOE at <http://tulare.k12oms.org/147-98314>

For park questions, contact: Kelly\_A\_Evans@nps.gov or 559-565-4211.



# Science of the Seasons: Workshop Agenda

Susan Mazer, PhD

Department of Ecology, Evolution and Marine Biology

University of California, Santa Barbara email: mazer@lifesci.ucsb.edu

## Sequoia and Kings Canyon National Parks

Monday, June 15, 2015 | 8 am – 5 pm | Ash Mountain Rec Hall (Three Rivers, CA)

8:00-8:30	Welcome, Workshop Outline (Denise Robertson, Sequoia National Park)
8:30-10:30am:	What is Phenology? (Susan Mazer) <ul style="list-style-type: none"><li>• <b>Phenology (the timing of the seasonal cycles of plants and animals)</b></li><li>• Visualizing phenological variation</li><li>• Linking phenology to climate</li><li>• Ecological consequences of phenological change</li><li>• A few case studies</li></ul>
10:30-10:40	(Break)
10:40 - 12:30	Move outside: hands-on practice monitoring plant phenology
12:30-1:30	LUNCH BREAK 1 hour ( <b>bring a sack lunch</b> )
1:30-2:30	Introduction to the California Phenology Project (CPP) and the USA  Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data (Susan Mazer)
2:30-2:45	(Break)
2:45-4:45	How do I incorporate phenology in my classroom? (Sequoia National Park Educators) <ul style="list-style-type: none"><li>• SPROUTS – Student Phenologist Researching Oaks to Understand Trees &amp; Science</li><li>• Monitoring at your school</li><li>• Field Trips for Phenology</li><li>• Project Based Learning</li></ul>
4:45-5:00	Closing, Questions, and what's next

**OVERVIEW:** In this workshop, you'll learn how to contribute to a nationwide effort to track the effects of climate change on the timing of phenological events in plants, and lead students in plant monitoring projects in your own school or on local field trips.

Topics will include ways to teach about the basics of **phenology (the timing of the seasonal cycles of plants and animals)**; the evidence-based link between phenological events and climate; the long-term effects of climate change on plant phenology; and the risks of phenological mismatches induced by environmental change. The workshop will prepare teachers to conduct their own projects in which students record phenological observations on campuses or in local natural habitats.

This workshop will include presentation, discussion, hands-on practice in the field, and details of the monitoring protocols and on-line database designed by the USA National Phenology Network. We will introduce the California Phenology Project (CPP; [www.usanpn.org/cpp](http://www.usanpn.org/cpp)), a statewide phenological monitoring program based in 8 National Parks and 6 University of California Natural Reserves, where 30 plant species are currently being monitored in across a variety of environmental gradients. We will demonstrate ways that you and your students can monitor plants in your own schoolyard, and on local outdoor field trips.

**Please explore the following two websites before the workshop:**

**The California Phenology Project: [www.usanpn.org/cpp](http://www.usanpn.org/cpp)**

**The USA National Phenology Network: <http://www.usanpn.org>**

# ***The California Phenology Project: tracking the effects of climate on plant phenology through citizen science***

**Susan Mazer, PhD**

*Department of Ecology, Evolution and Marine Biology  
University of California, Santa Barbara* email: [mazer@lifesci.ucsb.edu](mailto:mazer@lifesci.ucsb.edu)

**Santa Monica Mountains National Recreation Area (SAMO), 401 West Hillcrest Dr., Thousand Oaks, CA  
Saturday, May 16, 2015 | 10 am – 4 pm | SAMO Headquarters Training Room**

## **Agenda (Please bring sun screen, a hat, lunch, and a water bottle, preferably filled!)**

10:00 am - Introductions and brief round-robin

10:15-11:15 — How we teach it: **Phenology (the timing of the seasonal cycles of plants and animals)**, visualizing phenological variation, linking phenology to climate change, ecological consequences of phenological change, and a few case studies

11:15-11:30 — Break

11:30-12:45 — **California Phenology Project**: design, use of historical data, species selection for current monitoring, protocols, and a few results to date.

— **USA National Phenology Network**: Nature's Notebook, target species, resources available

12:45-1:30: Drive to Rancho Sierra Vista/Picnic Lunch (bring your own sack lunch)

1:30 -1:45 — Discussion – Ideas for teachers and Santa Monica Mountains interpreters

1:45-2:30 — Practical guide to setting up a public monitoring program: teaching botany for minimalists, best practices and lessons learned

2:30 – 4:00: Hands-on practice, both in monitoring phenology and teaching others how to do it.

**OVERVIEW:** In this workshop, you'll learn how to contribute to a nationwide effort to track the effects of climate change on the timing of phenological events in plants.

Topics will include ways to teach students, friends, or park visitors about: the basics of **phenology (the timing of the seasonal cycles of plants and animals)**; the evidence-based link between phenological events and climate; the long-term effects of climate change on plant phenology; and the risks of phenological mismatches induced by environmental change. The workshop will prepare participants to conduct their own training of students, volunteers, and members of the public to record phenological observations on campuses, at botanical gardens, and in wild habitats.

This workshop will include a presentation, discussion, hands-on practice in the field, and details of the monitoring protocols and on-line database designed by the USA National Phenology Network (USA-NPN; [www.usanpn.org](http://www.usanpn.org)) to which the public and scientists are contributing phenological observations of hundreds of plant and animal species. We will introduce the California Phenology Project (CPP; [www.usanpn.org/cpp](http://www.usanpn.org/cpp)), a statewide phenological monitoring program based in 8 National Parks and 6 University of California Natural Reserves, where 30 plant species are currently being monitored across a variety of environmental gradients. We will describe the planning and implementation of the California Phenology Project, and the standardized protocols of the National Phenology Network will be introduced and practiced. *Please explore the following two websites before the workshop!*

**The California Phenology Project:** [www.usanpn.org/cpp](http://www.usanpn.org/cpp)

**The USA National Phenology Network:** <http://www.usanpn.org>

# JUST FOR FUN: SELECTED ONLINE RESOURCES for climate change & phenology

## **PHENOLOGY**

USA National Phenology Network <https://www.usanpn.org/>

California Phenology Project <https://www.usanpn.org/cpp/>

Additional partners with the USA-NPN <https://www.usanpn.org/partner/current>

## **CLIMATE CHANGE**

Intergovernmental Panel on Climate Change (IPCC) <http://www.ipcc.ch/>

C2ES – Center for Climate & Energy Solutions (formerly Pew Center on Climate Change)  
<http://www.c2es.org/>

