Watershed 101
Introduction

May 18-19 and 31, 2017

Welcome
Logistics and materials
Overview and introductions
Workshop Goals
Workshop overview

Photo credit: NASA Earth as Art
Workshop schedule

Day 1 (Thurs, May 18, 2017)
- Physical
  - Presentations
  - Activity sessions
- Chemical
  - Presentations
  - Activity sessions

Day 2 (Fri, May 19, 2017)
- Biological
  - Microbiology and algae presentations
  - Activity session
  - Macroinvertebrates and fish presentations
  - Activity session

Day 3 (Wed, May 31, 2017)
- Study/project design
  - Presentation
  - Activity session
  - Monitoring and watershed management resources
  - Presentations
  - Demonstrations/discussions
Watershed 101 materials

• In 3-ring binder:
  - Agenda (in sleeve)
  - Reimbursement directions (in sleeve)
  - Wikiwatershed handout (in sleeve)
  - Resources list (in sleeve)
  - Presentations (w tab dividers)

• Note pads – for note taking and workshop feedback (feedback box)
Instructor Introductions

- Stroud Water Research Center
  - Dave Bressler – days 1-3
  - Matt Ehrhart – days 1 and 3
  - Melinda Daniels, PhD – days 1 and 3
  - Dave Arscott, PhD – days 1 and 3
  - Jinjun Kan, PhD – days 2 and 3
  - John Jackson, PhD – days 2 and 3
- The Academy of Natural Sciences of Drexel University
  - Allison Stoklosa – day 2
  - Greg Barren – day 2
  - Kathryn Christopher – day 3
  - Dave Keller – day 3
Attendee Introductions

• Name
• Organization
• Role in Delaware River watershed science and management efforts (e.g., coordinator, volunteer, scientist, manager, etc.)
Watershed 101 Intentions

• Better understanding of:
  - The fundamental characteristics and processes in watershed ecology
  - The connections between land and water, abiotic and biotic processes, in Delaware River basin
  - How this knowledge is used for strategic monitoring
For the purpose of:
- Developing quantifiable and realistic management goals
- Improving data quality to support accurate assessment of progress toward goals
- Understanding if and how projects are producing better water
The basic process

Understand ecological functions and connections

Understand and identify watershed management goals and actions - **Strategic choice of management decisions to maximize impact on improving water quality**

Develop and implement monitoring strategies to assess impact of management
Overview of DRWI

William Penn Foundation (WPF) Delaware River Watershed Initiative (DRWI) project overview – http://www.drwi.net/downloads

- 50 leading conservation organizations in Delaware River basin
- Goal: “watersheds that provide high quality and sufficient water quantity for healthy ecosystems and human communities”

- More Clean Water
Overview of DRWI

- Ongoing projects by conservation organizations
- DWRI emphasis on “establishing and maintaining an expansive monitoring program to assess whether this work is effective at protecting and/or restoring water quality”
  - 8 focus areas for the work – “clusters”
    - Restoration, protection, and hybrid
  - Cluster member organizations aligned toward shared goals
  - Measurable outcomes
  - ANSD lead monitoring initiative
  - Workshops to support citizen science efforts toward these goals
Delaware River Basin

- Longest un-dammed river in the U.S east of the Mississippi
- One of only four river sections (73mi) in the Northeast U.S. to have been designated as part of the National Wild and Scenic River System
- 330 miles long
- Largest tributaries – Schuylkill and Lehigh Rivers
- Basin Area: 33,041 km² (12,754 mi²)
- Number of fish species: 105
- Land cover: 
  - 60% forest
  - 24% agriculture
  - 9% urban
  - 7% surface water/other
- Population: 7.3 million
- Population for water: 15 million
Overview of Stroud watershed science and management workshops

- Watershed 101 starting point for additional workshops:
  - Customized version of Watershed 101 for institutional leaders
  - Developing studies and monitoring plans (in depth)
  - Automated in-situ monitoring using EnviroDIY sensor stations
  - Data management and analysis
  - Training on specific monitoring methods
  - Stream restoration
  - Wikiwatershed, Model My Watershed

