



Citizen Science  
Phenology Observation Program

# Jug Bay Wetlands Sanctuary Butterfly Phenology Training

# Phenology Observation Program

## Overview

- ✓ *Intro to Phenology*
- USA National Phenology Network
- Using *Nature's Notebook*



# Intro to Phenology

---



Spicebush swallowtail caterpillar  
photo by Rob McEachern



Adult spicebush swallowtail

Phenology refers to recurring plant and animal life cycle stages, or **phenophases**, such as leafing and flowering, maturation of agricultural plants, emergence of insects, and migration of birds.

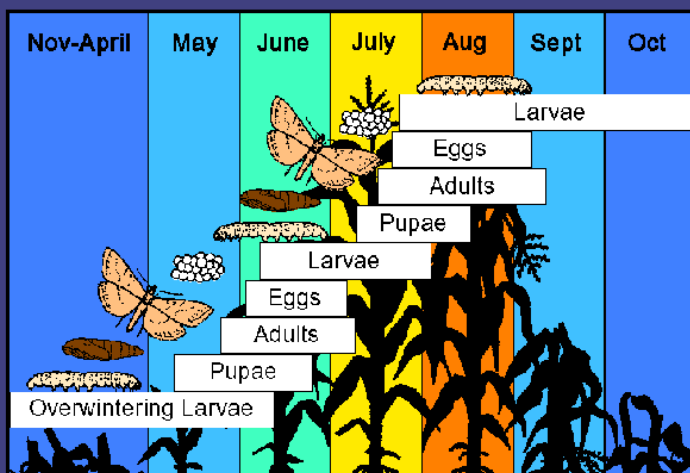
# Intro to Phenology, cont.



## Applications of Phenology Data

- Conservation
- Resource management
- Agriculture
- Recreation
- Health

Typical Life History of the European Corn Borer





# Phenology Observation Program

## Overview

- Intro to Phenology
- ✓ *USA National Phenology Network*
  - Using *Nature's Notebook*



# USA National Phenology Network



## Mission

- Make phenology data, models and related information available to scientists, resource managers and the public.
- Encourage people of all ages and backgrounds to observe and record phenology.

[usannpn.org](http://usannpn.org)

# USA National Phenology Network, cont.

---

## Why is this important?



- Citizen science programs supplement organizations with limited staffing
- Volunteers or partnerships with agencies make monitoring more robust





## What is *Nature's Notebook*?

The National Phenology Network's citizen science phenology observation program.



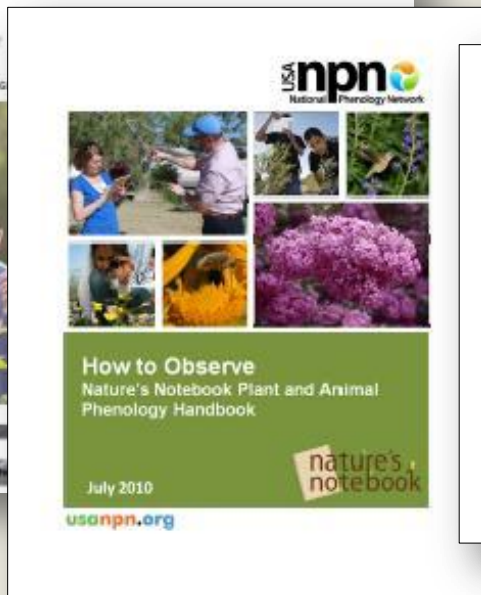


# USA National Phenology Network, cont.



## Online monitoring system

- 630 vetted plant species
- 230 vetted animal species
- Core protocols
- Metadata & QA/QC methods



▼ common buckeye

	10/08/2014	Circle all no Delete	Circle all no Delete	Circle all no Delete
Do you see active adults?	<input checked="" type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see flower visitation?	<input checked="" type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see emerging adults?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see feeding?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see active caterpillars?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see caterpillars feeding?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see dead adults?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see dead caterpillars?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see individuals at a feeding station?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Do you see individuals in a net?	<input type="radio"/> Y <input checked="" type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	<input type="radio"/> Y <input type="radio"/> N ? How many?	
Comments				

# Phenology Observation Program

## Overview

- Intro to Phenology
  - USA-National Phenology Network
- ✓ *Using Nature's Notebook*



# Using *Nature's Notebook*

---

1. **Join *Nature's Notebook***
2. **Orient yourself to the Observation Deck**
  - a. Site(s)
  - b. Species to be observed
  - c. Details about species
3. **Start observing!**
  - a. Get organized to observe
  - b. Record butterfly observations
  - c. Submit observations online





# 1. Join *Nature's Notebook*

The screenshot shows the homepage of the Nature's Notebook USA website. The browser address bar displays [https://www.usanpn.org/natures\\_notebook](https://www.usanpn.org/natures_notebook). The page features a large banner image of a child with butterflies. To the right of the banner is a section titled "Teachable Moments" with text about students benefiting from the program and a quote from Dr. Heidi Steltzer. Below the banner, there is a section titled "TOGETHER we logged ONE MILLION RECORDS LAST YEAR!" with a thank-you message and a "GO TO YOUR OBSERVATION DECK" button. On the right side, a "HOW TO PARTICIPATE IN THE PROGRAM" section lists three steps: "1 Join the program", "2 Set up your account", and "3 Go outside and observe!". Below these steps is a prominent orange button labeled "BECOME AN OBSERVER", which is circled in red. The website footer includes the USGS logo and the text "USGS npn National Phenology Network".

**Teachable Moments**

Students in my classes benefit from the outstanding opportunity *Nature's Notebook* provides to share their data on plant and animal life cycles with a national audience.

- Dr. Heidi Steltzer, Fort Lewis College, Durango, CO

**TOGETHER**  
we logged **ONE MILLION**  
**RECORDS LAST YEAR!**  
Help us collect another million this year!

Thank you for your hard work and persistence! Your contributions will support research and decision making for decades to come.

**GO TO YOUR OBSERVATION DECK**

**HOW TO PARTICIPATE IN THE PROGRAM**

Become an observer in 3 steps:

- 1 Join the program
- 2 Set up your account
- 3 Go outside and observe!

**BECOME AN OBSERVER**

USGS npn National Phenology Network  
science for a changing world Taking the Pulse of Our Planet

[https://www.usanpn.org/natures\\_notebook](https://www.usanpn.org/natures_notebook)

# 1. Join *Nature's Notebook*, cont.

Become an Observer | US/ X

https://www.usanpn.org/nn/become-observer

Apps Workspace Login Your Success Is Our ... World-Class Birding ... Stage Stop Inn - Pat... Social Educational D... Job Announcement: GovernmentJobs.co... Butterfly phenology

**Become an observer:** About 10 minutes

**Observe:** About 2 minutes per individual plant or animal (once you've familiarized yourself with the program and learned how to observe)

**Become an observer today in 3 steps:**

- 1 Join Nature's Notebook**
  - All that's needed to join is your name and email address. No previous experience necessary. We don't give personal information away (Read our [Privacy Policy](#)).
- 2 Set up your account**
  - Choose your site, the location where you want to observe, such as your backyard.
  - Select species from our [Species List](#), identifying individual plants or animals you want to observe.
- 3 Start observing!**
  - Familiarize yourself with our guidelines for observing.
  - Print paper datasheets to take outside when you record observations.
  - Go outside, take observations of your plants or animals using your paper datasheets and enter them online afterward.

