Measuring the Health of Streams and Rivers in California

College of Bioassessment – 2018 Curriculum

About the College of Bioassessment

Bioassessment in water quality management involves the use of biotic indicators and measures of physical/habitat condition to determine the health of aquatic systems. Development of standardized techniques for measuring the condition of California streams and rivers began in the early 1990s based on guidelines proposed by the U.S. EPA. Over the years, there have been considerable advancements in bioassessment techniques and tools for developing biotic indicators. This work, led by the California Department of Fish and Wildlife (CDFW) in cooperation with the State and Regional Water Board's Surface Water Ambient Monitoring Program (SWAMP), will be extensively explored in these courses.

Water resource managers and others concerned about protecting the health of streams and rivers need to understand the implications of bioassessment data and how it is being collected and used in California. The **"College of Bioassessment (COB)"**, offered through the Water Board and CDFW, provides students the necessary training to become competent with administering and conducting a bioassessment project.

About the Curriculum

The 2018 COB curriculum consists of two 3-day courses which combines an introduction to bioassessment and SWAMP field procedures into one course and laboratory procedures and data analysis into another course. The courses should be taken in succession and attending both will give the student a beginning understanding on the use of bioassessment by SWAMP and in water quality monitoring and regulation.

About the Instructor

The Principal Instructor for each course offered through the COB is Jim Harrington, a Senior Environmental Scientist with the CDFW. Jim has been working in the field of freshwater bioassessment for more than 30 years. In 1996, Jim developed field and laboratory curriculum for professionals, environmental educators and watershed groups, teaching them the principles of bioassessment and how biological indicators can be used in California water quality monitoring and enforcement.

How to Sign Up

This year all courses will be held in the Sacramento area and registration will be through the instructor, Jim Harrington. **Registration will open up March 1 for the "Concepts of Bioassessment and SWAMP Field Procedures" course only. Registration for the "Aquatic Invertebrate Laboratory Procedures and Data Analysis" course will open on August 1 with preference going to those who have completed the first course.** Students should request which date they prefer along with a backup date. Courses are limited to 12 students and a waiting list will be established if necessary.

Send registration requests to: james.harrington@wildlife.ca.gov with the subject line: **COB Registration**. Those who successfully register for a course will be informed within 10 days and receive course instructions and materials one week before the course begins.

2018 Course Schedule and Locations

Concept of Bioassessment and SWAMP Field Procedures

April 24, 25 and 26	Sacramento
May 8, 9 and 10	Sacramento

Aquatic Invertebrate Laboratory Procedures and Data Analysis

October 2, 3 and 4	Sacramento
October 16, 17 and 18	Sacramento

Concepts of Bioassessment and SWAMP Field Procedures

This 3-day field course covers concepts of bioassessment and all aspects of the SWAMP bioassessment protocol from collecting freshwater invertebrate and algae samples to measuring the physical habitat of wadeable streams. The participants will practice various procedures at the stream site following detailed demonstrations by the instructor. The California Rapid Bioassessment Protocol (CRBP) will also be presented as a lower effort alternative for Citizen Scientists or as biotic screening tool.

Course Agenda

Day 1 Classroom Instruction

9:00 – 9:30	Introductions and Training Objectives
9:30 – 10:40	Presentation 1 - Overview of Bioassessment
10:40 – 11:00	Break
11:00 – 12:30	Presentation 2 - Stream Ecology, Freshwater Invertebrate Taxonomy and Producing Biological Metrics
12:30 – 1:30	Lunch

1:30 – 2:40 Presentation 3 - Bioassessment Field Sampling

2:40 – 3:00 Break

3:00 – 4:00 Presentation 4 - Sampling Design and Considerations for Using Bioassessment in Water Resource Projects

Day 2 Field Demonstration and Practice

9:00 – 9:30 Introductions and Training Objectives

9:30 – 10:40 Demonstrate Site Delineation and Chemical Sample Collection

10:40 – 11:00 Break

11:00 – 12:30 Demonstrate and Practice Invertebrate and Algae Sample Collection

12:30 – 1:30 Lunch

1:30 – 3:00 Practice Invertebrate and Algal Sample Processing

3:00 – 4:00 Discuss CRBP Sampling Procedure

Day 3 Field Demonstration and Practice

9:00 – 9:30 Review and Questions from Day 1

9:30 – 10:40 Demonstrate Measuring Physical Habitat Transect Parameters

11:00 – 12:30 Practice Measuring Physical Habitat Transect Parameters

12:30 – 1:30 Lunch

1:30 – 2:40 Demonstrate Measuring Physical Habitat Reach-Wide Parameters

2:40 – 3:00 Break

3:00 – 4:00 Practice Physical Habitat Reach-Wide Parameters

Aquatic Invertebrate Laboratory Procedures, Biological Metrics and Data Analysis

The first two days of this 3-day laboratory/classroom course covers freshwater invertebrate taxonomy and biological metric calculations. The participants will identify invertebrates to the family level from different sites and produce the data for examining site condition. Students will be introduced to the Family Level Index as part of the CRBP. The last day of this course covers sampling design and data analysis of both ambient and point-source assessments. Excel spreadsheets of taxa lists, biotic metrics and physical habitat elements will be examined by the students to answer a series of questions on data interpretation, quality and variability at actual SWAMP sites.

Course Agenda

Day 1	**Conference Room and Laboratory**
9:00 – 9:00	Introductions, training objectives and description of Course 3 manual
9:30 – 11:00	Presentations on the principles of bioassessment, freshwater invertebrate ecology and sample processing
11:00 – 11:00	Form teams and sub-sampling BMIs from samples
12:30 – 1:30	Lunch
1:30 – 4:00	Perform invertebrate taxonomy to order Level
Day 2	**Laboratory and Conference Room**
9:00 – 9:30	Review and questions from Day 1
9:30 – 12:30	Perform invertebrate taxonomy to family level
12:30 – 1:30	Lunch
1:30 – 2:40	Complete taxonomy, generate biological metrics and calculate Family Level Index (FLI) scores
2:40 – 3:00	Break
3:00 – 4:00	Discuss significance of biological metrics and FLI scores
Day 3	**Conference Room**
9:00 – 9:30	Introductions and Training Objectives
9:30 – 10:40	Presentation on Study Design and Field Techniques
10:40 – 11:00	Break
11:00 – 12:30	Description of Team Assignment and Practice Data Analysis and Interpretation
12:30 – 1:30	Lunch
1:30 – 2:40	Practice Data Analysis and Interpretation
2:40 – 3:00	Break
3:00 – 4:00	Wrap-up and Data Entry