## **U.S. CLIMATE CHANGE RESEARCH PROGRAMS & RESOURCE MANAGEMENT ACTIVITIES**

United States Global Change Research Program <http://www.globalchange.gov>

U.S. Department of Interior – Strategic Response to Climate Change  
<http://www.doi.gov/whatwedo/climate/strategy/index.cfm>

U.S. Climate Science Centers <http://www.doi.gov/csc/index.cfm>

U.S. Landscape Conservation Cooperatives <http://www.doi.gov/lcc/index.cfm>

USGS National Climate Change & Wildlife Science Center <http://nccwsc.usgs.gov/>

National Park Service Climate Change Response Program:  
<http://www.nature.nps.gov/climatechange/index.cfm>

## **PUBLIC PARTICIPATION IN SCIENTIFIC RESEARCH (CITIZEN SCIENCE)**

Citizen Science Central (Cornell Lab of Ornithology) <http://www.birds.cornell.edu/citscitoolkit>

## **EDUCATION/OUTREACH RESOURCES**

350.org <http://www.350.org/>

Climate Central <http://www.climatecentral.org/>

Union of Concerned Scientists [http://www.ucsusa.org/global\\_warming/](http://www.ucsusa.org/global_warming/)

Climate Science Watch <http://www.climatesciencewatch.org>

Climate Change Education <http://www.climatechangeeducation.org>

California Climate Change Portal <http://www.climatechange.ca.gov>

California Climate Change & Energy: Education Resources Catalog <http://globalwarmingcalifornia.net>

# Detecting plant responses to climate change: the California Phenology Project (CPP)

California Native Plant Society, Channel Islands Chapter

Where: SBBG Blaksley Library

Date: Thursday, November 20

Time: 7:00pm – 8:30pm

Dr. Susan Mazer, Field Director, the California Phenology Project –and–  
Professor of Plant Ecology & Evolution, University of California, Santa Barbara



**The California Phenology Project (CPP)** is a new state-wide monitoring program funded by the National Park Service (NPS) to track the effects of climate change on the seasonal behavior of our flora and fauna.

**Come to this presentation to learn about phenology, the CPP, and how to participate.**

Phenology is the study of the timing of seasonal plant and animal life cycle events, such as the flowering and fruiting of plants and the hatching or fledging of birds.

- What species are we monitoring in California?
- How does climate affect their leafing, flowering and fruiting?
- Which species are most sensitive to climatic conditions?

## **The California Phenology Project needs you!**

In order to detect the causes and consequences of variation in plant and animal phenology, scientists require large quantities of data, across large geographic areas. To achieve this goal, the CPP invites residents across California to aid in observing key phenological events in ecologically important plants:

- Since 2011, citizen scientists, educators, and national park staff have contributed over 460,000 observations to the California Phenology Project
- **Training Workshop 1:00pm – 5:00pm, January 31, Blaksley Library**



Sponsored by the Tejon Ranch Conservancy

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## **The Fingerprint of Climate Change: Introduction to the California Phenology Project at Tejon Ranch**

**Dr. Susan Mazer**

Field Director, The California Phenology Project and  
Professor of Plant Ecology & Evolution, University of California, Santa Barbara  
Email: [mazer@lifesci.ucsb.edu](mailto:mazer@lifesci.ucsb.edu)

**The California Phenology Project** (CPP; [www.usanpn.org/cpp](http://www.usanpn.org/cpp)) is a statewide monitoring program funded by the National Park Service to track the effects of climate change on the seasonal cycles of California native plants. Phenology is the study of the timing and duration of seasonal plant and animal life cycle events. In order to detect variation in these events, scientists require large numbers of observations recorded across large geographic areas. Since 2011, citizen scientists, educators, public school students, and national park staff in California have contributed over 500,000 observations to the California Phenology Project, and we are now able to see that many of our monitored plant species are highly sensitive to climate. **Come and learn how you can contribute to this effort in your back yard, schoolyard, local park, national park, or at Tejon Ranch.**

**DATE: Saturday, September 13, 2014**

**PLACE: Arvin Learning Center, 141 North A St, Arvin, CA 93203**

**TIME: 9:00 – 11:30 am (presentation): 12:00 – 3:30 pm (in the field)**

# Using phenology to detect plant responses to climate change: the California Phenology Project

**The California Phenology Project** (CPP; [www.usanpn.org/cpp](http://www.usanpn.org/cpp)) is a new state-wide monitoring program funded by the National Park Service (NPS) to track the effects of climate change on the seasonal behavior of our flora and fauna (learn about the *nationwide* USA-National Phenology Network at: [www.usanpn.org](http://www.usanpn.org)). **Phenology** is the study of the timing of seasonal plant and animal life cycle events, such as the flowering and fruiting of plants and the hatching or fledging of birds.

In order to detect the causes and consequences of variation in plant and animal phenology, scientists require large quantities of data, across large geographic areas. To achieve this goal, the CPP invites residents across California to aid in observing key phenological events in ecologically important plants. **Since 2011, citizen scientists, educators, and national park staff have contributed over 460,000 observations to the California Phenology Project, and we now see that many of our monitored plant species are highly sensitive to climate.**

The CPP has begun this work in seven California National Parks: Joshua Tree National Park, Santa Monica Mountains National Recreation Area, Golden Gate National Recreation Area, John Muir Historic Monument, Redwood National Park, Sequoia and Kings Canyon National Parks, and Lassen Volcanic National Park, and we are recruiting volunteers interested in participating in the parks, in University of California Natural Reserves, in other wild lands, or in their backyards and communities. Volunteers assist by monitoring plants using the standardized methods developed by the USA-National Phenology Network and used across the U.S., allowing observations in California to be compared observations collected elsewhere.