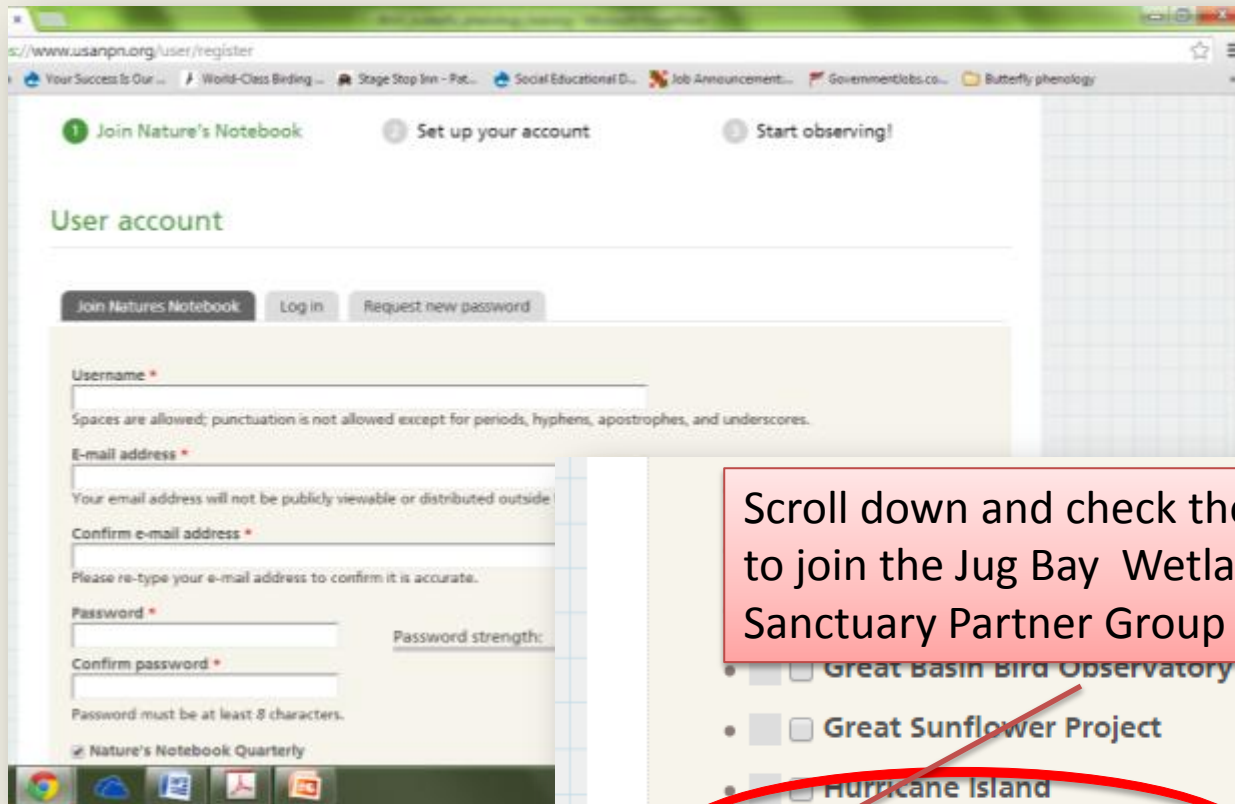
**BECOME AN OBSERVER NOW**

[FAQs](#) | [Glossary](#) | [Terms of Use](#)

Nature's Notebook is a project of the USA National Phenology Network.

USA **npn** National Phenology Network

# 1. Join *Nature's Notebook*, cont.



The screenshot shows the registration page for the USANPN (USGS National Phenology Network). The page has a green header with three steps: 1. Join Nature's Notebook, 2. Set up your account, and 3. Start observing!. Below the header, there's a 'User account' section with buttons for 'Join Nature's Notebook', 'Log in', and 'Request new password'. The registration form includes fields for Username, E-mail address, Confirm e-mail address, Password, and Confirm password. A checkbox for 'Nature's Notebook Quarterly' is also present. A red box highlights the 'Join Nature's Notebook' button.

1 Join Nature's Notebook 2 Set up your account 3 Start observing!

User account

Join Nature's Notebook Log in Request new password

Username \*

E-mail address \*

Confirm e-mail address \*

Password \*

Confirm password \*

Nature's Notebook Quarterly

Scroll down and check the box to join the Jug Bay Wetlands Sanctuary Partner Group

- ☐ Great Basin Bird Observatory
- ☐ Great Sunflower Project
- ☐ Hurricane Island
- ☐ Jug Bay Wetlands Sanctuary
- ☐ Juniper Pollen Project
- ☐ K-12 Schools
- ☐ Knock on Wood
- ☐ Knoxville Zoo Classroom Pollinator Project



# Using *Nature's Notebook*

---

1. Join *Nature's Notebook*
2. Orient yourself to the Observation Deck
  - a. Site(s)
  - b. Species to be observed
  - c. Details about species
3. Start observing!
  - a. Get organized to observe
  - b. Record butterfly observations
  - c. Submit observations online



