



The Importance of Professionally Trained Citizen Monitors For California Bioassessment

Jim Harrington
WPCL Bioassessment Laboratory



Status Monitoring

305b Report

NPS 319h

State Report
Card

BMP Effectiveness

Regional (Basin) Monitoring and Assessment

SWAMP by
RWQCBs

Stressor ID

Watershed Man.

303d Listing and
Delisting

Regulatory Monitoring

NPDES

Stormwater

Ag. Waver

Spill Response

FERC/Hydro

STATE OF CALIFORNIA
RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
FISH AND WILDLIFE
WATER POLLUTION
CONTROL LABORATORY

Aquatic Bioassessment Laboratory
2005 Nimbus Rd. Rancho Cordova
(916) 358-4398 or 358-5862
www.dfg.ca.gov

DFG Aquatic Bioassessment Laboratory

Rancho Cordova and Chico State Laboratory



Jim Harrington
Staff Environmental Scientists

Research/Taxonomy

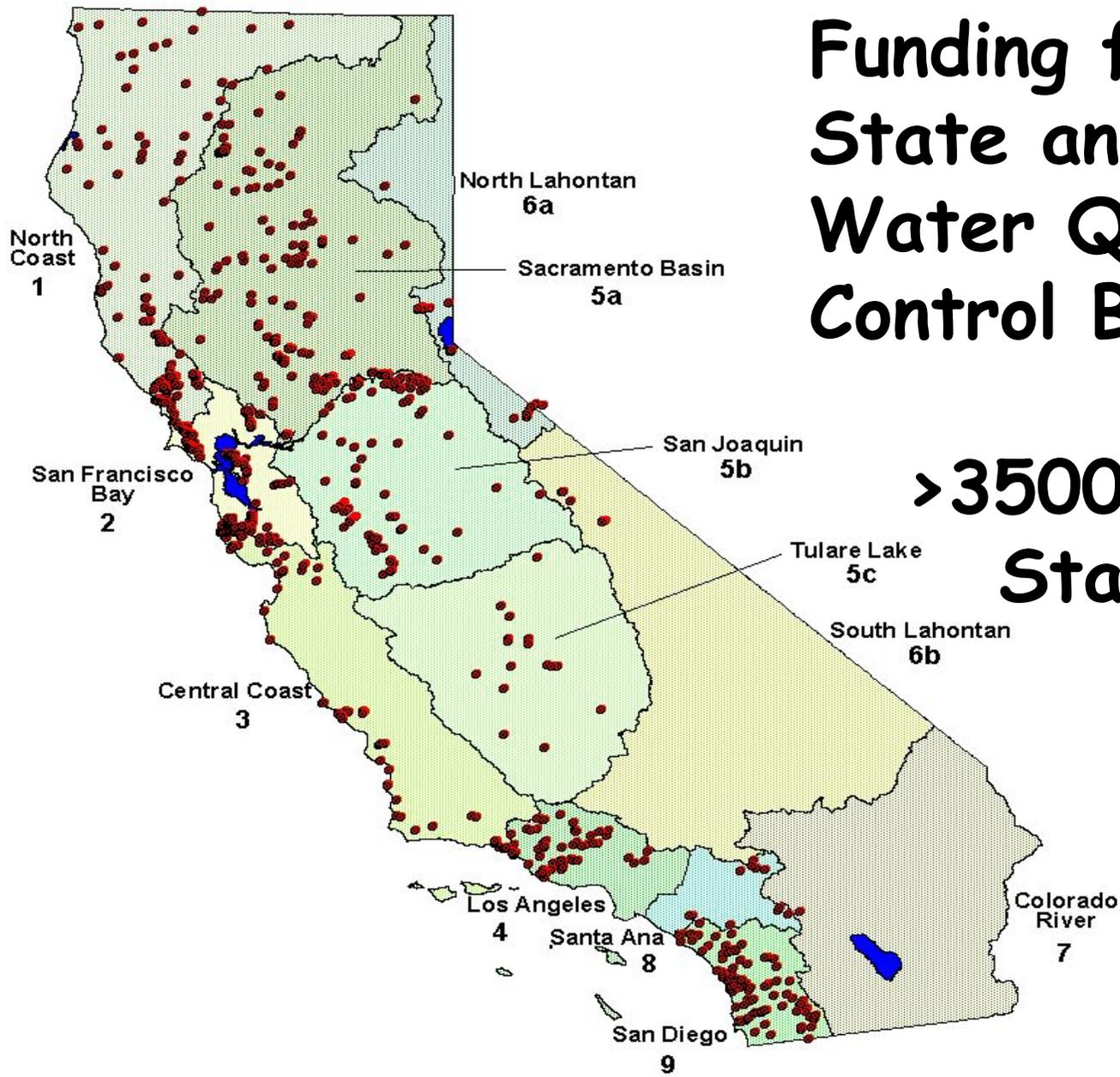
Dr. Pete Ode
Dr. Andrew Rehn

Enforcement
Angie Montalvo
Amy Tsuji

EMAP/Field
Mike Dawson
Jennifer Lenz
Shawn McBride
Glenn Sibbald
Nathan Brosius
Tim Mulloy