**Come and learn: What species are we monitoring in California? How does climate affect their leafing, flowering and fruiting? Which species are most sensitive to climatic conditions?**

**Where:** Santa Barbara Botanic Garden, Blaksley Library

**Date:** Monday, April 28

**Time:** 5:30 pm

**Who:** Dr. Susan Mazer, Field Director, The California Phenology Project and Professor of Plant Ecology & Evolution, University of California, Santa Barbara



# A California Phenology Project

## *Educator's Workshop:* How to use phenology and community-driven science in your education programs

*Please join us,*

April 17-18, 2014

9AM—3PM

Sequoia National Park,  
Ash Mountain Recreation Hall

*This free workshop explores*

- **Phenology**, the study of seasonal biological events like migrations and flowering
- Using phenology to track changes in climate
- How you can connect your students and audience to community-driven science

*For information and registration*

Contact **Kelly Evans**

Kelly\_A\_Evans@nps.gov  
(559)-565-4211

*Presented by*

**Professor Susan Mazer, PhD**

[Dept. of Ecology, Evolution and Marine Biology  
University of California, Santa Barbara, ]

**CPP Field Coordinators  
National Park Service Staff**



*Great for educators, interpreters, & nature enthusiasts!*



# *The California Phenology Project*

## Tracking phenological activity and its link to climate change at Redwood

*Susan Mazer*  
*University of California, Santa Barbara*  
*mazer@lifesci.ucsb.edu*

[www.usanpn.org/cpp](http://www.usanpn.org/cpp)





## ***The California Phenology Project: tracking the effects of climate on plant phenology through citizen science***

**Presented by Susan Mazer, Phd  
Dept. of Ecology, Evolution and Marine Biology  
University of California, Santa Barbara**



**To learn more, join us at the phenology workshop on Saturday, April 5, 2014 from 9am to 3pm!**

National Park Service Headquarters, 401 W. Hillcrest Drive  
Thousand Oaks, CA 91360 Telephone: 805-370-2301

In this full day workshop, you'll learn how to contribute to a nationwide effort to track the effects of climate change on the timing of phenological events (leaf out, flowering and fruit production cycles) in plants. Learn the basics of phenology, the long term effects of climate change on phenology, and what happens when these events are mistimed. In addition, this workshop will prepare participants to conduct their own training of students, volunteers and members of the public at campuses, botanical gardens and in wild habitats. Picnic lunch and short drive to nearby parklands for hands-on practice.

*Space is limited to 20 participants.* If you would like to attend the workshop contact Crystal Anderson at [crystal\\_anderson@partner.nps.gov](mailto:crystal_anderson@partner.nps.gov) or Dr. Susan Mazer, PhD at [mazer@lifesci.ucsb.edu](mailto:mazer@lifesci.ucsb.edu)

**Workshop: The California Phenology Project**

Santa Monica Mountains National Recreation Area

**SATURDAY, APRIL 5, 2014 | 9 am – 3 pm | SMM Park Headquarters**

**AGENDA**

9:00 start	Introductions and brief round-robin
9:20-10:20	Phenology, visualizing phenological variation, linking phenology to climate change, ecological consequences of phenological change, and a few case studies
10:20-10:35	Break
10:35-11:30	<b>California Phenology Project:</b> design, use of historical data, species selection for current monitoring, protocols and a few results to date. <b>USA National Phenology Network:</b> entering data on Nature's Notebook (on-line or using the Nature's Notebook app), target species, and resources available.
11:30-11:45	Break and discussion
11:45-12:30	Practical guide to setting up a public monitoring program: teaching botany for minimalists; best practices and lessons learned.
12:30-3:00	Picnic lunch and short drive to nearby parklands to practice hands-on phenological monitoring and to plan for future participation in the California Phenology Project at Santa Monica Mountains NRA or in your school yard, back yard, or nearby park or public lands.

Dr. Susan J. Mazer, UCSB, email:mazer@lifesci.ucsb.edu



*Quercus lobata* at Cheeseboro Canyon Spring 2014



**SANTA MONICA  
MOUNTAINS**  
A NATIONAL RECREATION AREA

# Volunteer Opportunity

**Volunteer For A Long Term Scientific Data Collection Project  
Tracking Plant Responses To Climate Change Through The  
California Phenology Project**



## **Volunteer Duties:**

- Hike alone or with a buddy along maintained trails. Trails range in length from 1 to 2 miles.
- Record what you see on a data sheet or your smartphone.
- Enter your data into the National Phenology Database.
- 2-3 hour weekly time commitment
- No tools needed - just a pen, data sheet and enthusiasm!

**To learn more join us at the phenology workshop on  
Saturday April 5 from 9am - 3pm!**

National Park Service headquarters, 401 west Hillcrest Drive, Thousand Oaks, CA 91360  
805-370-2300 or 805-370-2301

In this full day workshop, you'll learn how to contribute to a nationwide effort to track the effects of climate change on the timing of phenological events (leaf out, flowering and fruit production cycles) in plants. Learn the basics of phenology, the long term effects of climate change on phenology, and what happens when these events are mis-timed. In addition, this workshop will prepare participants to conduct their own training of students, volunteers and members of the public at campuses, botanical gardens and in wild habitats. Picnic lunch and short drive to near by park lands for hands-on practice.

If you would like to attend the workshop or learn more about the volunteer position contact Crystal Anderson at [crystal\\_anderson@partner.nps.gov](mailto:crystal_anderson@partner.nps.gov) or Dr. Suzan Mazer, PhD at [mazer@lifesci.ucsb.edu](mailto:mazer@lifesci.ucsb.edu).

The California Phenology Project: [www.usanpn.org/cpp](http://www.usanpn.org/cpp)

The USA National Phenology Network: <http://www.usanpn.org>

## SELECTED ONLINE RESOURCES for climate change & phenology workshop

### **PHENOLOGY**

USA National Phenology Network <https://www.usanpn.org/>

California Phenology Project <https://www.usanpn.org/cpp/>

Additional partners with the USA-NPN <https://www.usanpn.org/partner/current>

### **CLIMATE CHANGE**

Intergovernmental Panel on Climate Change (IPCC) <http://www.ipcc.ch/>

C2ES – Center for Climate & Energy Solutions (formerly Pew Center on Climate Change)  
<http://www.c2es.org/>

### **U.S. CLIMATE CHANGE RESEARCH PROGRAMS & RESOURCE MANAGEMENT ACTIVITIES**

United States Global Change Research Program <http://www.globalchange.gov>

U.S. Department of Interior – Strategic Response to Climate Change  
<http://www.doi.gov/whatwedo/climate/strategy/index.cfm>