## 2. Orient yourself to the Observation Deck

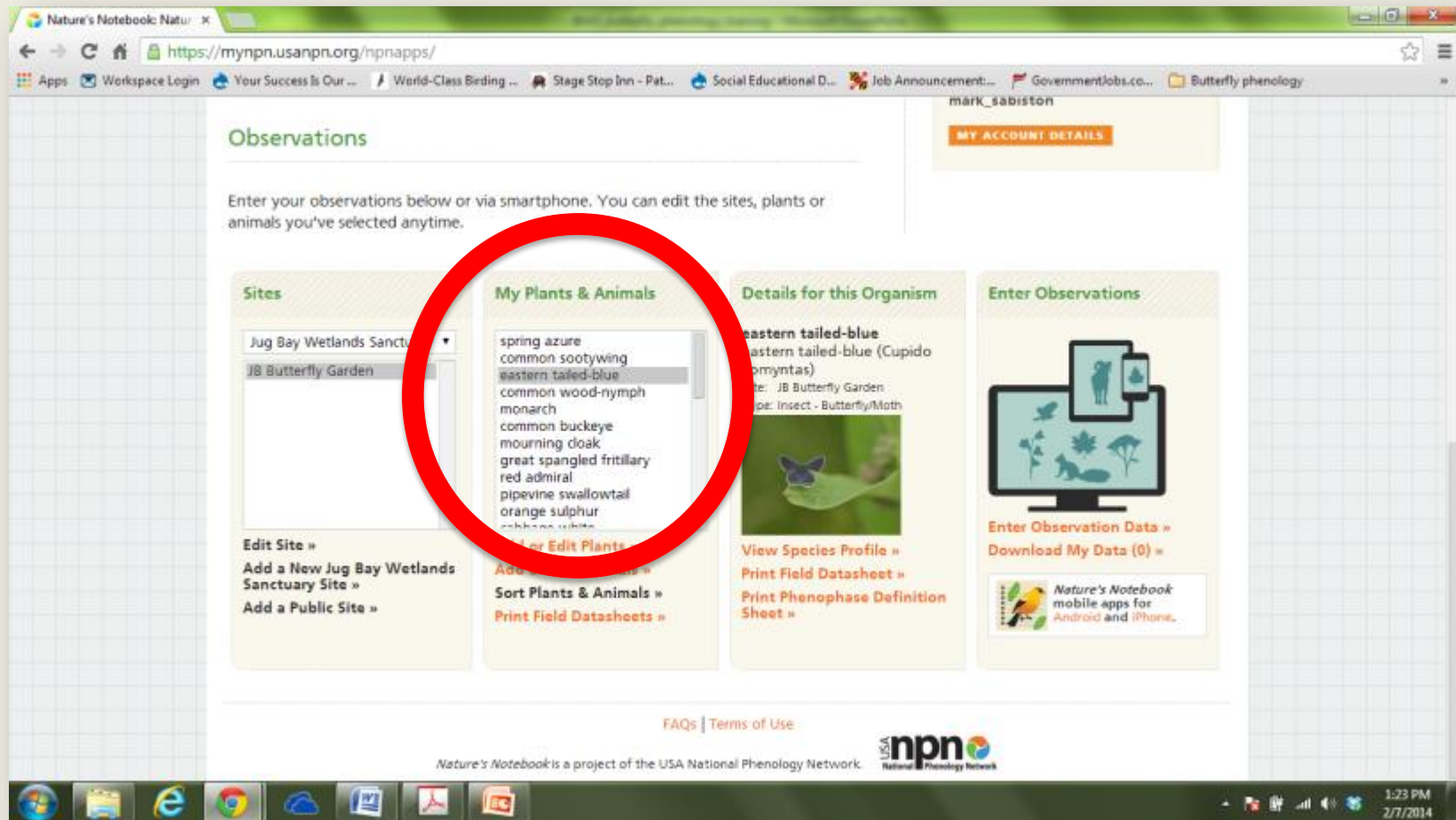
The screenshot shows the 'Observations' page on the Nature's Notebook website. The page has a header with the URL 'https://mynpn.usanpn.org/npnapps/' and a user profile for 'mark\_sabiston' with a 'MY ACCOUNT DETAILS' button. The main content area is divided into four columns:

- Sites:** A dropdown menu is highlighted with a red circle, showing 'Jug Bay Wetlands Sanctuary' and 'JB Butterfly Garden'. Below the dropdown are links: 'Edit Site »', 'Add a New Jug Bay Wetlands Sanctuary Site »', and 'Add a Public Site »'.
- My Plants & Animals:** A list of species including 'spring azure', 'common sootywing', 'eastern tailed-blue', 'common wood-nymph', 'monarch', 'common buckeye', 'mourning cloak', 'great spangled fritillary', 'red admiral', 'pipevine swallowtail', 'orange sulphur', and 'cabbage white'. Below the list are links: 'Add or Edit Plants »', 'Add or Edit Animals »', 'Sort Plants & Animals »', and 'Print Field Datasheets »'.
- Details for this Organism:** Features 'eastern tailed-blue' (Cupido comyntas) with a photo of a butterfly on a leaf. Links include 'View Species Profile »', 'Print Field Datasheet »', 'Print Phenophase Definition Sheet »', and 'Download My Data (0) »'.
- Enter Observations:** Includes an illustration of a smartphone and a computer monitor showing nature data. Links are 'Enter Observation Data »' and 'Download My Data (0) »'. A small box at the bottom says 'Nature's Notebook mobile apps for Android and iPhone'.

At the bottom of the page, there are links for 'FAQs' and 'Terms of Use', and a footer stating 'Nature's Notebook is a project of the USA National Phenology Network' with the 'npn' logo.

Your observation deck will show your site(s)...

## 2. Orient yourself to the Observation Deck, cont.



The screenshot shows the 'Observations' page on the Nature's Notebook website. The page has a header with the URL 'https://mynpn.usanpn.org/npnapps/' and a user profile for 'mark\_sabiston' with a 'MY ACCOUNT DETAILS' button. Below the header, there's a section titled 'Observations' with instructions: 'Enter your observations below or via smartphone. You can edit the sites, plants or animals you've selected anytime.'

The main content area is divided into four columns:

- Sites:** A dropdown menu showing 'Jug Bay Wetlands Sanct...' and 'JB Butterfly Garden'. Below it are links: 'Edit Site »', 'Add a New Jug Bay Wetlands Sanctuary Site »', and 'Add a Public Site »'.
- My Plants & Animals:** A list of species including 'spring azure', 'common sootywing', 'eastern tailed-blue', 'common wood-nymph', 'monarch', 'common buckeye', 'mourning cloak', 'great spangled fritillary', 'red admiral', 'pipevine swallowtail', 'orange sulphur', and 'cabbage white'. This list is circled in red. Below it are links: 'Add or Edit Plants »', 'Sort Plants & Animals »', and 'Print Field Datasheets »'.
- Details for this Organism:** A section for 'eastern tailed-blue' (Cupido myntas) with a photo of a butterfly. Below it are links: 'View Species Profile »', 'Print Field Datasheet »', and 'Print Phenophase Definition Sheet »'.
- Enter Observations:** A section with a graphic of a smartphone and a computer monitor. Below it are links: 'Enter Observation Data »' and 'Download My Data (0) »'. At the bottom, it says 'Nature's Notebook mobile apps for Android and iPhone'.

At the bottom of the page, there are links for 'FAQs' and 'Terms of Use', and a footer stating 'Nature's Notebook is a project of the USA National Phenology Network' with the 'npn' logo.

...the species that are registered for observation at this site...



## 2. Orient yourself to the Observation Deck, cont.

The screenshot shows the 'Observations' page on the Nature's Notebook website. The page has a header with the URL 'https://mynpn.usanpn.org/npnapps/' and a user profile for 'mark\_sabiston' with a 'MY ACCOUNT DETAILS' button. Below the header, there's a section titled 'Observations' with instructions: 'Enter your observations below or via smartphone. You can edit the sites, plants & animals you've selected anytime.'

