Public School Involvement in Volunteer Monitoring

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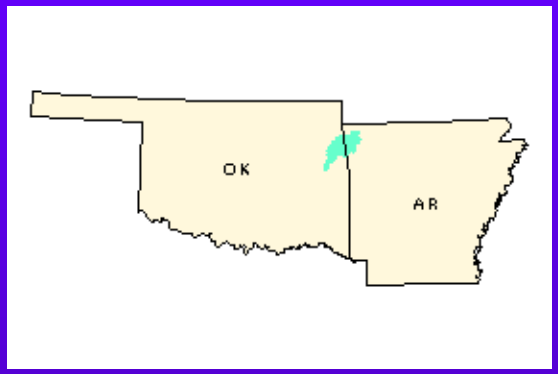
OSU
OKLAHOMA COOPERATIVE EXTENSION SERVICE

Oklahoma Blue Thumb
Monitoring and Education Project

- Emphasis on streams.
- Managed by OK Conservation Commission w/local co-sponsorship.
  - Mostly Conservation Districts
- Two CES co-sponsored programs
  - Stillwater Creek
  - Illinois Basin/Spring Creek



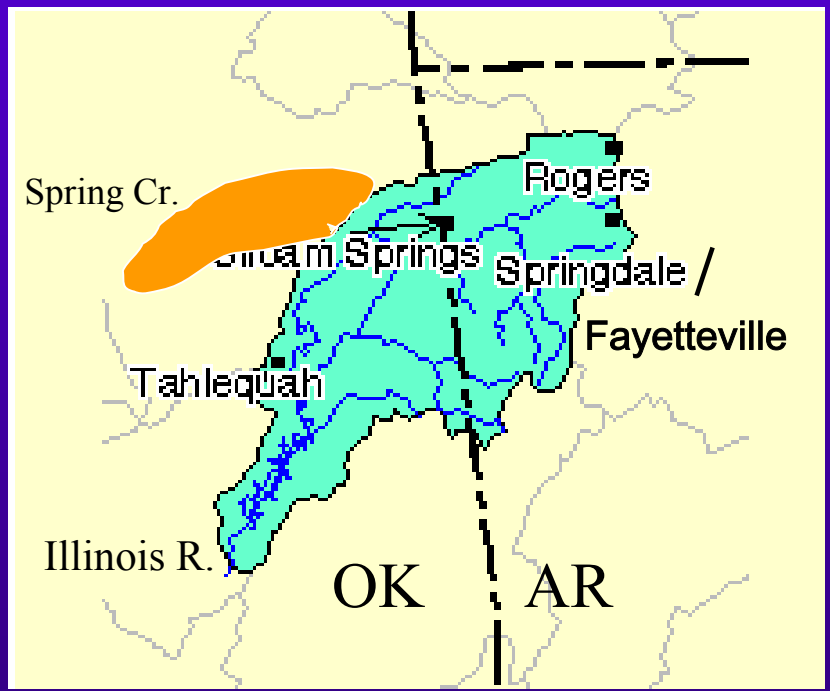
Project Area

Spring Creek Watershed

- Largely rural
- 232 mi^2

Illinois River Basin

- Rapid development
- >400,000 pop.
- 1,645 mi^2
- $42M tourism ind., including Lake Tenkiller



Illinois Basin / Spring Creek

- 1999: Spring Creek – 5 volunteers trained
- 2000 - 2002: Illinois Basin Education Project (319 funding)
  - 3 trainings for general public, including several teachers
  - 2 trainings directed to students

Summary of Program Activities

- 64 volunteers trained & certified 2000 – 2003
- 45 actively monitoring
  - 14 are students
  - Many more students monitor w/ certified teachers
- 9 stream sites monitored monthly
  - 2 sites intermittently
- 11 sites monitored twice yearly for invertebrates, habitat.
- Occasional warm-season samples for E. coli, chlorpyrifos

Volunteer Activity 2000-2002

- 206 site data reports
- 1150 hours of training
- 1260 monitoring hours
- 130 hours Quality Assurance (quarterly)
- 40 hours conducting volunteer ed. activity