- Starting point for Stroud 1:1 work with watershed groups
Agenda days 1 and 2

Day 1 – Workshop overview and background; physical and chemical characteristics of streams and rivers
- 8:00-8:30 – Informal discussions, light breakfast and refreshments
- 8:30-8:50 – Introduction – David Bressler (Stroud Center)
- 8:50-9:15 – Scope and scale – Dr. David Arscott (Stroud Center)
- 9:15-12:00 – Unit 1 – Physical characteristics and processes in the monitoring context – Dr. Melinda Daniels (Stroud Center)
  - 9:15-10:15 – Introduction, hydrology, geomorphology
  - 10:15-10:30 – Break
  - 10:30-11:30 – Geomorphology, temperature and solar
  - 11:30-12:00 – Discussion
- 12:00-1:00 – Lunch
- 1:00-4:00 – Unit 2 – Chemical characteristics and processes in the monitoring context – Dr. David Arscott (Stroud Center)
  - 1:00-2:15 – Geochemistry, basic chemistry parameters
  - 2:15-2:30 – Break
  - 2:30-3:30 – Nitrogen, Phosphorus, Carbon
  - 3:30-4:00 – Discussion
- 4:00-5:00 – Discussion, flexible time

Day 2 – Biological characteristics of streams and rivers
- 8:00-8:30 – Informal discussions, refreshments
- 8:30-8:45 – Intro, open discussion, questions from day 1
- 8:45-3:30 – Unit 3 – Biological characteristics and processes in the monitoring context
  - 8:45-9:35 – Microbiology – Dr. Jinjun Kan/David Bressler (Stroud Center)
  - 9:35-10:15 – Algae/primary productivity – Greg Barren (Academy of Natural Sciences of Drexel University)
  - 10:15-10:30 – Break
  - 10:30-12:00 – Macroinvertebrates – Dr. John Jackson
- 12:00-1:00 – Lunch
  - 1:00-1:45 – Macroinvertebrates (cont’d)
  - 1:45-2:00 – Break
  - 2:00-3:00 – Fish – Allison Stoklosa (Academy of Natural Sciences of Drexel University)
  - 3:00-3:30 – Discussion
- 3:30-5:00 – Discussion, flexible time, lead-in to day 3
Agenda day 3

Day 3 – Project/study design and monitoring

- 8:00-8:30 – Informal discussions, refreshments
- 8:30-9:00 – Project/study design – John
- 9:00-9:25 – Scope and scale – Matt Ehrhart (Stroud Center)
- 9:25-10:00 – Discussion
- 10:00-10:15 – Break
- 10:15-11:15 – Physical – Melinda
- 11:15-12:00 – Chemical – Dave A
- 12:00-1:00 – Lunch
- 1:00-1:30 – Microbiology – Jinjun
- 1:30-2:00 – Algae – Kathryn Christopher (Academy of Natural Sciences of Drexel University)
- 2:00-2:15 – Break
- 2:15-2:45 – Fish – David Keller (Academy of Natural Sciences of Drexel University)
- 2:45-3:30 – Macroinvertebrates and Final Thoughts – John
- 3:30-5:00 – Discussion and wrap-up
Small groups for day 1

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Unanswered questions; spin-off questions (accounting of questions throughout - opening for day 3)
Watershed 101 Learning Objectives

Better understanding of the fundamental characteristics and processes in watershed ecology
Better understanding of watershed ecological processes in the Delaware River basin
   Linking abiotic and biotic processes and understanding Delaware River basin landscape connection to instream conditions
How to link ecological issues to project design and monitoring planning
How is ecological knowledge used in helping design projects and goals?
How is monitoring used to help in understanding watershed function and progress toward goals?
How is monitoring used in describing efficacy of restoration and protection projects?