The main content area is divided into four columns:

- Sites:** A dropdown menu showing 'Jug Bay Wetlands Sanctuary' and 'JB Butterfly Garden'. Below it are links: 'Edit Site »', 'Add a New Jug Bay Wetlands Sanctuary Site »', and 'Add a Public Site »'.
- My Plants & Animals:** A list of species including 'spring azure', 'common sootywing', 'eastern tailed-blue', 'common wood-nymph', 'monarch', 'common buckeye', 'mourning cloak', 'great spangled fritillary', 'red admiral', 'pipevine swallowtail', 'orange sulphur', and 'cabbage white'. Below the list are links: 'Add or Edit Plants »', 'Add or Edit Animals »', 'Sort Plants & Animals »', and 'Print Field Datasheets »'.
- Details for this Organism:** A section for 'eastern tailed-blue' (Cupido comyntas) with a photo of a butterfly. It includes links: 'View Species Profile »', 'Print Field Datasheet »', 'Print Phenophase Definition Sheet »', and 'Enter Observation Data »'.
- Enter Observations:** A section with a graphic of a smartphone and a computer monitor showing a butterfly. It includes links: 'Download My Data (0) »' and 'Nature's Notebook mobile apps for Android and iPhone'.

A red circle highlights the 'My Plants & Animals' column, specifically the 'eastern tailed-blue' species entry. The bottom of the page features a footer with 'FAQs | Terms of Use', 'Nature's Notebook is a project of the USA National Phenology Network', and the 'USA npn National Phenology Network' logo. The system clock at the bottom right shows '1:23 PM 2/7/2014'.

...links to details for the species selected in the My Plants & Animals column...

## 2. Orient yourself to the Observation Deck, cont.

The screenshot shows the 'Observations' page of the Nature's Notebook website. The page layout includes a header with the user's name 'mark\_sabiston' and a 'MY ACCOUNT DETAILS' button. Below the header, there's a section titled 'Observations' with instructions: 'Enter your observations below or via smartphone. You can edit the sites, plants or animals you've selected anytime.'

The main content area is divided into four columns:

- Sites:** A dropdown menu showing 'Jug Bay Wetlands Sanctuary' and 'JB Butterfly Garden'. Below the menu are links: 'Edit Site »', 'Add a New Jug Bay Wetlands Sanctuary Site »', and 'Add a Public Site »'.
- My Plants & Animals:** A list of species including 'spring azure', 'common sootywing', 'eastern tailed-blue', 'common wood-nymph', 'monarch', 'common buckeye', 'mourning cloak', 'great spangled fritillary', 'red admiral', 'pipevine swallowtail', 'orange sulphur', and 'cabbage white'. Below the list are links: 'Add or Edit Plants »', 'Add or Edit Animals »', 'Sort Plants & Animals »', and 'Print Field Datasheets »'.
- Details for this Organism:** A section for 'eastern tailed-blue' with a small image of a butterfly. It includes links: 'View Species Profile »', 'Print Field Datasheet »', and 'Print Phenophase Definition Sheet »'.
- Enter Observations:** This section is highlighted with a red circle. It features an illustration of a smartphone and a tablet displaying nature-related icons. Below the illustration are links: 'Enter Observation Data »' and 'Download My Data (0) »'. At the bottom of this section, there's a small image of a bird and text: 'Nature's Notebook mobile apps for Android and iPhone'.

The footer of the page includes links for 'FAQs' and 'Terms of Use', and a logo for the 'USA npn National Phenology Network'. The system clock at the bottom right shows '1:23 PM 2/7/2014'.

...and links to the data entry page and data download page.

## 2. Orient yourself to the Observation Deck, cont.

The screenshot shows the 'Observations' page on the Nature's Notebook website. The page has a header with the URL 'https://mynpn.usanpn.org/npnapps/' and a user profile for 'mark\_sabiston' with a 'MY ACCOUNT DETAILS' button. Below the header, there's a section titled 'Observations' with instructions: 'Enter your observations below or via smartphone. You can edit the sites, plants or animals you've selected anytime.'

The main content area is divided into four columns:

- Sites:** A dropdown menu showing 'Jug Bay Wetlands Sanctuary' and 'JB Butterfly Garden'. Below the menu are links: 'Edit Site »', 'Add a New Jug Bay Wetlands Sanctuary Site »', and 'Add a Public Site »'.
- My Plants & Animals:** A list of species. The 'eastern tailed-blue' is circled in red. Other species include 'spring azure', 'common sootywing', 'common wood-nymph', 'monarch', 'common buckeye', 'mourning cloak', 'great spangled fritillary', 'red admiral', 'pipevine swallowtail', 'orange sulphur', and 'cabbage white'. Below the list are links: 'Add or Edit Plants »', 'Add or Edit Animals »', 'Sort Plants & Animals »', and 'Print Field Datasheets »'.
- Details for this Organism:** A section for 'eastern tailed-blue' (Cupido cornyntas) with a photo of a butterfly. It includes links: 'View Species Profile »', 'Print Field Datasheet »', and 'Print Phenophase Definition Sheet »'.
- Enter Observations:** A section with a graphic of a smartphone and a computer monitor. It includes links: 'Enter Observation Data »' and 'Download My Data (0) »'. Below this is a box for 'Nature's Notebook mobile apps for Android and iPhone'.

At the bottom of the page, there are links for 'FAQs' and 'Terms of Use', and a footer stating 'Nature's Notebook is a project of the USA National Phenology Network.' The USA NPN logo is also present.

Choose a butterfly species from My Plants & Animals



## 2. Orient yourself to the Observation Deck, cont.

The screenshot shows the 'Observations' page on the Nature's Notebook website. The page has a header with the URL 'https://mynpn.usanpn.org/npnapps/' and a user profile for 'mark\_sabiston' with a 'MY ACCOUNT DETAILS' button. Below the header, there's a section titled 'Observations' with instructions: 'Enter your observations below or via smartphone. You can edit the sites, plants or animals you've selected anytime.'

The main content area is divided into four columns:

- Sites:** A dropdown menu showing 'Jug Bay Wetlands Sanctuary' and 'JB Butterfly Garden'. Below the menu are links: 'Edit Site »', 'Add a New Jug Bay Wetlands Sanctuary Site »', and 'Add a Public Site »'.
- My Plants & Animals:** A list of species including 'spring azure', 'common sootywing', 'eastern tailed-blue', 'common wood-nymph', 'monarch', 'common buckeye', 'mourning doak', 'great spangled fritillary', 'red admiral', 'pipevine swallowtail', 'orange sulphur', and 'cabbage white'. Below the list are links: 'Add or Edit Plants »', 'Add or Edit Animals »', 'Sort Plants & Animals »', and 'Print Field Datasheets »'.
- Details for this Organism:** Features a photo of an 'eastern tailed-blue' butterfly. Below the photo is a red circle around the 'View Species Profile »' link. Other links include 'Print Field Datasheets »', 'Print Phenophase Definition Sheet »', and 'Print Phenophase Definition Sheet »'.
- Enter Observations:** Includes an illustration of a smartphone and a computer monitor. Below the illustration are links: 'Enter Observation Data »' and 'Download My Data (0) »'. At the bottom of this column is a box for 'Nature's Notebook mobile apps for Android and iPhone'.