Taxonomist
Doug Post
Dan Pickard
Brady Richards
Joe Slovark
Lab Techs
Stacy Kraus
Jennifer Moore
Ryan Brosius
Rueben Mahnke

ABL Sites by SWQCB Region



Funding from EPA,
State and Regional
Water Quality
Control Boards

>3500 sites
State-wide

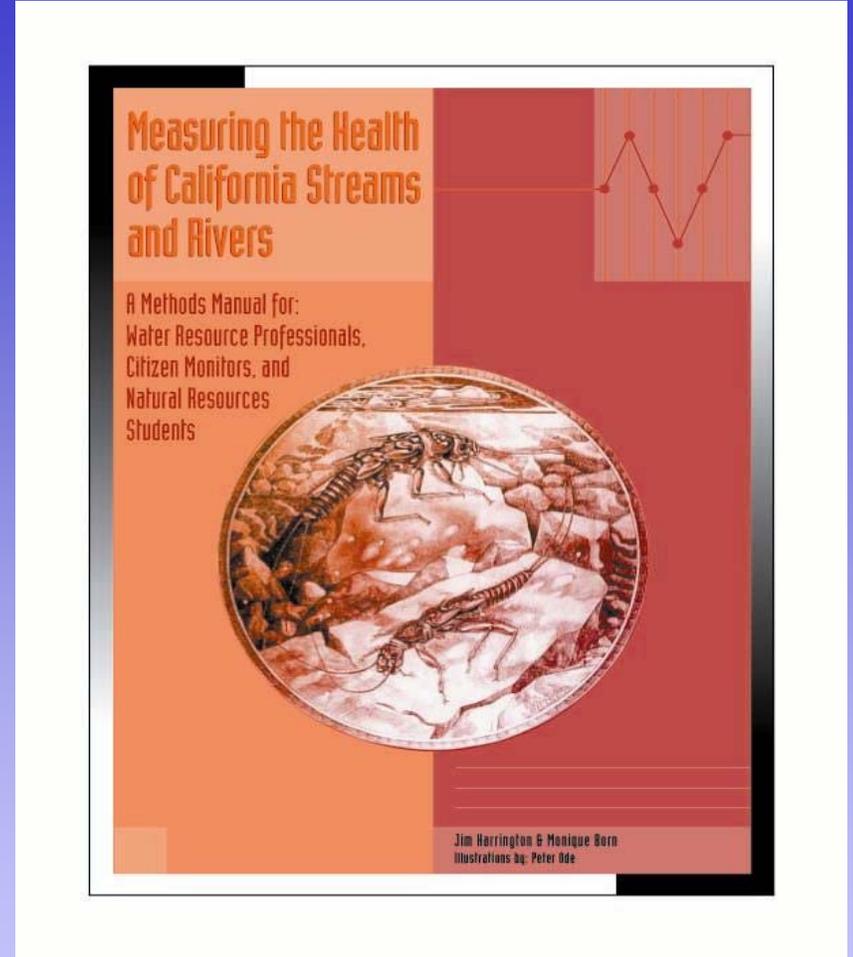


6-day Professional Training
sponsored by
American Fisheries Society
SETAC
Sustainable Land Stewardship Institute

Measuring the Health of California Streams and Rivers

A Methods Manual for:
Water Resource Professionals,
Citizen Monitors, and
Natural Resources Students

www.slsii.org



Jim Harrington & Monique Born
Illustrations by Peter Ode

**SLSI
Training
for
Citizen
Monitors**



**Professional
Level CSBP**

**Family Level
Taxonomy or
Professional**

SOP QAPP

**How to Work
with RWQCB**

**Scientifically
Sound
Environmental
Activism**

Citizen Monitors Workshops

Friends of

Grant Mandated Projects

319h Grant Funded Program (Placer RCD)

Resource Conservation Districts

High School

Total of 47 since 1996

AQUATIC ECOLOGICAL ASSESSMENT WORKSHOPS

PART 1 AGENDA

- Day 1 - Designing Freshwater Ecological Assessments**
 - Rapid and Fully Integrated Approach
- Day 2 - Physical/Habitat Assessments for Water Quality Projects**
- Day 3 - Sampling Biotic Communities in California Rivers and Streams**

Rapid Biological Assessment

California Stream Bioassessment Procedure

Surface Water Ambient Monitoring Program (SWAMP)