U.S. Climate Science Centers <http://www.doi.gov/csc/index.cfm>

U.S. Landscape Conservation Cooperatives <http://www.doi.gov/lcc/index.cfm>

USGS National Climate Change & Wildlife Science Center <http://nccwsc.usgs.gov/>

National Park Service Climate Change Response Program:  
<http://www.nature.nps.gov/climatechange/index.cfm>

### **PUBLIC PARTICIPATION IN SCIENTIFIC RESEARCH (CITIZEN SCIENCE)**

Citizen Science Central (Cornell Lab of Ornithology) <http://www.birds.cornell.edu/citscitoolkit>

### **EDUCATION/OUTREACH RESOURCES**

350.org <http://www.350.org/>

Climate Central <http://www.climatecentral.org/>

Union of Concerned Scientists [http://www.ucsusa.org/global\\_warming/](http://www.ucsusa.org/global_warming/)

Climate Science Watch <http://www.climatesciencewatch.org>

Climate Change Education <http://www.climatechangeeducation.org>

California Climate Change Portal <http://www.climatechange.ca.gov>

California Climate Change & Energy: Education Resources Catalog <http://globalwarmingcalifornia.n>



# **2014 Tulare County Audubon Society Meeting**

Sponsored by the Audubon Society, Visalia CA

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## **The Fingerprint of Climate Change: The California Phenology Project at Sequoia and Kings Canyon National Park**

**Dr. Susan Mazer**

Field Director, The California Phenology Project and  
Professor of Plant Ecology & Evolution, University of California, Santa Barbara

**The California Phenology Project** (CPP; [www.usanpn.org/cpp](http://www.usanpn.org/cpp)) is a new state-wide monitoring program funded by the National Park Service to track the effects of climate change on the seasonal behavior of our flora and fauna. Phenology is the study of the timing of seasonal plant and animal life cycle events. In order to detect variation in these events, scientists require large quantities of data gathered across large geographic areas. Since 2011, citizen scientists, educators, and national park staff in California have contributed over 460,000 observations to the California Phenology Project, and we are now able to see that many of our monitored plant species are highly sensitive to climate. **Come and learn how you can contribute to this effort in your back yard, school yard, local park, or national park.**

**DATE: Friday, April 18, 2014**

**PLACE: Tulare Co. Office of Education, 2637 W. Burrel, Visalia**

**TIME: 7:00 pm**

**NatureBridge Workshop**  
**August 9, 2013**  
**9am - 3pm**  
**Adolfo Camarillo High School**  
**Agricultural Classroom/Greenhouse**  
**Agenda**

- Welcome & Light Breakfast
- NatureBridge Program Overview & Ice Breaker  
*-Meg Jakubowski, NatureBridge*
- Public participation in scientific research (PPSR)  
*-Meg Jakubowski, NatureBridge*
- California Phenology Program (CPP) Overview  
*-Dr. Susan Mazer, UCSB/CPP*
- Plant Data Collection  
*-Dr. Susan Mazer, UCSB/CPP*
- Lunch
- Phenology, Plant Data Analysis & Global Climate Change  
*-Meg Jakubowski, NatureBridge & Dr. Susan Mazer, UCSB/CPP*
- Curriculum Development & Next Generation Science Standards (NGSS) Alignment  
*-Meg Jakubowski, NatureBridge & Nathan Inouye, OUHSD Learning Design Coach*

**Workshop Goals:**

- Teachers will learn a method to incorporate PPSR and real world scientific data collection into their classrooms
- Teachers will see phenology as an avenue to teach climate science and data analysis
- Teachers will create their own lesson plans and share with colleagues

National Park Service U.S. Department of the Interior



# Joshua Tree

National Park  
California

## Explore This Park

There are park alerts in effect.

[SHOW ALERTS »](#)

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[Plan Your Visit](#)

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[History & Culture](#)

[Nature & Science](#)

[For Teachers](#)

[For Kids](#)

[News](#)

[News Releases](#)

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## Free One-Day Workshop at Joshua Tree National Park

**Date:** January 27, 2014

[Subscribe](#)  | [What is RSS](#)

**Explore phenology, "the science of the seasons", at Joshua Tree National Park in a free, one-day workshop.** Engage in citizen science and learn how you can volunteer to help the park detect the impacts of climate change by observing the seasonal activities of the park's desert plants, from bud-burst to flowering and fruiting. The California Phenology Project has been launched to implement a monitoring program focused on national parks in California.

Dr. Susan Mazer, a professor of plant ecology, genetics, and evolution at University of California, Santa Barbara is researching the processes and results of evolution by natural selection, specifically as it pertains to vegetation. She will lead this workshop and share her extensive knowledge of species and plant communities ranging from South American tropical rainforests, to remote regions of the southern Sierra Nevada, to the central coast of California.

Join us on Saturday, February 1, 2014, at Joshua Tree National Park headquarters in Twentynine Palms. The group will meet at the Oasis of Mara from 1-5:00 pm.

Bring snacks, water, sunscreen, appropriate layered clothing for the predicted temperatures, a notebook and pen. If interested in this opportunity, please contact Josh Hoines at 760-367-5564, or at [Josh\\_Hoines@nps.gov](mailto:Josh_Hoines@nps.gov).

### Did You Know?



*Five of North America's 158 desert fan palm oases are located in Joshua Tree National Park, where fault lines force water to the surface. [More...](#)*

[Frequently Asked Questions](#)

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Last Updated: 01/29/2014



# From Bud to Bloom:

## Phenology at Joshua Tree National Park with Dr. Susan Mazer

**Saturday, February 1, 1—5pm, Joshua Tree National Park Headquarters at the Oasis of Mara in Twentynine Palms**

Explore **phenology**, “the science of the seasons”, at Joshua Tree National Park in this free, one-day workshop. Learn how you can volunteer to help the park detect the impacts of climate change by observing the seasonal activities of the park’s desert plants, from bud-burst to flowering and fruiting. This workshop will review botanical basics, the link between phenology and climate change, and examples of phenological responses to climate change across the globe. Hands-on experience investigating plants in the park will be included!