At the bottom of the page, there are links for 'FAQs' and 'Terms of Use', and a footer stating 'Nature's Notebook is a project of the USA National Phenology Network.' The USA National Phenology Network logo is also present.

**View a Species Profile for that butterfly**

## 2. Orient yourself to the Observation Deck, cont.

The image displays three overlapping screenshots of the USANPN (United States and Northern Canada) website, specifically the species profile and observation deck for *Cupido comyntas*.

**Left Screenshot (Species Profile):** Shows the species name *Cupido comyntas* and a photograph of a blue butterfly on a green leaf. Below the photo, there is a section titled "What does this species look like?" which describes the butterfly's appearance, including its wingspan (0.9 to 1.1 inches) and color variations (blue with black dots, or nearly solid dark gray).

**Middle Screenshot (General Phenology and Life History):** Displays the "General Phenology and Life History" section. It states that there are three or more broods in most of the range, typically occurring from April to October in southern New Jersey and from March to November on the Gulf Coast. It also mentions that caterpillars feed mostly on young flower leaves, and adults are common in gardens.

**Right Screenshot (Observation Deck):** Shows the "ACTIVITY" section of the observation deck. It includes fields for "Active adults" and "Active caterpillars", each with a "Do you see...?" question and a "For abundance, enter the number of individual animals observed in this phenophase." field. There are also "More..." links for each section.

Review the Species Profile for helpful background information

## 2. Orient yourself to the Observation Deck, cont.

The screenshot displays the 'Observations' page of the Nature's Notebook website. The page is divided into several sections:

- Observations:** A header section with instructions: "Enter your observations below or via smartphone. You can edit the sites, plants or animals you've selected anytime."
- Sites:** A dropdown menu showing "Jug Bay Wetlands Sanctuary" and "JB Butterfly Garden". Below the menu are links: "Edit Site »", "Add a New Jug Bay Wetlands Sanctuary Site »", and "Add a Public Site »".
- My Plants & Animals:** A list of species including "spring azure", "common sootywing", "eastern tailed-blue", "common wood-nymph", "monarch", "common buckeye", "mourning doak", "great spangled fritillary", "red admiral", "pipevine swallowtail", "orange sulphur", and "cabbage white". Below the list are links: "Add or Edit Plants »", "Add or Edit Animals »", "Sort Plants & Animals »", and "Print Field Datasheets »".
- Details for this Organism:** A section for "eastern tailed-blue" (Cupido cornytas) with a photo of a butterfly. Below the photo are links: "View Species Profile »", "Print Field Datasheet »", and "Print Phenophase Definition Sheet »". The "Print Phenophase Definition Sheet »" link is circled in red.
- Enter Observations:** A section with a graphic of a smartphone and a computer monitor. Below the graphic are links: "Enter Observation Data »" and "Download My Data (0) »".

At the bottom of the page, there are links for "FAQs" and "Terms of Use", and a footer stating "Nature's Notebook is a project of the USA National Phenology Network." The USA National Phenology Network logo is also present.

**Print Phenophase Definition Sheet**



## 2. Orient yourself to the Observation Deck, cont.

**Eastern Tailed-blue**  
(*Cupido comyntas*)

**Phenophase Definitions**

**Directions:**  
As you report on phenophase status (Y, N or ?) on the datasheets, refer to the definitions on this sheet to find out what you should look for, for each phenophase in each species. For reporting animal abundance, if a specific question is included below the phenophase, choose the best answer to the question. If there is no specific question, enter the number of individual animals you observed in each phenophase. Feel free not to report on phenophases or abundances if they seem too difficult or time-consuming.

**Activity**

**Active adults**  
One or more adults are seen moving about or at rest.

**Flower visitation**  
One or more individuals are seen visiting flowers or flying from flower to flower. If possible, record the name of the plant or describe it in the comments field.

**Reproduction**

**Mating**  
A male and female are seen coupled in a mating position, usually end to end. This can occur at rest or in flight.

**Development**

**nature's notebook**



Review a printer-friendly (PDF) Phenophase Definition Sheet for that butterfly species

# Using *Nature's Notebook*

---

1. Join *Nature's Notebook*
2. Orient yourself to the Observation Deck
  - a. Site(s)
  - b. Species to be observed
  - c. Details about species
3. **Start observing!**
  - a. Get organized to observe
  - b. Record butterfly observations
  - c. Submit observations online



# 3a. Get organized to observe

The screenshot shows the 'Observations' page on the Nature's Notebook website. The page is divided into several sections:

- Observations:** A heading with instructions: "Enter your observations below or via smartphone. You can edit the sites, plants or animals you've selected anytime."
- Sites:** A dropdown menu showing "Jug Bay Wetlands Sanctuary" and "JB Butterfly Garden". Below it are links: "Edit Site »", "Add a New Jug Bay Wetlands Sanctuary Site »", and "Add a Public Site »".
- My Plants & Animals:** A list of species including "spring azure", "common sootywing", "eastern tailed-blue", "common wood-nymph", "monarch", "common buckeye", "mourning doak", "great spangled fritillary", "red admiral", "pipevine swallowtail", "orange sulphur", and "cabbage white". Below the list are links: "Add or Edit Plants »", "Add or Edit Animals »", "Sort Plants & Animals »", and "Print Field Datasheets »" (which is circled in red).
- Details for this Organism:** A section for "eastern tailed-blue" (Cupido comyntas) with a photo of a butterfly. Below the photo are links: "View Species Profile »", "Print Field Datasheet »", "Print Phenophase Definition Sheet »", and "Print Phenophase Definition Sheet »".
- Enter Observations:** A section with a graphic of a smartphone and a computer monitor. Below the graphic are links: "Enter Observation Data »" and "Download My Data (0) »".

At the bottom of the page, there are links for "FAQs" and "Terms of Use", and a footer stating "Nature's Notebook is a project of the USA National Phenology Network." The USA National Phenology Network logo is also present.

Print Field Datasheets



## 3a. Get organized to observe, cont.

via smartphone. You can edit the sites, plants or

### Print Field Datasheets »

Use the checkboxes below to select which datasheets you would like to print, and then click "Create Datasheets".

Create All Datasheets: ☐

Create Cover Sheet	<input type="checkbox"/>
Create Animal Checklist	<input type="checkbox"/>
<b>Create Plant &amp; Animal Phenophase Datasheets</b>	
Day by Day	<input type="checkbox"/> Preview
Species by Species	<input type="checkbox"/> Preview
Create Phenophase Definition Sheet	<input type="checkbox"/>

[ Close ]

Not sure what to print?

You will enter data on either two or three different sheets each day you observe:

1. Animal Checklist  
AND
2. Either
  - a. Day by Day Datasheet  
OR
  - b. Cover Sheet + Species by Species Datasheet

# 3a. Get organized to observe, cont.

**Animal Checklist**

Directions:  
Please list below all the animal species from the animal checklist you created online for this site.  
Fill in the date and time of your site visit in the top row. In each box, click the appropriate letter for that visit:  
y (if you see or hear this species);  
n (if you do not see or hear this species);  
? (if you are not certain if you saw or heard this species)  
Do not tickle anything if you did not tickle for this species

For each species you clicked y or ? (present or uncertain), please also fill out a column in your Animal Phenophase Data sheet for this species to report on the status of each of the phenophases for that visit.