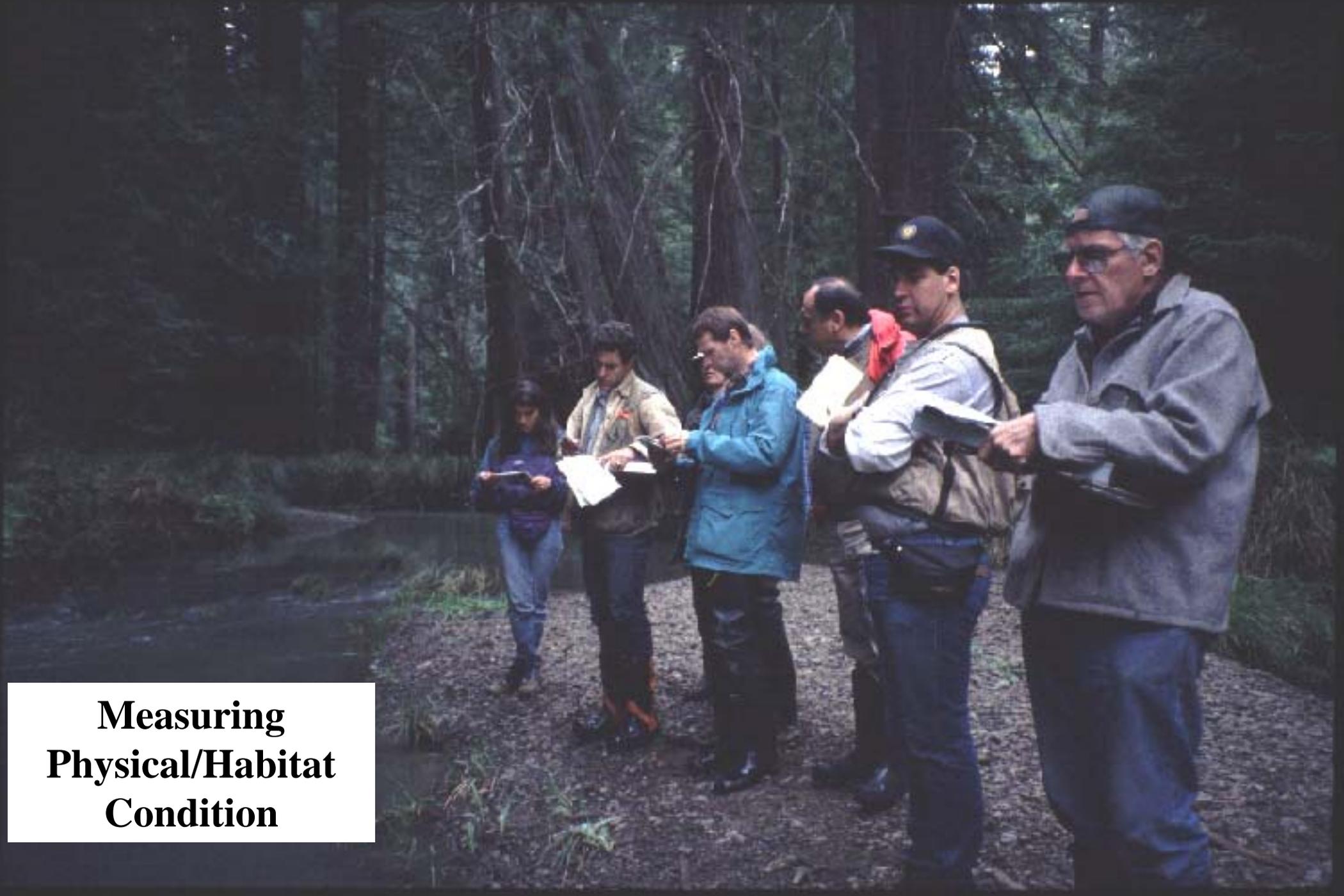
**Benthic
Macroinvertebraes**









A group of five people are standing on a dirt path in a forest. They are dressed in outdoor or work attire, including jackets and hats. Some individuals are holding papers or notebooks, and they appear to be engaged in a field study or data collection activity. The background is filled with tall, thin trees, creating a dense forest environment.

**Measuring
Physical/Habitat
Condition**

Fall 2004 Started
Teaching New SWAMP
P/Hab Protocols



Professional Level
Municipalities, Stormwater

Citizen Monitor Level
Friends of..., others



AQUATIC ECOLOGICAL ASSESSMENT WORKSHOPS

PART 2 AGENDA

- Day 1 - Family-Level Taxonomic Identification of Freshwater Invertebrates
- Day 2 - Continuation of Invertebrate Taxonomy, Insuring Quality Data and Calculating Biological Metrics
- Day 3 - Interpreting Biological Metrics and Current Topics on the Use of Freshwater Ecological Assessments in Water Quality Regulation

