



Passaic River Institute

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**MONTCLAIR
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PROJECT SUMMARY

PASSAIC RIVER EDUCATIONAL ENVIRONMENTAL MONITORING ORGANIZATION (PREEMO)

Dr. Kirk R. Barrett, Director, Passaic River Institute; Dr. Nicholas Smith-Sebasto, Associate Professor, Department of Earth and Environmental Studies; Dr. Katherine Herbert, Assistant Professor, Department of Computer Science

This project brings together high school students from communities across the socioeconomic spectrum within New Jersey's Passaic River basin to study and monitor benthic ecology and water quality in their community, to learn how rivers are affected by land use and industry, and to discover how rivers are used and what they mean to different communities. The communities range from some of the most affluent in the State along the upper river, to middle class along the mid river, to an economically disadvantaged and minority dominated community along the mouth of the river at Newark Bay.

One or more teachers in each of four schools will be trained in water-related environmental education programs and in water quality and benthic macroinvertebrate monitoring procedures appropriate for students. These teachers will then lead their students in monthly monitoring forays into the Passaic River (or a tributary) near their school. The students will use kits to measure water quality variables such as dissolved oxygen, water clarity, and phosphorus concentrations. Students will also, of course, learn what these measurements mean and why they are important. They will also investigate the biology of the water bodies by sampling for benthic macroinvertebrates with kick nets and dip nets. Students will identify collected invertebrates and classify them according to their sensitivity to pollution and then compute an index of biological integrity for the water body.

The Passaic River Institute will develop and maintain a web site, into which students will enter their data. The web site will have a geographic interface, which will help students retrieve and compare data among locations. The web site will also provide links to relevant educational materials, links to other data sets about the river, and provide a forum where students can post their impressions and questions about ecology and environmental science.

Students will use data collected by themselves and others to investigate an environmental science question. Data analysis assignments will involve tasks like using computerized spreadsheets to compute descriptive statistics and to construct graphs of monitored variables against time. Data will be compared to that of other participating schools, to historical data from government agencies, and to regulatory criteria.

PRI scientists will work with participating teachers to identify relevant and feasible scientific and policy issues that can be studied, such as exploring what factors affect water quality and to provide subsequent technical assistance. Students may hypothesize about possible relationships between independent variables (e. g., preceding rainfall, snowfall, water temperature, land use) and dependant variables (e. g., dissolved oxygen, turbidity, phosphorus, conductivity, coliforms). Students will learn to construct scatter plots of concurrent measurements of independent and dependant variables to assess whether any correlation is observable.

Near the end of the school year, the PRI will host a conference of participants on the campus of Montclair State University. Students will make oral or poster presentations about their monitoring activities and subsequent investigations. The conference will allow students from different backgrounds to intermingle and discuss social and environmental issues important in their communities.

Anticipated outcomes of the project include increased student knowledge and personal involvement in environmental quality (motivating environmental stewardship) and better trained and more highly motivated teachers in environmental education. The project will be evaluated to determine if it increased student knowledge and/or altered their attitudes regarding environmental processes and stewardship by administering established instruments for environmental literacy and attitudes.