Training

20 hours over 3 days;

Provided by statewide Blue Thumb staff

- Intro. to NPS
- Lab technique/kit maintenance
- Field observation, water sampling
- Intro. to bio-assessment
- Water quality educational models and activities

Student Involvement

- Two models
  - Teachers certified, train students in class
  - Teachers and students certified
- 3 rural schools, one site each
  - Vo-Ag teacher, Natural Resources classes
  - Middle School teacher w/selected students in special projects
  - H.S. science teacher

Student involvement, cont'd

- Urban
  - Tahlequah H.S. – largest in OK side of Illinois Basin
  - 6 teachers certified
  - 11 students, 10+ due to train in Nov. 03
  - Many in A.P. Env. Studies class and Science Club
  - 2 sites, one stream
  - Additional teacher at Alternative School

Students and teachers

- Monitor stream site, water chemistry monthly
- Join macro-invertebrate collections
  - Collect 3 sq. meters w/ kicknet
  - Habitat assessment
  - Stream discharge measurement
  - Macro-inv. sub-sampling later (picking)
- Students are on 5 of 11 sites in project area;
- 3/4 of volunteer hours

Blue Thumb Monitoring Kit

- One per stream site

Tahlequah Creek Data: 2 sites, Mar. '01 – Dec. '02
16 sampling dates (7 for bacteria/pesticides)

	SPRING			BASIN		
Parameter	**Max**	**Min**	**Median**	**Max**	**Min**	**Median**
Water Temp °C	22	11	17	25	10	18
DO, mg/L	12	0	11	16	9	12
% Oxygen Saturation	140	9	114	150	99	126
pH	8.0	5.5	7.0	8.0	7.0	7.5
Nitrate, mg/L N	1.70	0.40	1.50	2.50	0.28	0.88
Ammonia, mg/L NH3-N	0.3	0.0	0.0	0.2	0.0	0.0
Orthophosphate, mg/L P	0.127	0.000	0.044	0.070	0.000	0.020
Chloride, mg/L Cl	25	5	10	90	5	15
E. Coli	2419	196	504	2419	167	653.5
Chlorpyrifos ppb	0.190	0.090	0.090	0.220	0.090	0.142

Most popular with teachers, students:

- Macro-invertebrate collections (kick-net)

Twice yearly
per site

Most popular, cont'd

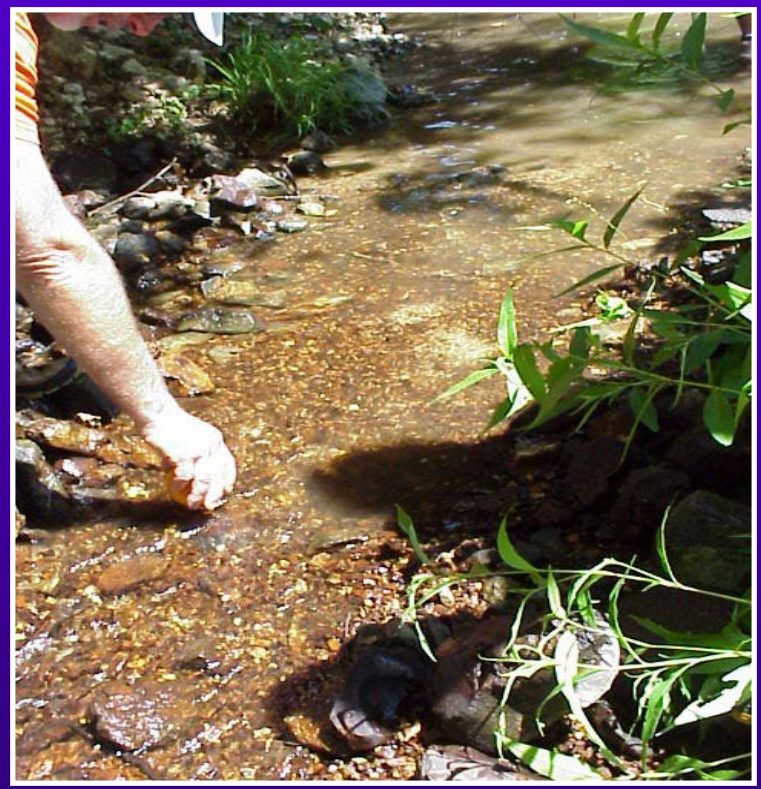
- Bug-picking (macro-invertebrate sub-sampling)

•Twice yearly per site, with preserved collections

•Final collections of 100-150 bugs sent for professional. I.D.