*Dr. Susan Mazer is a professor of plant ecology, genetics, and evolution at University of California, Santa Barbara. Her research aims to detect the processes and results of evolution by natural selection, particularly for plant reproductive traits that contribute to the adaptation of plants to stressful environments, such as seed size, age at flowering, flower size, and pollen and ovule production. She has worked with a wide variety of species and plant communities to detect reproductive and physiological adaptations, ranging from South American tropical rainforests, to remote regions of the southern Sierra Nevada, to the central coast of California.*

*The California Phenology Project has been launched to implement a monitoring program focused on California National Parks. Our goal is to engage park visitors, dedicated volunteers, informal science educators, teachers, and park staff in a long-term program to track the effects of climate change on the annual timing of budburst, leafing out, flowering, and fruiting in targeted wild and exotic plant species throughout the state.*

**Please RSVP for this workshop by contacting Josh Hoines at (760) 367-5564 or [Josh\\_Hoines@nps.gov](mailto:Josh_Hoines@nps.gov).**



# A California Phenology Project workshop: Using phenology to detect plant responses to climate change

**When: Saturday, July 21st, Introductory workshop 10am-12pm; Field workshop 1pm-4pm**

The Field workshop from 1pm-4pm is complementary to the Thursday and Saturday Introductory workshops. If you attend the Thursday workshop, you have the option to attend only the afternoon session on Saturday and meet at the Lobos Dunes trail head in the Presidio

**Who:** professional scientists, educators, citizen scientists, and nature enthusiasts

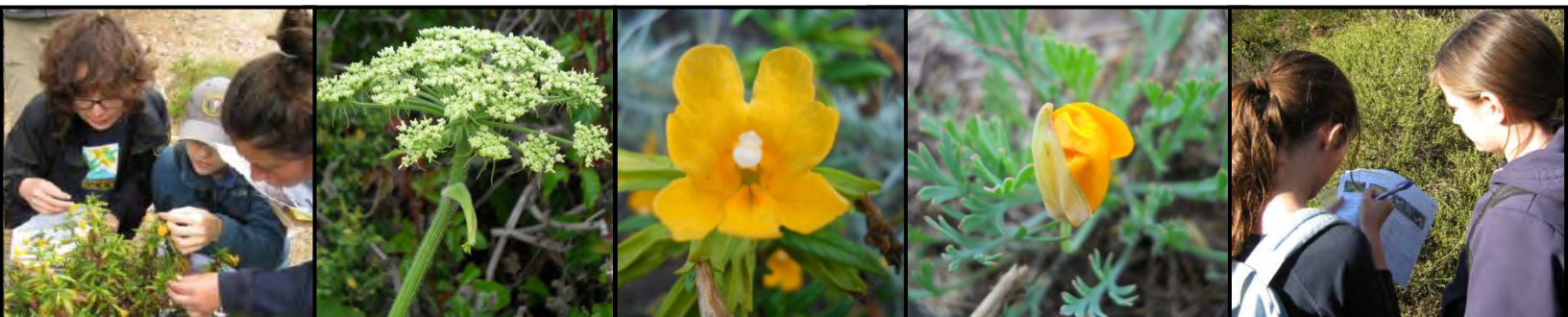
**Where:** Golden Gate National Recreation Area, Building 1216 in the Presidio (directions below)

**Cost:** Free!

**RSVP by Tuesday July 17th**

**CPP website:** [www.usanpn.org/cpp](http://www.usanpn.org/cpp)

Note: we recommend that you explore the CPP website prior to the workshop to learn a bit about this project!



## Workshop Agenda

### INTRODUCTORY SESSION

- 9:45 am: Arrive at The Natural Resources Building 1216, Presidio (*directions in Thur. workshop flyer*)
- 10:00am-10:15am: Introductions & What to Expect
- 10:15am-12:00pm: Presentation and discussion:
- The link between climate change and phenology
  - Introduction to the California Phenology Project (CPP) and the USA National Phenology Network (USA-NPN)
- 12:00pm-12:45pm: **LUNCH BREAK** (everyone should bring a bag lunch!)

### FIELD SESSION

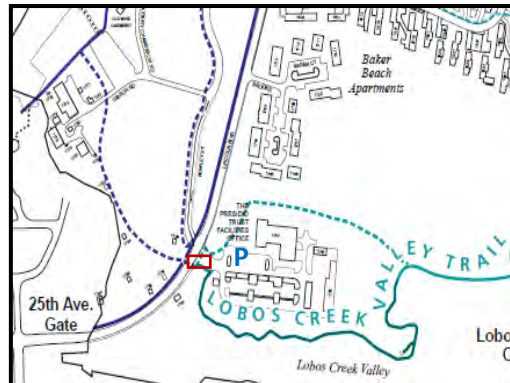
- 1:00pm-4:00pm: Meet at Lobos Dunes trail head (*directions below*)
- Wrap-up morning content, discussion, and opportunity for Q&A
- Move outside: hands-on practice monitoring plant phenology in the Presidio
  - Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data
  - Logistics of implementing phenological monitoring at natural areas (e.g., learn how to establish monitoring sites, label plants, and record important field information)
  - How to get involved in the CPP, as an educator, scientist, student, or natural area representative
  - Developing educational and interpretive activities around phenological monitoring

**Workshop Facilitators:** Dr. Susan Mazer and Dr. Liz Matthews, CPP Field Coordinators, University of California, Santa Barbara; email: [phenology@eemb.ucsb.edu](mailto:phenology@eemb.ucsb.edu)

**Contact:** For more information about the workshop and to RSVP, please contact Ruby Kwan at [rkwanppintern@gmail.com](mailto:rkwanppintern@gmail.com)

**Directions:** The Lobos Dunes trail is located near the 25<sup>th</sup> Avenue gate into the Presidio. Find directions to the Lobos Dunes trail here: <http://www.presidio.gov/explore/trails/Pages/mountain-lake-trail.aspx>.

If you are traveling from the 25<sup>th</sup> Avenue gate on Lincoln Ave., the Lobos Dunes trail will be on the right. If traveling towards the gate on Lincoln Ave., drive past the Baker Beach Apartments and the trail will be on the left.



**P** Locations with available PARKING  
**□** Lobos Dunes trail head

# A California Phenology Project Workshop:

Using phenology to detect plant responses to climate change

**Who:** educators (formal and informal), citizen scientists and nature enthusiasts

**Where:** Sequoia National Park (further location to be determined)

**When:** Friday, July 6, 2012, 9am–3pm

**CPP website:** [www.usanpn.org/cpp](http://www.usanpn.org/cpp)

Note: we recommend that you explore the CPP website prior to the workshop to learn a bit about this project!



