

VERNAL POOL BRANCHIOPODS

A Workshop for Future Permit-Holders



Davis (Classroom)
Sacramento Valley (Field)

JAN 22-27
2024

Western Section of
The Wildlife Society

Participants May Choose Between

Full Class: January 22-27, 2024
Field Portion Only: January 25-27, 2024

Instructors

Mary Schug Belk, Belk Fairy Shrimp ID
Carol Witham, Vernal Pool Specialist, Witham Consulting
David Muth, Senior Branchiopod Biologist and Herpetologist, LSA
Peter Balfour, Vice President and Principal Biologist ECORP

Coordinator/Contact for Questions: Ivan Parr, workshops@twc-west.org

This workshop combines both an ID class and 20 hours of wet season surveys, two requirements needed to begin the Large Listed Branchiopods 10(a)(1)(A) permit process for wet season surveys (note: taking the workshop hopes to but does not guarantee minimum qualifications for the permit). Full requirements of the permit are found [here](#). Participants also have the option of taking only the wet season field survey portion if they choose. The ID course will be taught in Davis, CA; and the wet season field survey portions will take place in three different locations in the Sacramento Valley, specially chosen for a diverse branchiopod fauna.

Course Overview

Identification Course

To take this class separately, please see [Mary Belk's other classes](#))

The classroom portion, taught by Mary Belk, will teach you to identify fairy shrimp of California using the key provided, and will conclude with the test required for the permit. Mary will teach students how to identify all 25 vernal pool branchiopods known from the state and two other shrimp likely to occur in California. Students will spend two full days working on identifications under dissecting scopes and one on lecture. The test given on the third day of the classroom portion fulfills the testing requirements of the U.S. Fish and Wildlife Service 10(a)(1)(A) permit for surveying and collecting fairy shrimp in the state of California. This class or an equivalent is a prerequisite to the wet season surveys.

At least a month prior to the workshop, you will receive online homework, including some print-outs to bring with you. Review the videos to prepare you for what a fairy shrimp looks like and a look at a few of their environments.

What's Included: Hands-on training with the expert in a lab setting; a binder-bound copy of Erikson and Belk's *Fairy Shrimp of California's Puddles, Pools, and Playas*; an updated key to fairy shrimp of California; and scientific illustrations including cheat-sheets made specifically for this workshop, and soft-tip forceps. Mary will loan you a petri dish and weights. Snacks and 2 lunches are included with the classroom ID course only. **Your own microscope, transportation, lodging and other meals are NOT included.**



Wet Season Surveys (can be taken separately)

The field portion of the workshop is designed to provide 20 hours of wet season work. We will visit three distinct locations within the Sacramento Valley. Depending on site conditions, participants will have the opportunity to handle listed branchiopods species endemic to our vernal pool systems under supervision of some of the state's top fairy shrimp biologists.

What's Included: Hands-on training with THE experts in the field, access to three publicly-inaccessible locations courtesy of Carol Witham. Handling hours, field equipment (viewing containers, sorting trays, water for clarification, and pipettes), and booklet. You can borrow our nets and buckets, but bringing your own disinfected gear is also welcome.



If you pass the test and complete the field hours, you should be eligible to add 6 threatened and endangered species to your 10(a)1A recovery permit.

Audience

This workshop is aimed towards biologists serious about getting a recovery permit on large, listed branchiopods.

Although this workshop is novel in being able to offer both the required test and field training for wet season

surveys, passing will require your persistence. Full course participants will need to become adept in using a dichotomous key, to look under a microscope for hours at a time, and brave windy and potentially rainy conditions in the field.



The test will be conducted with participants correctly identifying all specimens within 20+ vials. You may encounter multiple species per vial. You will be required to make 100% in order to receive a letter informing the USFWS that you passed the class. Mary Belk's classes get an average of a 90% pass rate.

Please fill out this [Prerequisite survey](#) to determine whether this workshop will be a good fit for you, prior to registering. Only you get to see the results - it's just to help your decision-making process. A score of 7 or higher means you'd probably do well in this workshop.



Registration

All registrants complete the secure online form at:

Registration will open on July 31st at 8:00 AM. Those previously waitlisted will have priority notification.

All participants must fill out a **registration form** here:

<https://user.tws-west.org/store.php?e=VPB2024>

Prerequisite

Prior to the registration date, please take the [prerequisite survey](#) above to determine if this class is what you are looking for.