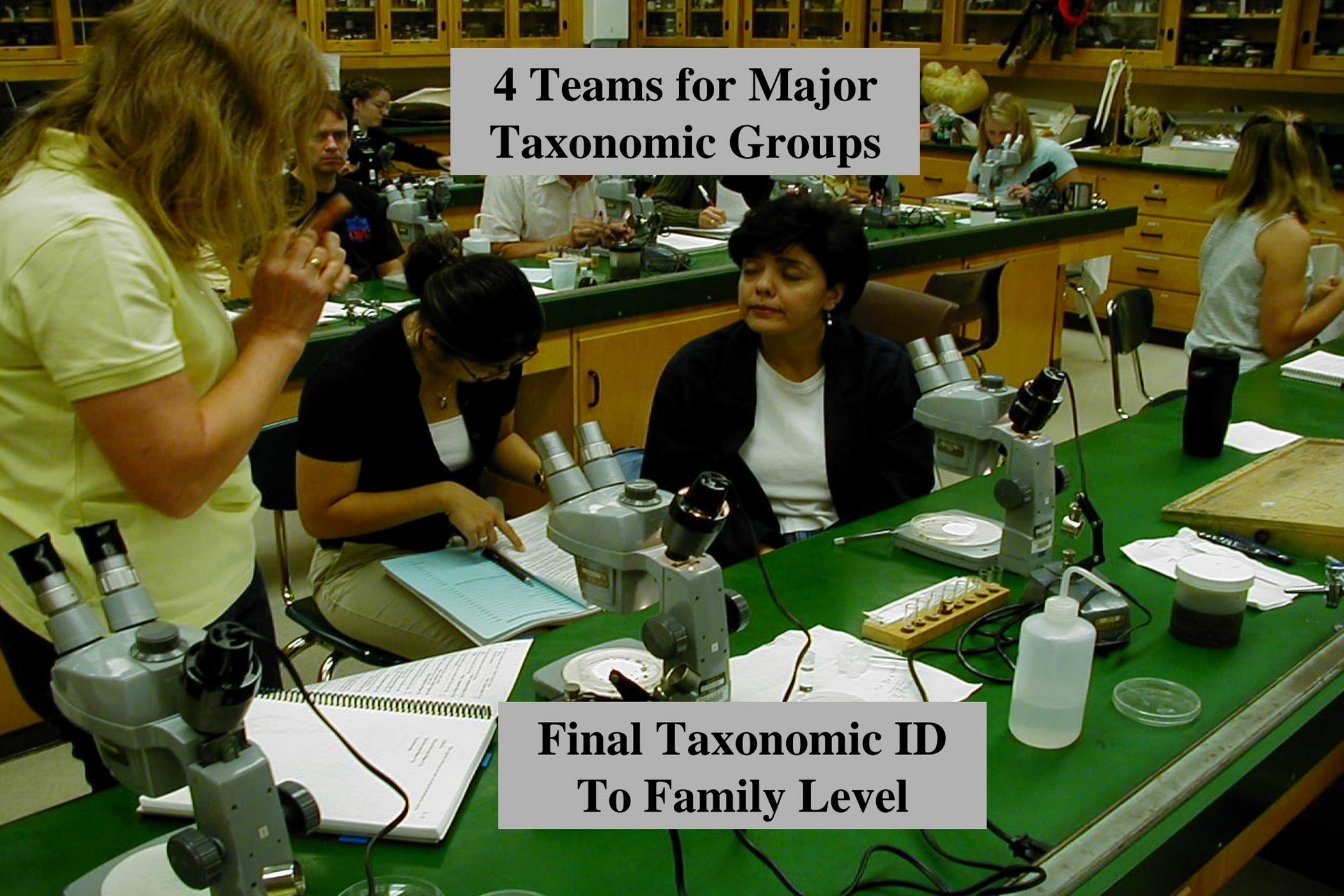
6 Teams for the 6 Samples

Step 1 – Subsampling and Sorting



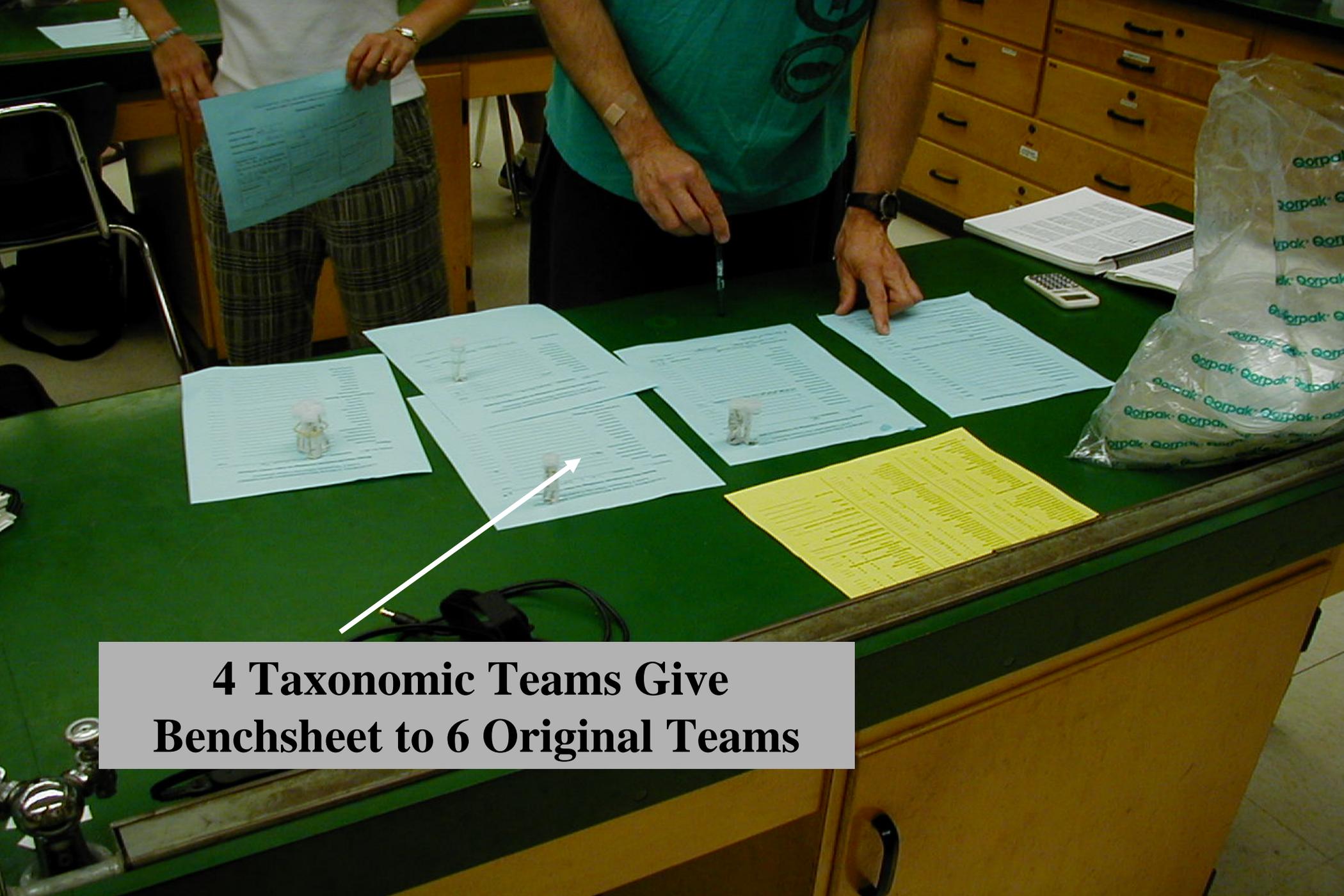


**Subsampling and
Sorting Benchsheet**



**4 Teams for Major
Taxonomic Groups**

**Final Taxonomic ID
To Family Level**



**4 Taxonomic Teams Give
Benchsheet to 6 Original Teams**

6 Original Teams Calculate Biological Metrics



MONITORING DATA SHEET - LEVEL 2 TAXONOMIC EFFORT

WATERSHED/STREAM: _____

MONITORING GROUP: _____

More organic
in this creek

More sediment
in this creek

Biological Metrics	UPPER RIFLE / CONTROL			LOWER RIFLE		
	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 1	SAMPLE 2	SAMPLE 3
	SR1	SR2	SR3	MR1	MR2	MR3
Richness Measures						
Taxa Richness	1	8	9	12	9	13