**Phenology** is the study of seasonal or periodic biological events such as flowering, leaf-out, insect emergence, and animal migration. Put simply, *phenology is the science of the seasons.*

## Workshop Agenda

- 8:45: Arrive at training location—to be determined
- 9:00: Introductions and what to expect
- 9:15–12:00pm: Presentations, hands-on practice, and discussion
- The link between climate change and phenology
  - Introduction to the California Phenology Project (CPP) and the USA National Phenology Network (USA-NPN)
  - Move outside: hands-on practice monitoring plant phenology
  - Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data
- 12:00–1:00pm: **LUNCH BREAK** (everyone should bring a bag lunch)
- 1:00–3:00pm: Wrap up morning content, discussion and opportunity for question and answer
- Logistics of implementing phenological monitoring at natural areas
  - How to get involved in the CPP, as an educator, scientist, student, or natural area representative
  - Developing educational and interpretive activities around phenological monitoring

**Workshop Facilitators:** Dr. Susan Mazer and Dr. Liz Matthews with the University of California at Santa Barbara, CPP Field Coordinators as well as National Park Service Staff

**To Register:** email Denise Robertson at [Denise\\_Robertson@nps.gov](mailto:Denise_Robertson@nps.gov) or call 559-565-3132

**Registration deadline is June 22, 2012**



# Two California Phenology Project events at John Muir NHS

## Using phenology to detect plant responses to climate change

**Who:** professional scientists, educators, citizen scientists, and nature enthusiasts

**Where:** John Muir National Historic Site, Martinez, CA (see directions below)

**When:** Thursday July 19<sup>th</sup> (6 - 7:30pm) and Friday July 20<sup>th</sup> (9-12:00pm)

**CPP website:** [www.usanpn.org/cpp](http://www.usanpn.org/cpp)

Note: we recommend that you explore the CPP website prior to these events to learn a bit about this project!



### Thursday evening presentation:

- 6:00pm: Introductions
- 6:15pm-7:30pm: 1-hour presentation, followed by question and answer session
- What is phenology? Why monitor phenology?
  - The link between climate change and phenology
  - Introduction to the California Phenology Project (CPP) and the USA National Phenology Network (USA-NPN)
  - How to get involved in the CPP effort

### Friday morning workshop:

- 8:45am Arrive at Visitor Center, John Muir National Historic Site (see detailed directions below)
- 9:00am – 12:00pm: Presentation, hands-on practice monitoring plant phenology, and discussion
- Brief introduction to the study of phenology, the link between climate change and phenology, and the California Phenology Project at John Muir NHS
  - How to monitor phenology using the USA National Phenology Network protocols
  - *Move outside for hands-on practice monitoring plant phenology*
  - Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data
  - Discussion: how to get involved in the CPP effort, on your own or at John Muir NHS

**Both events are free and open to the public (see RSVP information below). The Thursday and Friday events are complementary, and participants may choose to attend both events. There will also be CPP workshops at the Presidio on Thursday, July 19<sup>th</sup> and Saturday July 21<sup>st</sup> (see [www.usanpn.org/cpp/news](http://www.usanpn.org/cpp/news) for more information).**

**Contact:** For more information about the workshop and to RSVP, please contact Fernando Villalba at [fernando\\_villalba@nps.gov](mailto:fernando_villalba@nps.gov)

**Workshop Facilitators:** Dr. Susan Mazer and Dr. Liz Matthews, CPP Field Coordinators, University of California, Santa Barbara; email: [phenology@eemb.ucsb.edu](mailto:phenology@eemb.ucsb.edu)

**Directions to Visitor Center, John Muir National Historic Site:** From San Francisco, follow I-80 E (Oakland - San Francisco Bay Bridge) to eastbound Highway 4. Exit at Alhambra Avenue, turning left at bottom of the ramp. Cross beneath highway. The park is immediately on your left. Visit <http://www.nps.gov/jomu/planyourvisit/index.htm> for more information, including directions using public transportation.





# 2013 Yosemite Forum

Sponsored by Resources Management and Science, Yosemite National Park

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An interactive lecture series designed to bring evolving knowledge of the Sierra Nevada to the public and the park.

## The Fingerprint of Climate Change: The California Phenology Project at Yosemite

**Dr. Susan Mazer**

Field Director, The California Phenology Project and  
Professor of Plant Ecology & Evolution, University of California, Santa Barbara

**The California Phenology Project** (CPP; [www.usanpn.org/cpp](http://www.usanpn.org/cpp)) is a new state-wide monitoring program funded by the National Park Service to track the effects of climate change on the seasonal behavior of our flora and fauna. Phenology is the study of the timing of seasonal plant and animal life cycle events. In order to detect variation in these events, scientists require large quantities of data gathered across large geographic areas. Since 2011, citizen scientists, educators, and national park staff have contributed over 420,000 observations to the California Phenology Project, and we are now able to see that many of our monitored plant species are highly sensitive to climate. Come and learn how Yosemite can contribute to this effort!

**Tuesday, September 10, 2013**  
**Auditorium, Yosemite Valley**  
**Noon to 1 p.m.**

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Yosemite Forum is a partnership among:

- ☞ Yosemite National Park, Resources Management and Science Division
- ☞ USGS, Western Ecological Research Center, Yosemite Field Station
- ☞ University of California, Sierra Nevada Research Institute
- ☞ The Yosemite Conservancy



# A California Phenology Project workshop: Using phenology to detect plant responses to climate change

**When: Thursday, July 19<sup>th</sup>, 9am-12pm**

**There are two opportunities to attend the Introductory workshop – Thur. 9am-12pm or Sat. 10am-12pm**

**Who: professional scientists, educators, citizen scientists, and nature enthusiasts**

**Where: Golden Gate National Recreation Area, Building 1216 in the Presidio (directions below)**

**Cost: Free!**

**RSVP by Tuesday July 17th**

**CPP website: [www.usanpn.org/cpp](http://www.usanpn.org/cpp)**

**Note: we recommend that you explore the CPP website prior to the workshop to learn a bit about this project!**



## Workshop Agenda

### INTRODUCTORY SESSION

- 8:45 am: Arrive at The Natural Resources Building 1216, Presidio (*directions below*)
- 9:00 am: Introductions & What to Expect
- 9:15 am-12:00 pm: Presentation and discussion:
- The link between climate change and phenology
  - Introduction to the California Phenology Project (CPP) and the USA National Phenology Network (USA-NPN)
  - Move outside: hands-on practice monitoring plant phenology at the Presidio Nursery!
  - Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data

**Workshop Facilitators:** Dr. Susan Mazer and Dr. Liz Matthews, CPP Field Coordinators, University of California, Santa Barbara; email: [phenology@eemb.ucsb.edu](mailto:phenology@eemb.ucsb.edu)

**Contact:** For more information about the workshop and to RSVP, please contact Ruby Kwan at [rkwanppsintern@gmail.com](mailto:rkwanppsintern@gmail.com)

**Directions:** The Natural Resources Building 1216 is located at Fort Scott in the northwest section of the Presidio. The address is 1216 Ralston Ave., San Francisco. Find directions to Fort Scott here: <http://www.presidio.gov/explore/Pages/fort-scott.aspx>. Once at Fort Scott, follow the map on the right to find parking and the location of Building 1216.