Registration will be processed by order of receipt. Checks are no longer accepted as payment. However, we recognize that **state & federal employees** require payment by check with lead time. Therefore, exceptions to this rule may be requested by 1. emailing the workshop coordinator at workshops@tws-west.org, showing proof of intent from a manager, and 2. filling out a registration form (skipping the payment page) to hold your spot.

A month before the workshop, you will receive further details about the course.

Registration Categories	Registration Costs
Classroom and Field	
Member, TWS Western Section	\$2,050
Non-Member	\$2,120
Field Only	
Member, TWS Western Section	\$1,130
Non-Member	\$1,230

The maximum enrollment is **15** for the full course; and **10** for the wet season survey portion only. A **waitlist** will be kept once we hit our limit, and participants will be notified as soon as someone drops out of the class. The waitlist will be processed in order of registration.

If the workshop must be canceled or rescheduled, we will offer transfer registrations to the alternate dates in the priority that registrations were initially received.

Cancellation and Refund Policy: If you cancel prior to 3 weeks prior to the first day of the workshop, you are eligible for a refund, sans a \$50 processing fee. You can also transfer your registration to another person for \$25. After 3 weeks, you are no longer eligible for a refund.

contact workshops@tws-west.org

Locations

The workshop will take place in the Sacramento Valley of California. We will conduct the identification class in Davis and visit three geographically distinct (per the permit requirement) field locations within a 50 mile radius of Sacramento. Typically, these locations are Jepson Prairie in Dixon and two locations as far east as Sloughhouse. Field locations are determined within a couple weeks of the workshop to maximize potential for finding required listed species.

We will conduct the **Identification Course** at:

[Davis Veterans Memorial](#)

[203 E 14th St. Davis, CA 95616](#)

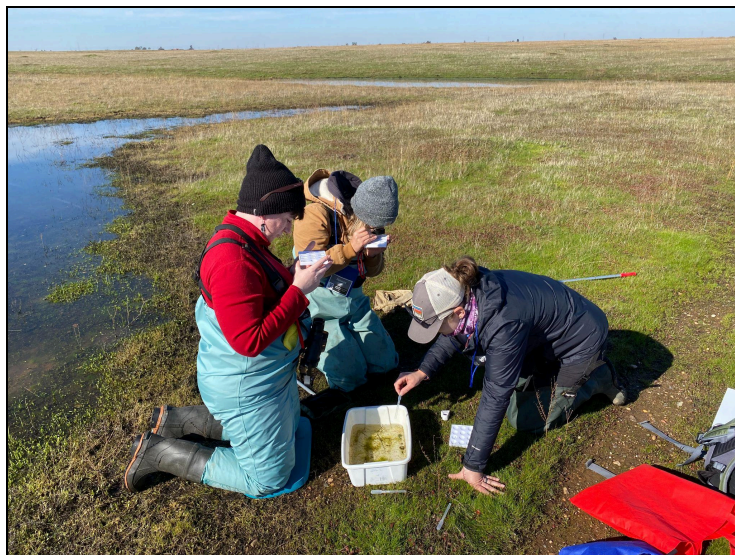
Preparation

Identification Course

For the identification course, each individual will need to obtain a **dissecting microscope**, with a magnification range between objectives ranging from 1X to 4X and 10X to 40X magnification. Mary is no longer accepting compound microscopes in the class, as it has been too tempting to mangle delicate specimens. A [list of recommended microscopes can be found here](#). Note that you cannot share a microscope, particularly during the test.

What Species Will I See?

This will depend on the weather, but we typically see *Lepidurus packardi* and *Branchinecta conservatio*. If we are lucky, we *might* see *B. mesovallensis*, *B. lynchi*, and *Linderiella occidentalis*.



Packing List

IDENTIFICATION COURSE

- Homework: after registration, you'll receive a link to some handouts and videos. Please print out the handouts and view the videos prior to coming to class. This is a new style to the workshop, but we have found it to be more efficient for your study time in class and for our ability to set up the field portion.
- Microscope, as described above (not optional)
- One or more high quality light source(s). High intensity desk lamp \$10 work well. This is helpful if your scope bulbs fail.
- An isobar with four foot cord is helpful.
- Colored Pens or pencils for accenting parts of the animals in drawing.
- Thermos and water bottle

Optional

- Your own small petri dish
- A notebook or laptop. The latter may be useful (though not necessary) as some information will be provided by thumb drive.