Ephemeroptera Taxa	1	1	1	1	1	1
Plecoptera Taxa	0	0	0	0	0	0
Trichoptera Taxa	1	2	1	2	2	2
EPT Taxa	2	3	2	3	3	3
Composition Measures						
EPT Index	51	84	78	65	88	62
Sensitive EPT Index	0	1	0	0	11	8
Percent Hydropsychidae	0	7.8	0	2.7	5.1	2.6
Percent Baetidae	0	6	2.6	3.6	21	2.8
Tolerance/Intolerance Measures						
Tolerance Value	5.2	4.4	4.8	4.7	4.0	4.7
Percent Intolerant Organisms	0	1	0	0	0	0
Percent Tolerant Organisms	10	7	17	2	5.2	6
Percent Dominant Taxa	47	7.8	5.2	3.6	5.1	2.8
Functional Feeding Groups						
Percent Collectors (CC)	39	16	38	63	32	50
Percent Filterers (FC)	47	7.8	5.2	2.1	6.2	4.0
Percent Scrapers (SC)	6	2	2	2	0	3
Percent Predators (P)	9	4	5	2	5	7
Percent Shredders (SH)	0	0	0	0	0	0
Final Count	105	90	98	85	75	96
Abundance	420	1296	963	1968	1064	1150