P Locations with available PARKING  
□ Building 1216



# A California Phenology Project workshop: Using phenology to detect plant responses to climate change

**When: Saturday, July 21st, Introductory workshop 10am-12pm; Field workshop 1pm-4pm**

The Field workshop from 1pm-4pm is complementary to the Thursday and Saturday Introductory workshops. If you attend the Thursday workshop, you have the option to attend only the afternoon session on Saturday and meet at the Lobos Dunes trail head in the Presidio

**Who:** professional scientists, educators, citizen scientists, and nature enthusiasts

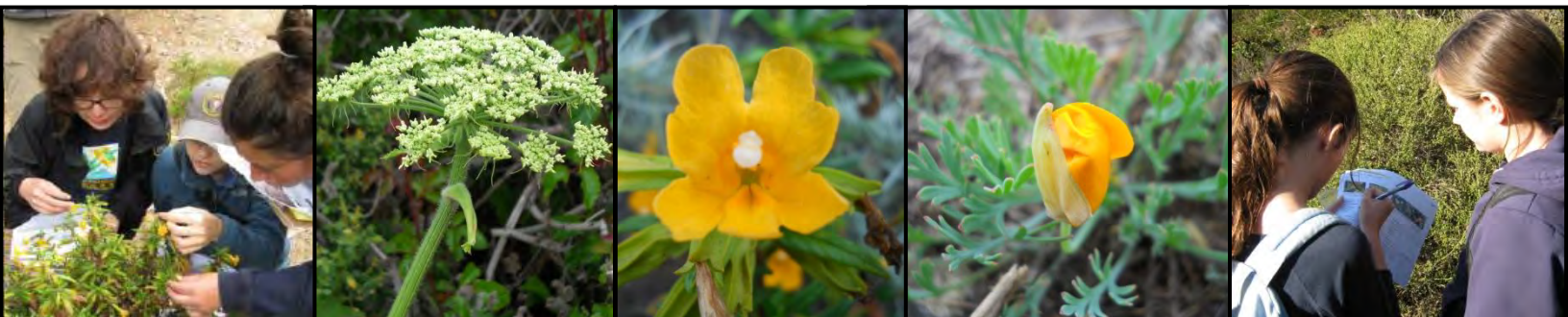
**Where:** Golden Gate National Recreation Area, Building 1216 in the Presidio (directions below)

**Cost:** Free!

**RSVP by Tuesday July 17th**

**CPP website:** [www.usanpn.org/cpp](http://www.usanpn.org/cpp)

Note: we recommend that you explore the CPP website prior to the workshop to learn a bit about this project!



## Workshop Agenda

### INTRODUCTORY SESSION

- 9:45 am: Arrive at The Natural Resources Building 1216, Presidio (*directions in Thur. workshop flyer*)
- 10:00am-10:15am: Introductions & What to Expect
- 10:15am-12:00pm: Presentation and discussion:
- The link between climate change and phenology
  - Introduction to the California Phenology Project (CPP) and the USA National Phenology Network (USA-NPN)
- 12:00pm-12:45pm: **LUNCH BREAK** (everyone should bring a bag lunch!)

### FIELD SESSION

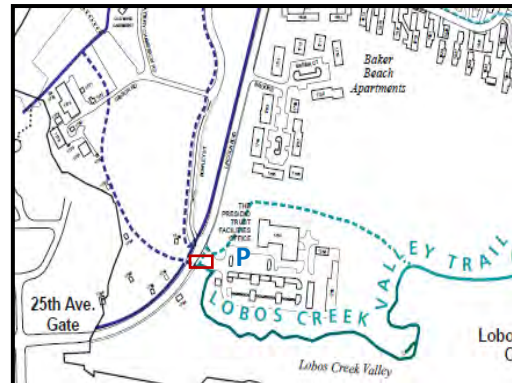
- 1:00pm-4:00pm: Meet at Lobos Dunes trail head (*directions below*)
- Wrap-up morning content, discussion, and opportunity for Q&A
- Move outside: hands-on practice monitoring plant phenology in the Presidio
  - Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data
  - Logistics of implementing phenological monitoring at natural areas (e.g., learn how to establish monitoring sites, label plants, and record important field information)
  - How to get involved in the CPP, as an educator, scientist, student, or natural area representative
  - Developing educational and interpretive activities around phenological monitoring

**Workshop Facilitators:** Dr. Susan Mazer and Dr. Liz Matthews, CPP Field Coordinators, University of California, Santa Barbara; email: [phenology@eemb.ucsb.edu](mailto:phenology@eemb.ucsb.edu)

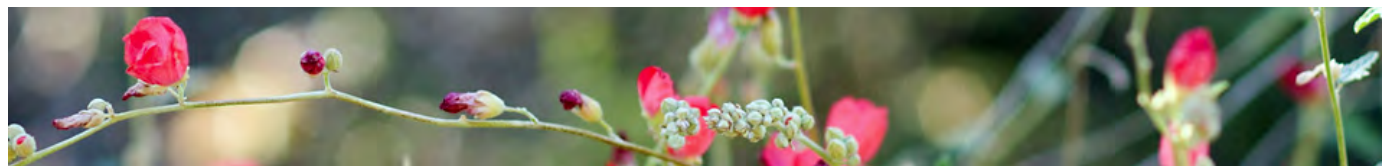
**Contact:** For more information about the workshop and to RSVP, please contact Ruby Kwan at [rkwanppintern@gmail.com](mailto:rkwanppintern@gmail.com)

**Directions:** The Lobos Dunes trail is located near the 25<sup>th</sup> Avenue gate into the Presidio. Find directions to the Lobos Dunes trail here: <http://www.presidio.gov/explore/trails/Pages/mountain-lake-trail.aspx>.