Also Popular:

Measuring cross-sectional area and flow velocity to calculate stream discharge.



School involvement: Advantages for Blue Thumb

- Regularity of monitoring
  - Dates, times set in advance
- Personnel, equipment management
- More quality control (where students are certified)
- Potential for tailored data management & feedback (a weakness of the adult program)

Advantages for Blue Thumb and Schools

- Community Connections
  - Service work (river cleanups, tree planting, fair and tour work)

Advantages, cont'd

- Educational activities for peers and younger kids

Training for elementary school environmental expo

Aquatic. bug show at CCD Earth Day fair

Advantages, cont'd.

Illinois Basin Program: New for '03:

- Storm drain marking

Some problems

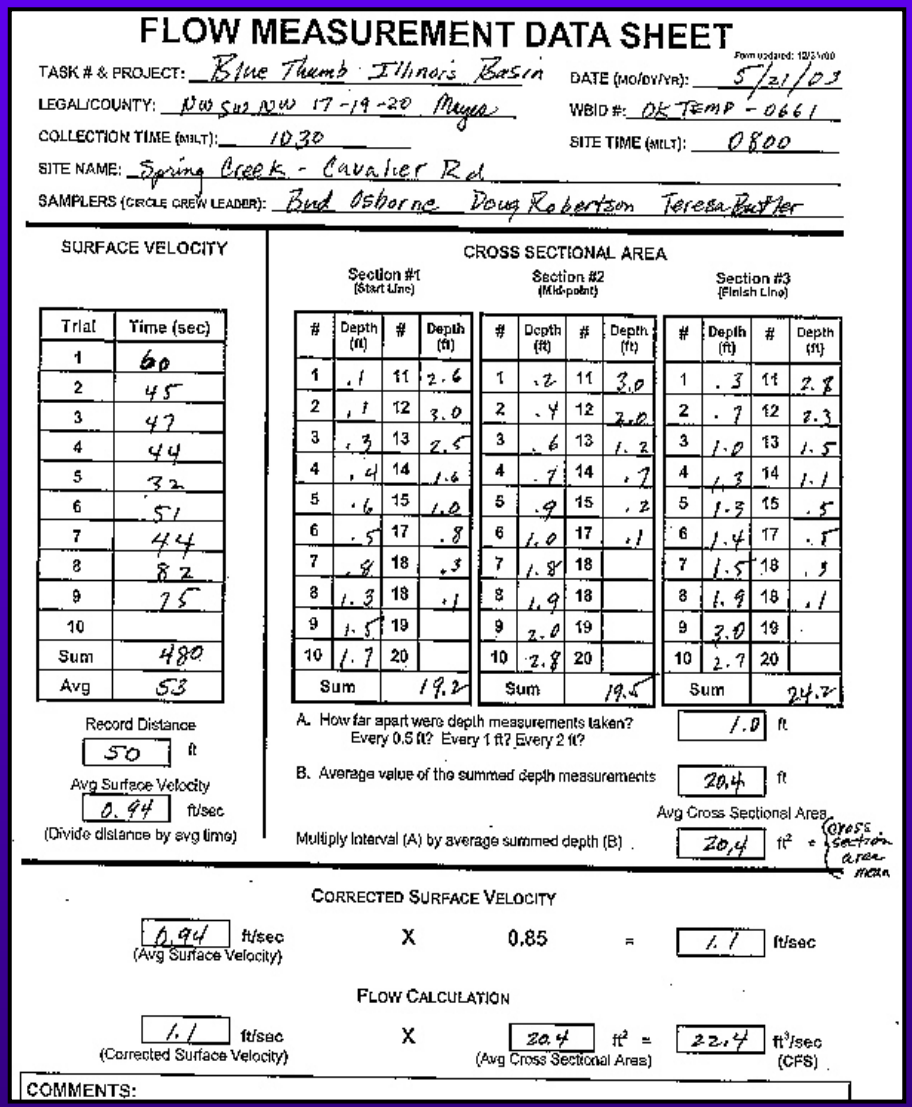
- Difficult to maintain program over summer
- Time demands difficult for extensive County Extension involvement
  - Shorter-term activities, like storm drain labeling work well for 4-H
- Have to adjust to Statewide S.O.P.
- Data feedback problems