WET SEASON FIELD SURVEYS

- Mask for carpooling
- Participants will be required to sign a liability waiver for each of the private properties we will be accessing.
- Heavy-duty boots or waders for submersion, rain pants for sitting in wet prairies
- Hand lens or magnifier
- Hand towel
- Water, lunch, snacks
- Sunscreen, hat, layers, etc.
- Something to sit/lie on upon wet dirt (ground pad, camp stool, tarp) - it's going to be very wet.
- Rain gear
- Toilet paper
- Garbage bag for car floor protection
- Gas in your car

Optional:

- Dip nets (highly recommended)
- Camera
- A white plastic dish bucket
- A gallon jug of water for cleaning
- Sorting trays

*Decontamination supplies and field kits including viewing buckets, sorting trays, viewing containers, pipettes, cleaning materials, etc. are provided by the Western Section.

Schedule

(SUBJECT TO CHANGE PER INSTRUCTORS)

IDENTIFICATION COURSE

Instructor: Mary Belk

Location: [Davis Veterans Memorial](#)
[203 E 14th St, Davis, CA 95616](#)

January 22, 2024

7:00 - 8:00 AM - REGISTRATION

8:00 AM - 7:00 PM - INTRODUCTION and ID



LECTURE: We begin class by viewing several PowerPoint presentations and then an award winning video on large Branchiopod crustaceans – fairy shrimps, clam shrimps, and tadpole shrimps. Mary Belk will discuss Branchiopod general biology, ecology, zoogeography, and conservation, followed by a discussion of morphology of fairy and tadpole shrimp. Questions are welcome at any point both during and after these presentations.

LABORATORY: Mary Belk will discuss techniques useful in studying fairy shrimps under the microscope and using the revised key fashioned after Eriksen and Belk (1999). This will include PowerPoint presentations of the California species illustrating key characters. The key (emailed to you) and update sheets will be used to identify study specimens of the California fairy shrimp and tadpole shrimp species. Mary Belk will work individually with each student during this exercise helping each person learn how to see key characters.

Tuesday, January 23, 2024

8:00 AM - 7:00 PM - KEY and STUDY

LABORATORY: Mary will begin the class by stepping through the key couplet by couplet with the use of a PowerPoint presentation. Students will resume individual study aided by Mary.

Wednesday, January 24, 2024

8:00 AM - 7:00 PM - STUDY and TEST

TEST: Students may spend time studying (2-2:30 hours max) before taking a practical examination during which they will identify a set of test specimens using the key and their own notes (Open book test). Students must get 100% to pass. Bring your own lunch.



WET SEASON SURVEYS

Lead Instructor: Carol Witham

David Muth, Pete Balfour, Mary Belk

Location: Three Geographically Separate Areas within a 30-mile radius of Sacramento, TBD based on rainfall conditions.

Surveys: Students will rendezvous at a designated location at 7 AM and then drive themselves to a site to begin at 8 AM. Students arrive each day and divide into groups to survey for endangered branchiopods. Access information and maps will be provided prior to the field, as we will be traveling to a separate location each day.

Note: Please do not plan on leaving early during any of these surveys. Not only will you fail to receive your full hours, but you will also cause a disruption to the parking/carpool situation.

January 25, 2024

7:00 AM - 5:00 PM

We will meet at the parking lot of the

[Davis Veterans Memorial](#)

[203 E 14th St, Davis, CA 95616](#)

From there, we will carpool to Jepson Prairie.

January 26, 2024

7:00 AM - 5:00 PM

We will meet at the parking lot of the [Park and Ride on Highway 16](#)

11695 Jackson Rd, Sacramento, CA 95830 (note: do not rely on Apple Maps to get there)

January 27, 2024

7:00 AM - 5:00 PM

We will meet at the parking lot of the [Park and Ride on Highway 16](#)

11695 Jackson Rd, Sacramento, CA 95830 (note: do not rely on Apple Maps to get there)



LODGING and TRAVEL

Lodging and travel are NOT included in registration. As we cannot confirm the site locations for the wet season field surveys until closer to the date, we recommend choosing lodging in Davis or Sacramento.

You can find hotels at [hotels.com](https://www.hotels.com).

If you are **flying** to get to the workshop: we will try to be in the field until we can complete the 20 hours, so flexibility will be in your favor. We strongly recommend giving yourself a minimum of five hours after the final day's end time (5 PM) for your return flight. Although we will try to have the last day be the one closest to the airport, please consider that airports and traffic can be unpredictable and that you will probably want to change out of wet field clothes, return rentals and field gear, etc.

