



The Northwest Environmental Training Center presents:

Freshwater Fish Identification Biology, Ecology, and Morphology

Course ID: BIO-403 (2 days)
July 31 - August 1, 2008, 8:30 A.M. to 5 P.M.
Lakeland Village Beach and Mountain Resort
3535 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150

Instructor: Michael Carbiener, Senior Fisheries Biologist, URS Corp.

Description: This course will cover the identification of freshwater fish species found throughout the West. Covering over 80 species of fish, this course will provide participants with the opportunity to learn about, and distinguish between, nearly every fish found in the state of California, as well as the majority of fish occurring within the Western United States. Species habitat preferences, life history and morphology will be emphasized, in addition to dichotomous keys, to provide participants the tools required to identify fish based on location, habitat, timing, and life stage. The two-day course will focus on the discussion and identification of freshwater fish. Participants will learn over 80 fish species, their habitat and distribution ranges, and other distinguishing factors. Participants will gain an understanding of fish communities, allowing them to accurately predict the composition of fish species throughout a stream or lake. This information can be used to help determine which fish species may be present and will need to be addressed in environmental documentation and the permitting process.

Course Topics:

Morphology and Functions: Participants will learn how the form and function of fish determine their role in the ecosystem. We will discuss what fish to expect in a given habitat and why they are there.

Habitat Preferences: Why are certain fish are found in fast water and others prefer deep pools or lakes? Why are some fish found in warm water but others need cold water to survive? By expanding on how morphology can be used to categorize habitat preferences, participants will gain a better understanding of what fish to expect at a given location.

Life History: Participants will learn about various life histories; why some fish spawn in rivers and others in lakes; why certain fish die after spawning and others spawn multiple times. We will also focus on the life histories of several fish species commonly encountered in biological impact analysis and discuss adaptations to extreme and varying environments.

Native vs. Introduced: We will learn how native fish are adapted to the west coast environment and utilize entirely different life strategies than introduced fish.

Managed Systems: We will explore how California's growth and demand for water is affecting fish communities. We will also explore the effects humans have had on California's fish community.

Fish Identification

Techniques: We will discuss various strategies for collecting fish, pros and cons of each method, and ways to reduce mortality.

Using Keys: Participants will learn how to use a dichotomous key to work through the identification process.

After completing this course, participants will be able to:

- Predict the fish community of a given habitat, based upon the conditions and location.
- Understand the life history and preferred habitat of over 80 native and introduced fish species.

- Identify nearly all fish species found throughout California and the West.
- Use a dichotomous key to positively identify fish that are difficult or unfamiliar.

About the Instructor: Michael Carbiener is a Senior Fisheries Biologist with URS Corporation in Oakland, CA. He has over ten years of experience leading and conducting fisheries and aquatic studies throughout Northern and Central California. He is currently managing fish population studies on Hat Creek and the Pit River in Northern California, as well as a recent study of fish populations in restored salt ponds throughout South San Francisco Bay.

Intended Audience: This course is designed for professionals and members of the public with an interest in fish identification. Particularly helpful for fisheries technicians, environmental consultants, creek groups, and volunteer coordinators, this course will be beneficial for people looking to learn the skills required to identify freshwater fish, as well as those that may need to brush up on existing skills. Basic fish identification skills would be helpful but are not required.

Prerequisites: Participants should have some knowledge of biology. An understanding of general hydrology, fish biology and aquatic systems would be helpful but is not required.

Education Level: Introductory/Review

Course Materials: Participants will receive course proceedings, tutorials, and reference materials.

Continuing Education Units: 1.3

What to Bring: Pen or pencil, coffee mug, and a water bottle (to reduce waste). Please wear comfortable clothes appropriate for the prevailing weather. Lunch will be on your own. There are numerous restaurants within walking distance. Drinks and snacks will be provided each day.

Registration: \$495 (*\$395 reduced tuition is available for Native American tribes; government employees; nonprofits; students; and [AFS](#), [NAEP](#), [NEBC](#), [NWAEP](#) members). You may register via the link below or by calling the Northwest Environmental Training Center at 206-762-1976.

Cancellation Policy: Registration fees are fully refundable up to 30 days prior to the event and 50 percent refundable (or 100% credit) thereafter up to 3 business days prior to the event. No refunds are issued for cancellations occurring less than 3 business days before the start day. Course registration fees and cancellation policy are subject to change without notice.

Disability Accommodations: To request disability accommodations, please contact us at info@nwetc.org or (206) 762-1976 at least 30 days prior to the event.

Northwest Environmental Training Center

A nonprofit 501(c)(3) program of the Northwest Environmental Education Council
650 S. Orcas Street, Suite 220, Seattle, Washington 98108
Phone: (206)762-1976, Fax: (206)762-1979
www.nwetc.org



Tahoe, CA | ACCOMMODATIONS near the Lakeland Village Resort

Lakeland Village Beach & Mountain Resort

3535 Lake Tahoe Blvd.
 South Lake Tahoe, CA 96150
<http://www.lakeland-village.com/>

<p>Avalanche Inn 786 Bigler Court Stateline, Nevada</p>	<p>(775) 588-1931</p>	<p>Harvey's Lake Tahoe Hotel & Casino 4130 Lake Tahoe Boulevard South Lake Tahoe, California</p> <p>www.harrahs.com</p>	<p>(775) 588-2411</p>
<p>Embassy Suites Lake Tahoe 4130 Lake Tahoe Boulevard South Lake Tahoe, California</p> <p>http://embassysuites1.hilton.com</p>	<p>(530) 544-5400</p>	<p>Marriott's Timber Lodge 4100 Lake Tahoe Blvd South Lake Tahoe, CA</p> <p>www.marriott.com</p>	<p>(530) 542-6600</p>
<p>3 Peaks Resort & Beach Club 931 Park Avenue South Lake Tahoe, CA</p> <p>www.lake-tahoe-california-hotels.com</p>	<p>(530) 543-1814</p>	<p>Best Western Station House Inn 901 Park Avenue South Lake Tahoe, CA</p> <p>www.stationhouseinn.com</p>	<p>(530) 542-1101</p>
<p>Seven Seas Inn 4145 Manzanita Avenue South Lake Tahoe, CA</p> <p>www.sevenseseahotels.com</p>	<p>(530) 544-7031</p>	<p>Royal Valhalla on the Lake 4104 Lakeshore Boulevard South Lake Tahoe, CA</p> <p>www.tahoeroyalvalhalla.com</p>	<p>(530) 544-2233</p>

Northwest Environmental Training Center

A nonprofit 501(c)(3) program of the Northwest Environmental Education Council
 650 S. Orcas Street, Suite 220, Seattle, Washington 98108
 Phone: (206)762-1976, Fax: (206)762-1979
www.nwetc.org



Directions to:

Lakeland Village Beach & Mountain Resort

3535 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150
<http://www.lakeland-village.com/>

Parking: Complimentary on-site parking is available

FROM RENO

Take Highway 395 South through Carson City.
After Carson City, turn right onto Highway 50 West.

FROM SACRAMENTO & SAN FRANCISCO

Follow Highway 50 to South Lake Tahoe.
Turn RIGHT on South Lake Tahoe Blvd.

Northwest Environmental Training Center

A nonprofit 501(c)(3) program of the Northwest Environmental Education Council
650 S. Orcas Street, Suite 220 | Seattle, Washington 98108
Phone: (206)762-1976 | Fax: (206)762-1979
www.nwetc.org