MONITORING DATA SHEET - LEVEL 2 TAXONOMIC EFFORT

WATERSHED/STREAM: _____

MONITORING GROUP: _____

Dry Creek near Forsythe

Dry Creek Conservancy

DATE/TIME: June 17, 2001

Biological Metrics	Secret Ravine			Miners Ravine		
	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 1	SAMPLE 2	SAMPLE 3
Richness Measures						
Taxa Richness	10	8	9 (9)	12	6	11 (11)
Ephemeroptera Taxa	1	1	1 (1)	1	1	1 (1)
Plecoptera Taxa	0	0	0 (0)	0	0	0 (0)
Trichoptera Taxa	1	2	1 (1)	2	2	2 (2)
EPT Taxa	2	3	2 (2)	3	3	3 (3)
Composition Measures						
EPT Index	71	84	78 (71)	65	88	67 (71)
Sensitive EPT Index	0	1	0 (0)	0	11	8 (8)
Percent Hydropsychidae	47	7.8	32 (39)	27	11	26 (35)
Percent Baetidae	4	6	26 (32)	16	21	19 (28)
Tolerance/Intolerance Measures						
Tolerance Value	5.2	4.4	4.8 (4.8)	4.7	4.0	4.7 (4.7)
Percent Intolerant Organisms	0	1	0 (1)	0	0	0 (0)
Percent Tolerant Organisms	10	7	17 (11)	2	5	6 (6)
Percent Dominant Taxa	47	7.8	32 (39)	16	11	28 (38)
Functional Feeding Groups						
Percent Collectors (CC)	39	16	18 (31)	63	32	36 (38)
Percent Filterers (FC)	47	7.8	35 (38)	11	6.2	46 (47)
Percent Scrapers (SC)	6	2	2 (1)	2	0	3 (2)
Percent Predators (P)	9	4	3 (6)	2	5	7 (7)
Percent Shredders (SH)	0	0	0 (0)	0	0	0 (0)
Final Count	100	90	98	81	71	96
Abundance	408	1296	963	1968	1064	1150