Instructor Biographies

**Mary Schug Belk**

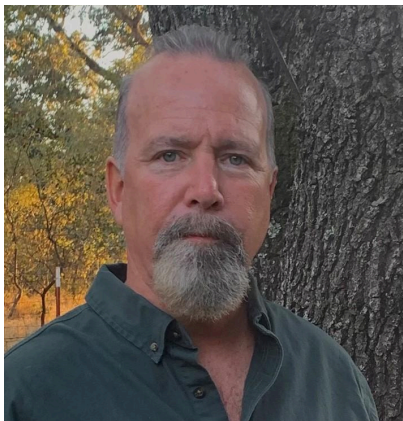
Mary has been teaching the Anostracan, Notostracan Identification Classes since 2001. She has a Masters in Biology and a Masters in Adult Education and Training. Mary has conducted and published research on fairy shrimp in California. From 2002 - 2018, she became first the volunteer Treasurer for The Crustacean Society and in January 2011, she started serving as the Executive Director. Mary Belk is the widow of Denton Belk PhD, who, at the time of his death in 2001, was recognized as the world's most prominent fairy shrimp researcher. He set up identification classes like the one described in this flier in 1992 prior to several species of fairy shrimp being put on the endangered species list in 1994.

**Carol Witham**

Carol W. Witham of Witham Consulting is recognized as one of the top vernal pool ecologists in California. Carol is self-educated, having begun with a general curiosity about the plants found in vernal pools, which led to exploring, researching, and working with other experts. Since then, Carol has spent most of her career dedicated to studying the natural history of these unusual natural communities. She is an active conservation advocate through the California Native Plant Society, promoting the belief that plants are necessary to humans and animals alike; as well as promoting the conservation of vernal pool ecosystems.

**David Muth**

David Muth is a senior biologist at LSA Associates. His main interests focus on herpetology, in addition to aquatic invertebrates. He specializes in biological resource assessment, endangered species surveys, biological construction monitoring, wetland delineation, and wetland restoration. San Francisco garter snake, California tiger salamander, western pond turtle, arroyo toad and fringe-toed lizards are among the many species David works with on a regular basis. David is considered one of California's experts on dry season vernal pool branchiopod surveys and is one of the few people familiar with the extremely rare longhorn fairy shrimp.

**Peter Balfour**

Peter Balfour is a Vice President and Principal Biologist with ECORP Consulting, Inc. He holds a B.S. in Zoology from the University of California, Davis and a M.S. in Biology from California State University, Sacramento. He has over 32 years of professional experience working with fauna and flora of various ecosystems throughout California. He regularly assists both private and public sector clients with a variety of biological resource investigations, special status species surveys, and regulatory compliance. He has decades of experience working with large branchiopods in vernal pool landscapes and has served as a technical contributor on recovery teams for vernal pool

species and other aquatic organisms.

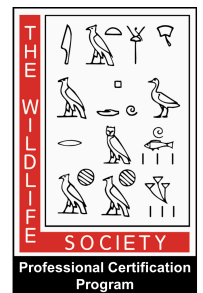


We thank the **Public Works, Environmental Resources Division at the City of Davis** for sponsoring our venue. The Environmental Resources Division's mission is to serve as stewards for the responsible use of environmental resources by promoting conservation and pollution prevention, while ensuring regulatory compliance through fiscally stable planning and program implementation.

Certified Wildlife Biologist Renewal/Professional Development Certificate Program

The Wildlife Society will allow a maximum of **37** Continuing Education Units in Category I.

28 of these are assigned to the Identification Course.
9 of these are assigned to the Wet Field Season Surveys.



COVID Policy

The Western Section of The Wildlife Society follows California State, Center for Disease Control, County, City, and The Wildlife Society guidance on COVID restrictions.

If you have recently been diagnosed with or exposed to COVID-19, please consult and adhere to the CDC Isolation and Exposure Calculator. Please do not attend if you have a suspected or confirmed case of COVID-19. Alliance policies and protocols may be updated at any time based on CDC and/or local or state public health guidelines as needed.

By attending the workshop, you assume all of the risk of contracting COVID-19 and agree to hold the Section harmless.

Code of Conduct

All TWS-WS events will adhere to the following code of conduct

<https://twswest.org/the-wildlife-society-code-and-ethics-policy/>