

GK 12 Global Watershed

Information Workshop for Teachers
March 17, 2010



What is Global Watershed program?

- ◆ Michigan Tech PhD students (GK12 fellows) will be awarded two-year fellowships to work with middle and high school teachers to create lesson plans and activities that transfer their research on watershed science topics to teacher and students.

More information

- ◆ GK12 Fellows will teach, under the supervision of their partner teacher, water topics from existing lesson plans and lesson plans they develop.
- ◆ GK12 fellows will be prepared to teach in the middle or high school classroom through a specially designed education course at Michigan Tech.



How is the program funded?

- ◆ This program is funded for a five-year period, by the Graduate Fellows Grant Program (GK12) of the National Science Foundation to Michigan Technological University.



What are benefits to teachers?

- ◆ Teachers and students will be engaged in research on the scientific aspects of water issues, covering a broad range of content standards and school improvement goals.
- ◆ GK12 fellows will develop lesson plans and activities that can become a permanent part of the school curriculum.
- ◆ Fellows will act as a resource to teachers throughout their two-year school assignment.

What are benefits to teachers?

- ◆ Participating teachers will be paid a \$4,500 stipend per year.
- ◆ Teachers will earn professional development credits.
- ◆ No additional expenses will be borne by the schools. Up to \$1,000 will be available to Fellows and teachers to cover supplies, field trips, etc.

What are the requirements of participating teachers?

- ◆ Candidate teachers will attend an evening informational workshop on March 17, 2010.
- ◆ Interested teachers will complete a short application for the program and teachers will be selected to participate in the program by a committee composed of representatives of the school community and Michigan Tech faculty.
- ◆ Each teacher will commit to mentor a GK12 Fellow for two academic years.



What are the requirements of participating teachers?

- ◆ Selected teachers will attend a four day summer workshop designed to prepare teachers and GK-12 Fellows for their upcoming work and to pair teachers and GK-12 Fellows with similar interests.

2010 Summer Workshop

- ◆ June 21-24, 2010
- ◆ Copper Country ISD Conference Room A
- ◆ 9:00am- 4:00pm each day
- ◆ Teachers and fellows will teach each other about their work in the watershed science and learn how to design learning experiences that incorporate inquiry, formative assessment and American Indian perspectives.

Example application of Fellow's research project to K-12 instruction

- ◆ Coaster brook trout (CBT) are a unique life history variant of the brook trout species that have existed in Lake Superior for thousands of years.
- ◆ Currently, only a few populations of CBT remain in the Lake Superior basin.
- ◆ The decline of the CBT is associated with over-fishing and habitat degradation.
- ◆ To support conservation efforts and rehabilitation efforts along the southern shore of Lake Superior, researchers are characterizing the habitat conditions associated with naturally reproducing CBT populations.

Groundwater-Surface Water Interactions and Coaster Brook Trout Spawning Habitat

- ◆ Several studies have shown a connection between groundwater seepage and brook trout spawning habitat.
- ◆ This research project focuses on quantifying groundwater seepage in the river at sites that both support and do not support a naturally reproducing population of CBT.
- ◆ The research includes installing networks of monitoring wells equipped with vertically stratified temperature sensors into these sites and inverting the temperature data to estimate groundwater seepage as a function of time and space.

Research and Classroom Topics	General Principles	Sample Activities
Life history of the CBT (4-8 classroom days)	<ul style="list-style-type: none"> • Ecosystems • Evolution • Genetics • Aquatic biology • Physiology • Experimental design • Data analysis 	<ul style="list-style-type: none"> • Lectures • Readings • Exercise: How does a CBT decide it's time to spawn? • Exercise: How does a CBT sense its environment? • Exercise: How do we determine if the CBT is a distinct species? • Field trip: Observing fish spawning behavior • Field trip: Observing instrumentation used in genetic analyses

Research and Classroom Topics	General Principles	Sample Activities
Decline and renewal of the CBT (4-8 classroom days)	<ul style="list-style-type: none"> • Impacts of humans on ecosystems • Ecosystem management and restoration • Experimental design • Data analysis 	<ul style="list-style-type: none"> • Lectures • Readings • Exercise: How would we choose a site for reintroducing CBT? • Exercise: How do we set fishing catch limits for CBT? • Exercise: Debate on a local natural resource extraction conflict • Field trip: Observing operations of a fish hatchery • Field trip: Observing methods for counting fish populations

Research and Classroom Topics	General Principles	Sample Activities
Influence of groundwater seepage on CBT spawning (4-8 classroom days)	<ul style="list-style-type: none"> • Hydrologic cycle • Ecohydrology • Stream hydrology • Physics of heat transfer • Experimental design • Data analysis 	<ul style="list-style-type: none"> • Lectures • Readings • Exercise: How do we measure streamflows? • Exercise: How and why do streamflows vary over a year and from year to year? • Exercise: Why is groundwater seepage important for stream ecology? • Exercise: What do variations in temperature underneath a streambed tell us about groundwater seepage? • Exercise: How do we design an instrument for detecting temperatures underneath a streambed? • Field trip: Measuring streamflows • Field trip: Collecting data from a seepage well network

For more information, contact

- ◆ Alex Mayer, Center for Water and Society

asmayer@mtu.edu, 487-3372

- ◆ Shawn Oppliger, Western UP Center for Science, Math and Environmental Education

shawn@copperisd.org 482-0331



Questions?



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