QA/QC Requirements for Bioassessment Contracts

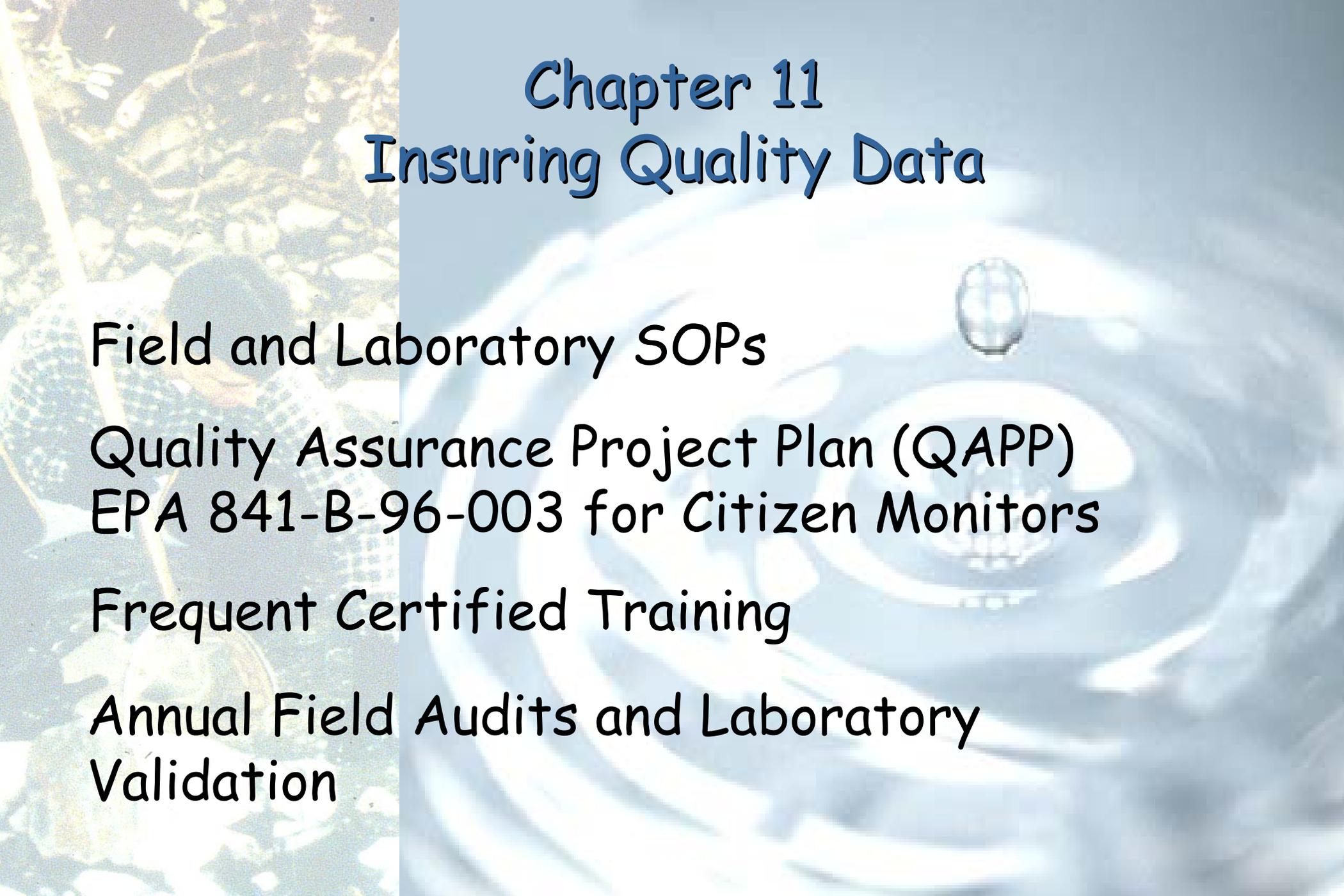
Require Field and Laboratory SOPs

Require Proof of Certified Training

Review Internal Documentation of Field
and Laboratory QA/QC

Require 10 - 20% External QA/QC

CAMLnet Standardized Taxonomy and
Certification

The background of the slide is split into two vertical panels. The left panel shows a person wearing a dark cap and a patterned shirt, working in a field with tall grass and trees. The right panel is a close-up, slightly blurred image of a white, circular water filter with a central cap.