Teachers' Comments

- Creates science awareness beyond water quality/environmental study:
  - Lab techniques in "real" setting
  - Metric system; measurement
  - Observation for detail
  - Data handling; graphing
  - Entomology - new setting (indicator organisms)
  - Discarding assumptions – let the data speak for itself

Teachers' comments

- Opportunity to teach cross-curricular skills in diverse, interesting settings:
  - Math
  - Chemistry
  - Physics
  - Writing



FLOW MEASUREMENT DATA SHEET

Form updated: 12/3/00

TASK # & PROJECT: Blue Thumb Illinois Basin
DATE (MO/DY/YR): 5/21/03
LEGAL/COUNTY: NW SW NW 17-19-20 Mayes
WBID #: OK TEMP - 0661
COLLECTION TIME (MILT): 1030
SITE TIME (MILT): 0800
SITE NAME: Spring Creek - Cavalier Rd
SAMPLERS (CIRCLE CREW LEADER): Bud Osborne Doug Robertson Teresa Rutter

SURFACE VELOCITY

Trial	Time (sec)
1	60
2	45
3	47
4	44
5	32
6	51
7	44
8	82
9	75
10	
Sum	480
Avg	53

Record Distance: 50 ft

Avg Surface Velocity: 0.94 ft/sec
(Divide distance by avg time)

CROSS SECTIONAL AREA

Section #1 (Start Line)				Section #2 (Mid-point)				Section #3 (Finish Line)			
#	Depth (ft)	#	Depth (ft)	#	Depth (ft)	#	Depth (ft)	#	Depth (ft)	#	Depth (ft)
1	.1	11	2.6	1	.2	11	3.0	1	.3	11	2.8
2	.1	12	3.0	2	.4	12	3.0	2	.7	12	2.3
3	.3	13	2.5	3	.6	13	1.2	3	1.0	13	1.5
4	.4	14	1.6	4	.7	14	.7	4	1.3	14	1.1
5	.6	15	1.0	5	.9	15	.2	5	1.3	15	.5
6	.5	17	.8	6	1.0	17	.1	6	1.4	17	.5
7	.8	18	.3	7	1.8	18		7	1.5	18	.3
8	1.3	18	.1	8	1.9	18		8	1.9	18	.1
9	1.5	19		9	2.0	19		9	3.0	19	
10	1.7	20		10	2.8	20		10	2.7	20	
Sum		19.2		Sum		19.5		Sum		24.7	

A. How far apart were depth measurements taken? Every 0.5 ft? Every 1 ft? Every 2 ft? 1.0 ft

B. Average value of the summed depth measurements 20.4 ft

Multiply Interval (A) by average summed depth (B). Avg Cross Sectional Area: 20.4 ft² (cross section area mean)

CORRECTED SURFACE VELOCITY

0.94 ft/sec (Avg Surface Velocity) X 0.85 = 1.1 ft/sec

FLOW CALCULATION

1.1 ft/sec (Corrected Surface Velocity) X 20.4 ft² (Avg Cross Sectional Area) = 22.4 ft³/sec (CFS)

COMMENTS:

Teachers' Comments

- Best justification to get student outdoors
  - Have program responsibilities to fulfill!
- Learn importance of community service
  - Environmental stewardship
- Access to equipment & supplies
- Exposure to basic aquatic research methods
  - Science fair projects
  - Long-term research projects

Teachers' comments

- Make connection between classroom science and real world
  - Critical thinking
- It's fun!