For each species you clicked n (not present), you do not need to fill out a column in the Animal Phenophase Data sheet, and can simply click "Click all 'No'" meaning you did not see or hear any phenophases for that species when entering your observations online for that visit.

Site:  
Year:  
Observer:

	Date:	Date:	Date:	Date:	Date:	Date:	Date:	Date:	Date:	Date:	Date:
Do you see or hear...?	Time:	Time:	Time:	Time:	Time:	Time:	Time:	Time:	Time:	Time:	Time:
spring azure	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
common sootywing	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
eastern tailed-blue	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
common wood-nymp	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
monarch	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
common buckeye	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
mourning cloak	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
great spangled fritillary	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
red admiral	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
pipevine swallowtail	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
orange sulphur	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
cabbage white	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?

nature's

	Date:	Date:
Do you see or hear...?	Time:	Time:
spring azure	y n ?	y n ?
common sootywing	y n ?	y n ?
eastern tailed-blue	y n ?	y n ?
common wood-nymp	y n ?	y n ?
monarch	y n ?	y n ?
common buckeye	y n ?	y n ?
mourning cloak	y n ?	y n ?
great spangled fritillary	y n ?	y n ?
red admiral	y n ?	y n ?
pipevine swallowtail	y n ?	y n ?
orange sulphur	y n ?	y n ?
cabbage white	y n ?	y n ?
	y n ?	y n ?
	y n ?	y n ?
	y n ?	y n ?
	y n ?	y n ?

**Animal Checklist: Captures observation data for each butterfly species—not phenophase—on each day of observation**

# 3a. Get organized to observe, cont.

**Butterflies**

Directions: Fill in the date and time in the top row and circle the appropriate letter in the column below: y (phenophase is occurring); n (phenophase is not occurring); ? (not certain). Do not circle anything if you did not check for the phenophase. In the adjacent column, circle the appropriate number of individuals observed for the phenophase. (Date and Time)

Species: *Cydia conorsis*  
Common Name: *Eastern Toddler*  
Habitat: *Butterfly Garden*  
Year: *2018*  
Observer: *John Smith*

Do you see/hear...	Date:	Date:	Date:	Date:	Date:	Date:	Date:	Date:
	Time:	Time:	Time:	Time:	Time:	Time:	Time:	Time:
Active adults	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Flower visitation	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Mating	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Active caterpillars	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Caterpillars feeding	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Dead adults	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Dead caterpillars	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Individuals at a feeding station	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Individuals in a net	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Check when data entered online:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

**Butterflies**

Directions: Fill in the date and time in the top rows and circle the appropriate letter in the column below: y (phenophase is occurring); n (phenophase is not occurring); ? (not certain). Do not circle anything if you did not check for the phenophase. In the adjacent column, circle the appropriate number of individuals observed for the phenophase. (Date and Time)

Species: *Cydia conorsis*  
Common Name: *Eastern Toddler*  
Habitat: *Butterfly Garden*  
Year: *2018*  
Observer: *John Smith*

Do you see/hear...	Date:	Date:
	Time:	Time:
Active adults	y n ?	y n ?
Flower visitation	y n ?	y n ?
Mating	y n ?	y n ?
Active caterpillars	y n ?	y n ?
Caterpillars feeding	y n ?	y n ?
Dead adults	y n ?	y n ?
Dead caterpillars	y n ?	y n ?
Individuals at a feeding station	y n ?	y n ?
Individuals in a net	y n ?	y n ?
Check when data entered online:	<input type="checkbox"/>	<input type="checkbox"/>

Species by Species Datasheet: Captures phenophase data for each butterfly species on an observation day

Easier datasheet format for FIELD DATA COLLECTION



# 3a. Get organized to observe, cont.

## Cover Sheet

**Direction:**  
On this Cover Sheet, please report information to describe each visit to the site. On the Animal Checklist, please list the species of animals you are looking for at the site and record whether or not you saw or heard that species on each visit. On the Plant and Animal Phenophase Data sheets, please record the phenophases you observed on each visit for your individual plants and your animal species.

Below, please fill in the date and time of your site visit in the first row. Then, estimate your contribution of time to the project for the time it took you to travel to the site and the time you spent making observations on plants and animals: once you arrived at the site, animals, report the time you specifically spent searching for animals and circle the appropriate letter for your observation method (time for incidental sightings):

i = incidental chance sighting while not specifically searching  
s = stationary standing or sitting at a single point  
w = walking a single pass or transect through your site  
a = area search multiple passes through your site

If there is snow on the ground or in the canopy (tree tops), please make a note of it in the third section and estimate the percent of the site that the snow is covering. After each visit, please enter the information from these datasheets online.

Site: 18 Butterfly Garden

	Date:	Date:	Date:	Date:	Date:	Date:	Date:	Date:
	Time:	Time:	Time:	Time:	Time:	Time:	Time:	Time:
<b>Report your contribution of time</b>								
Time spent observing	hr min	hr min	hr min	hr min	hr min	hr min	hr min	hr min
Time spent in travel	hr min	hr min	hr min	hr min	hr min	hr min	hr min	hr min
<b>Report your animal observation methods</b>								
Time spent looking for animals	hr min	hr min	hr min	hr min	hr min	hr min	hr min	hr min
Animal survey method	i s w a	i s w a	i s w a	i s w a	i s w a	i s w a	i s w a	i s w a
<b>Report on snow</b>								
Is there snow on the ground?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
% of ground covered								
Is there snow in the canopy?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?	y n ?
Check when data entered online:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:								

**Cover Sheet: Captures details about the observation session and environmental conditions on the day of observation**

# 3a. Get organized to observe, cont.

**nature's notebook**

Site: JB Butterfly Garden  
Observer: nuli-nuli  
Date: \_\_\_\_\_  
Time: \_\_\_\_\_

Directions: In the box below, estimate your contribution of time to the project today, separating the time it took you to travel to the site and the time you spent making observations on plants and animals once you arrived at the site. If you are observing animals, report the time you spent searching for animals and circle the appropriate letter for your observation method (there is no need to report time for incidental sightings).

l = incidental chance sighting while not specifically searching  
s = stationary: standing or sitting at a single point  
w = walking: a single pass or transect through your site  
a = area search: multiple passes through your site

In the four boxes to the right, circle the appropriate letter to describe the phenophase status:  
y = phenophase is occurring  
n = phenophase is not occurring  
? = not certain if the phenophase is occurring

Do not circle anything if you did not check for the phenophase. In the adjacent blank, write in the appropriate measure of intensity or abundance for the phenophase.