Chapter 11

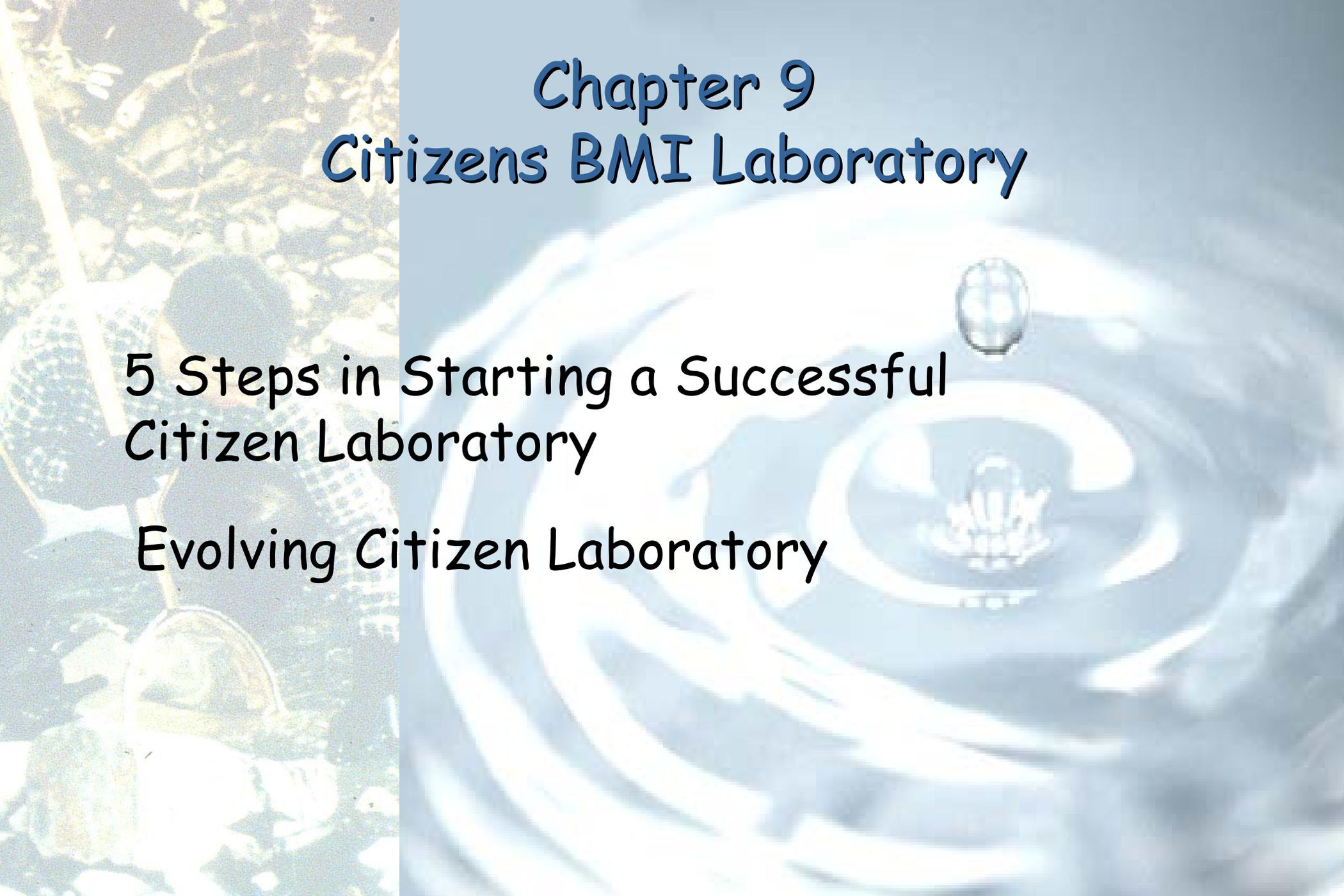
Insuring Quality Data

Field and Laboratory SOPs

Quality Assurance Project Plan (QAPP)
EPA 841-B-96-003 for Citizen Monitors

Frequent Certified Training

Annual Field Audits and Laboratory
Validation



Chapter 9

Citizens BMI Laboratory

5 Steps in Starting a Successful
Citizen Laboratory

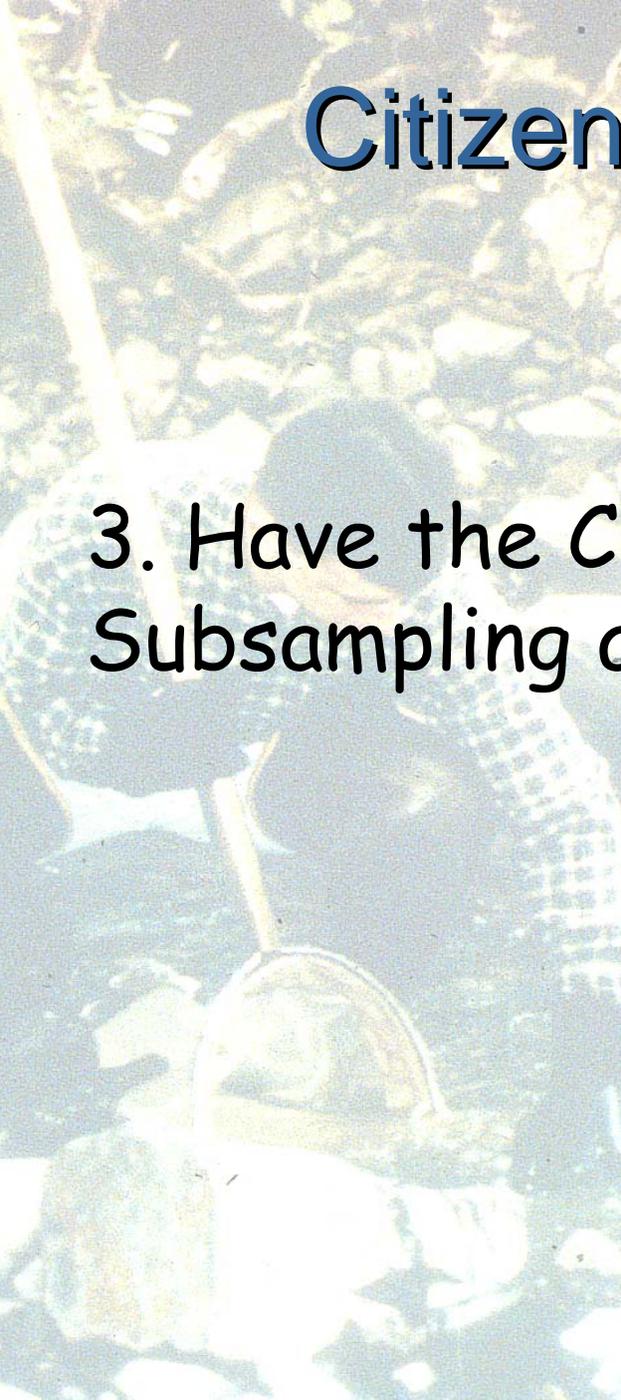
Evolving Citizen Laboratory

Citizens Laboratory Alternatives

1. Emphasize the Sampling and P/Hab Quality Portion of the CSBP and Send BMI Samples to a Professional Laboratory
2. Have Citizens Work on One Set of Duplicate Samples While Another Set From the Same Reach Is Sent to A Professional Laboratory

Citizens Laboratory Alternatives

3. Have the Citizens Perform Only the
Subsampling and/or Sorting Portion



A woman wearing a wide-brimmed straw hat, sunglasses, a light green t-shirt, and khaki shorts is smiling. She is standing in a shallow stream with many rocks. She is holding a large, light-colored net with a wooden handle. The background shows a stone wall and some greenery.

**So, Yes There Should
Always be an Element
of Fun With Volunteer
Biomonitoring**

**But, by Building a
Professional Level Volunteer
Program, You Will Help
Them Help You in Starting
and Maintaining a Successful
State WQM Program**

An underwater photograph showing a school of fish swimming in a shallow, clear water environment. The fish are silvery with some darker markings. The background is filled with green algae and seaweed. The text "Thanks for Listening" is overlaid in the center in a white, rounded font.

Thanks for Listening