If you are traveling from the 25<sup>th</sup> Avenue gate on Lincoln Ave., the Lobos Dunes trail will be on the right. If traveling towards the gate on Lincoln Ave., drive past the Baker Beach Apartments and the trail will be on the left.



**P** Locations with available PARKING  
**□** Lobos Dunes trail head


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## California Phenology Project Workshop

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Date: Saturday, March 2, 2013

Time: 1:00PM - 5:00PM

Instructor: Dr. Susan Mazer & Dr. Liz Matthews

Location: The Santa Barbara Botanic Garden: Blaksley Library

1 Phenology Workshop Complimentary

Admission @ \$0.00 [Add to cart](#)

[Register Now](#)

### A California Phenology Project (CPP) Workshop and Field Training

The National Phenology Network brings together citizen scientists, government agencies, non profit groups, educators and students of all ages to monitor the impacts of climate change on plants and animals in the United States. The network harnesses the power of people and the Internet to collect and share information, providing researchers with far more data than they could collect alone.



### The CPP Workshop will include:

- Brief introduction to the study of phenology, the link between climate change and phenology, and the regional and national efforts to track phenology (the California Phenology Project and the USA National Phenology Network)
- How to monitor phenology using the USA National Phenology Network's protocols
- Hands-on practice monitoring plant phenology - OUTSIDE!
- Brief demonstration of *Nature's Notebook*: the USA-NPN's user-friendly online interface for contributing phenological data
- Discussion: how to get involved in the CPP: on your own, at SBBG, or at one of the other CPP sites

Please bring water and snacks (we will take a short break for refreshments half-way through the workshop) and dress appropriately for outdoor activities.

*Space is limited - Reservation required.*





**Become a member or renew your Garden membership!**

# The California PHENOLOGY Project

Using Phenology to detect plant responses to climate change



Join professional scientists, educators, citizen scientists, and nature enthusiasts at the John Muir National Historic Site, in Martinez, California.

Thursday July 19th (6-7:30pm) and Friday July 20th (9-12:00pm)

#### CPP Website:

[www.usanpn.org/cpp](http://www.usanpn.org/cpp)  
Please explore the site prior to events

**Free to the Public**  
Please RSVP to  
[Fernando\\_Villalba@nps.gov](mailto:Fernando_Villalba@nps.gov)

#### Facilitators:

Dr. Susan Mazer and  
Dr. Liz Matthews, CPP Field  
Coordinators, University of  
California, Santa Barbara  
[phenology@eemb.ucsb.edu](mailto:phenology@eemb.ucsb.edu)

#### Thursday Evening Presentation 6pm-7:30pm

- One hour presentation followed by questions and answer session
- What is phenology? Why monitor phenology?
- The link between climate change and phenology
- Introduction to the California Phenology Project (CPP) and the USA National Phenology Network (USA-NPN)

#### Friday Morning Workshop 8:45am-12 Noon

- Presentation, hands-on practice monitoring plant phenology, and discussion
- Brief introduction to the study of phenology, the link between climate change and phenology, and the California Phenology Project at John Muir NHS
- How to monitor phenology using the USA National Phenology Network protocols
- Demonstration of Nature's Notebook: the user-friendly USA-NPN interface for contributing phenological data
- Discussion: how to get involved in the CPP effort, on your own or at John Muir NHS

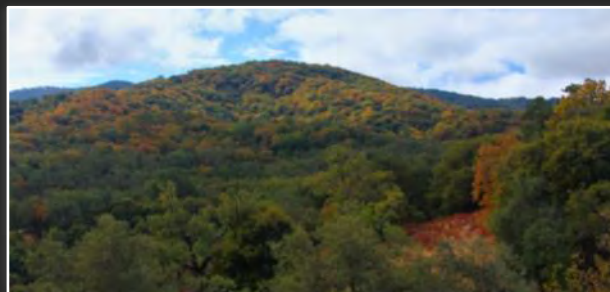
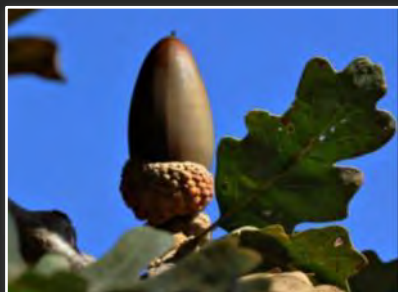
Directions to John Muir NHS: Visit <http://www.nps.gov/jomu/planyourvisit/index.htm> or call 925-228-8860 for more information.



# THE CALIFORNIA PHENOLOGY

PROJECT

*Tracking plants and animals through the seasons to study climate change*



**Join the coordinators of the California Phenology Project for an evening lecture with the California Native Plant Society**

**First United Methodist Church**

*Tuesday December 11 | 7:30pm – 9pm | 1008 11<sup>th</sup> Street • Santa Monica*

- Presentation followed by question and answer session
- Learn how the seasonal activities of plants and animals are linked with climate change
- Get informed about how scientists, educators, and the public are working together across the country – and throughout California – to track plant and animal phenology
- Find out how the CNPS and *you* can contribute to this important effort from your backyard, schoolyard, open spaces, California's National Parks, and the UC Natural Reserve System

*The presenters are research scientists at UC Santa Barbara. They deliver engaging lectures and phenology training workshops for scientists, educators, and the public in their efforts to coordinate the California Phenology Project. Come learn what's happening in your region.*

**Brian Haggerty, M.S.**  
UCSB PhD student

**Dr. Liz Matthews**  
UCSB Post-Doctoral  
associate

**Dr. Susan Mazer**  
UCSB Professor of  
Ecology & Evolution

**Join the presenters for a  
phenology field  
workshop!**

**UCLA Stunt Ranch Santa  
Monica Mountains Reserve**  
(UC Natural Reserve System)

**Saturday December 15**

**10am – 2pm**

**Details for this free event will be  
provided at the Tuesday evening  
lecture, or email the presenters  
for details and to RSVP:**

**[phenology@eemb.ucsb.edu](mailto:phenology@eemb.ucsb.edu)**

*California Phenology Project website*

**WWW.USANPN.ORG/CPP**