Report your contribution of time	
Time spent observing	no
Time spent in travel	no

Report your animal observation method	
Time spent looking for animals	no
Animal survey method	l s w a

Report bird status	
Is there snow on the ground?	y n ?
% of ground covered	
Is there snow in the canopy?	y n ?
Cloud cover percentage (0-100)	

**npne** Taking the Pulse of Our Planet  
Contact: npn@usgs.gov

Species: Colostynia lachon complex  
Common Name: spring azure  
Nickname: spring azure

Do you see...?	Circle when observed
Active adults	y n ?
Roamer/adults	y n ?
Wings	y n ?
Active caterpillars	y n ?
Caterpillars feeding	y n ?
Dead adults	y n ?
Dead caterpillars	y n ?
Individuals still feeding status	y n ?
Individuals in nest	y n ?
	y n ?
	y n ?
	y n ?

Species: Pholisora saturnia  
Common Name: common wood nymph  
Nickname: common wood nymph

Do you see...?	Circle when observed
Active adults	y n ?
Roamer/adults	y n ?
Wings	y n ?
Active caterpillars	y n ?
Caterpillars feeding	y n ?
Dead adults	y n ?
Dead caterpillars	y n ?
Individuals still feeding status	y n ?
Individuals in nest	y n ?
	y n ?
	y n ?
	y n ?

Species: Cupido cominus  
Common Name: eastern tailed blue  
Nickname: eastern tailed blue

Do you see...?	Circle when observed
Active adults	y n ?
Roamer/adults	y n ?
Wings	y n ?
Active caterpillars	y n ?
Caterpillars feeding	y n ?
Dead adults	y n ?
Dead caterpillars	y n ?
Individuals still feeding status	y n ?
Individuals in nest	y n ?
	y n ?
	y n ?
	y n ?

Species: Ceryx neophaea  
Common Name: common wood nymph  
Nickname: common wood nymph

Do you see...?	Circle when observed
Active adults	y n ?
Roamer/adults	y n ?
Wings	y n ?
Active caterpillars	y n ?
Caterpillars feeding	y n ?
Dead adults	y n ?
Dead caterpillars	y n ?
Individuals still feeding status	y n ?
Individuals in nest	y n ?
	y n ?
	y n ?
	y n ?

Day by Day Datasheet: Captures phenophase data for each butterfly species on an observation day

Easier datasheet format for ONLINE DATA ENTRY

# Questions so far?

Coming up...

- Recording butterfly observations
- Observation protocol and commitment
- Nature's Notebook* Butterfly Identification 101



# Using *Nature's Notebook*

---

1. Join *Nature's Notebook*
2. Orient yourself to the Observation Deck
  - a. Site(s)
  - b. Species to be observed
  - c. Details about species
3. **Start observing!**
  - a. Get organized to observe
  - b. **Record butterfly observations**
  - c. Submit observations online



## 3b. Record butterfly observations

---

### When can we expect to see butterflies?

- Insects' development rate is directly related to temperature
- **Growing Degree Days (GDD)**
  - Measure of “heat units” that accumulate over time

$$\frac{\text{Max T} + \text{Min T}}{2} - 50 = \text{GDD}$$

- Always in reference to a starting date (traditionally March 1)
- 50 F: considered “threshold” temperature required for insect development

## 3b. Record butterfly observations

---

Why might GDD be important to the butterfly phenology study?

- To compare changes over time at JBWS—more meaningful than temperature alone
- To study relationship of GDD to climate change for individual species



**GDD Calculator:**

<https://www.pioneer.com/home/site/ca/agronomy/tools/gdu>

## 3b. Record butterfly observations, cont.

---

It's never the *wrong* time to observe—  
“negative data” is valuable in phenology!

### Why?

- Climate shift may be changing when events occur
- Conditions may change rapidly, especially in late winter/early spring



**More frequent surveys = more precise data**



## 3b. Record butterfly observations

---

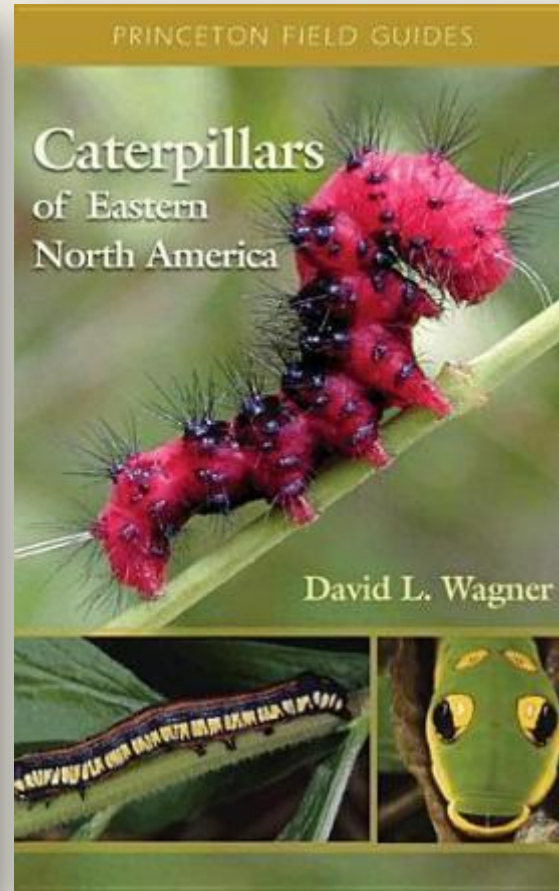
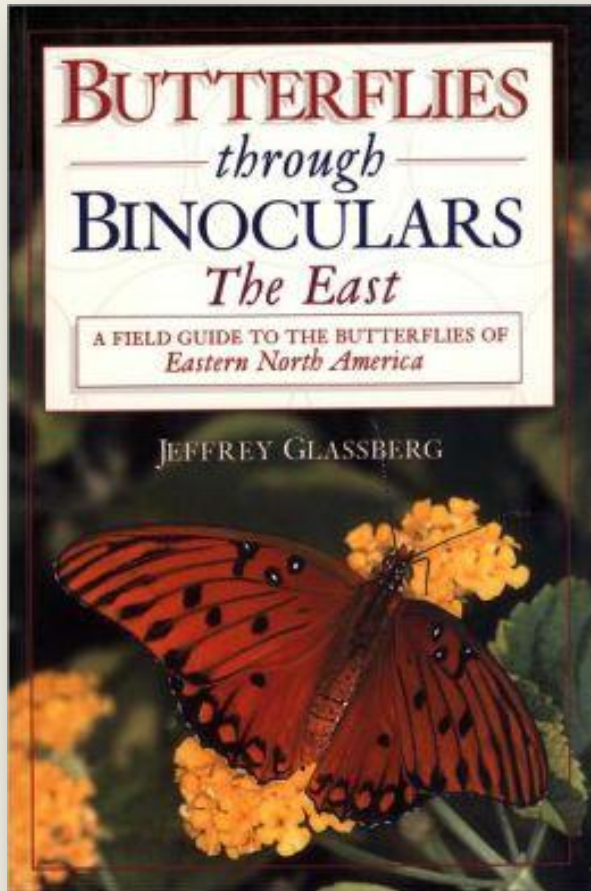
To make observations, you will need:

- **Datasheets, clipboard, pencil**
- **Identification guides**  
(phenophase definition sheets, field guides)
- **Binoculars**  
(optional but strongly suggested)
- **Camera**  
(optional but darn handy if you're not sure about IDs)



## 3b. Record butterfly observations, cont.

---



The two best butterfly field guides—both are part of the Plummer House library

## 3b. Record butterfly observations, cont.

---



### **Close-focus binoculars (focus as close as ~5 ft)**

- For butterflies in the distance
- For cryptic species with hard-to-discern field marks



### **Photographs**

- Vouchers for the presence of a species on a particular day
- Invaluable for difficult IDs—take multiple views if possible (open and closed wings)

## 3b. Record butterfly observations, cont.

---

### Animal survey method: Area search



**What does this mean exactly?**

- Walk multiple times through the butterfly garden, crossing points more than once and noting butterflies as you go
- Search plants (especially known host plants) for caterpillars, turning leaves and looking along stems
- Permissible to sit in one spot periodically to rest



## 3b. Record butterfly observations, cont.

---

### Recording plant visitation



(Not required for *Nature's Notebook*, but interesting)

- For *adult butterflies*, record at least one flower species visited per butterfly species seen on a given observation day
- For *caterpillars*, always record the plant on which the caterpillar is feeding or resting

## 3b. Record butterfly observations, cont.

---

### A few words about estimating abundance...



(Relax...it's not required)

- For *adult butterflies*, can be very difficult and is not required for *Natures' Notebook* protocol
- For *caterpillars*, is usually much easier and worth the attempt

# Using *Nature's Notebook*

---

1. Join *Nature's Notebook*
2. Orient yourself to the Observation Deck
  - a. Site(s)
  - b. Species to be observed
  - c. Details about species
3. **Start observing!**
  - a. Get organized to observe
  - b. Record butterfly observations
  - c. **Submit observations online**



## 3c. Submit observations online

---

- As frequently as possible (trust me, you'll want to stay on top of this!)
- Follow the step-by-step questions
- Enter data for all species collected each time

**NOTE: Can schedule a separate workshop on online data entry—much easier to demonstrate “live.”**





# Phenology Observation Program

## Overview

- Recording butterfly observations
- ✓ *Observation protocol and commitment*
- NN Butterfly ID 101
- Q & A



# Observation Protocol and Commitment

---

*Nature's Notebook* would prefer that our site be observed:

- As often as possible
- BUT—at least once a week



# Observation Protocol and Commitment, cont.

---

## “Baseline” commitment for volunteers

For Jug Bay butterfly phenology program:

- Observe **one hour per week** throughout the season (~April through October)
- As a group, we will try to spread out assignments to record observations on **several days/week**





# Phenology Observation Program

## Overview

- Recording butterfly observations
- Observation protocol and commitment
- ✓ *NN Butterfly ID 101*
- Q & A





# *Nature's Notebook* Butterfly ID 101

---

## **Twelve NN butterfly species in our region:**

- Two will probably not be seen in the garden
  - Mourning Cloak
  - Common Wood-Nymph
- Two may be seen in the garden
  - Red Admiral
  - Pipevine Swallowtail
- Eight are expected to be seen in the garden
  - Spring Azure
  - Eastern Tailed-Blue
  - Monarch
  - Common Buckeye
  - Great Spangled Fritillary
  - Common Sootywing
  - Orange Sulphur
  - Cabbage White

# *Nature's Notebook* Butterfly ID 101, cont.

---

## Mourning Cloak (~1.6 in)

- Does not generally visit gardens because it feeds on mud, sap, and rotting fruit
- Flight period – disjunct throughout year, but emerges early in spring (April)
- One brood
- Caterpillar host plants
  - Willows
  - Poplars
  - Elms
  - Hackberry
  - Birch



# Nature's Notebook Butterfly ID 101, cont.

## Common Wood-Nymph (~1.25 in.)

- Does not generally visit gardens because it is a brushy woods edge dweller
- Flight period – Late June through Late August
- One brood
- Caterpillar host plants
  - Grasses (beard grass, bluestem, purple-top, and many other types of grass)



# *Nature's Notebook* Butterfly ID 101, cont.

---

## Red Admiral (~1.3 in.)

- Occasionally visits flowers in garden
- Flight period – Migratory waves (~3) throughout the season, starting in May
- Two broods
- Caterpillar host plants
  - Nettles (including false nettle)





# *Nature's Notebook* Butterfly ID 101, cont.

---

## Pipevine Swallowtail (~1.75 in.)

- Occasionally visits flowers in garden
- Flight period – May, then July-August
- Two broods
- Caterpillar host plants
  - Pipevines



# *Nature's Notebook* Butterfly ID 101, cont.

---

## Spring Azure (~1/2 in.)

- Most often seen close to the ground, resting on or flitting over grass
- Flight period – April through June
- One brood
- Caterpillar host plants
  - Dogwood
  - Viburnum
  - Blueberry
  - Labrador Tea



# *Nature's Notebook* Butterfly ID 101, cont.

## Eastern Tailed-Blue (~1/2 in.)

- Commonly seen in garden, usually close to the ground
- Flight period – late April throughout warm season
- Three or more broods
- Caterpillar host plants
  - Clover
  - Lupine
  - Pea vine
  - Tick-trefoil
  - Vetch





# *Nature's Notebook* Butterfly ID 101, cont.

---

## Monarch (~2 in.)

- Needs no introduction
- Flight period – June through October
- Three or more broods
- Caterpillar host plants
  - Milkweeds!





# Nature's Notebook Butterfly ID 101, cont.

## Common Buckeye (~1.12 in)

- Stunning (Darcy's favorite butterfly)
- Flight period – Late July through early October
- Two broods
- Caterpillar host plants
  - Gerardias
  - Toadflax
  - Plaintain
  - *Ruellia*



# *Nature's Notebook* Butterfly ID 101, cont.

## Great Spangled Fritillary (~1.7 in.)

- Flight period – Mid-June through early September
- One brood
- Caterpillar host plants
  - Violets



# *Nature's Notebook* Butterfly ID 101, cont.

---

## Common Sootywing (~1/2 in.)

- White spots on head are key to ID
- Flight period – Late May throughout the warm season
- Two broods
- Caterpillar host plants
  - Lamb's quarters
  - Pigweed
  - Amaranth





# *Nature's Notebook* Butterfly ID 101, cont.

---

## Orange Sulphur (~1 in.)

- Variable in color, but always with some orange on wing
- Flight period – May through October
- Three or more broods
- Caterpillar host plants
  - Alfalfa
  - Clover





# *Nature's Notebook* Butterfly ID 101, cont.

## Cabbage White (~1 in.)

- Flight period – Early April through frost
- Three or more broods
- Caterpillar host plants
  - Crucifers (cabbage, cauliflower, cress, bok choy, broccoli)

