

The Application of Community Based Participatory Environmental Research (CBPR) on the Study of the Water Quality of a Major Regional Water Source

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Background

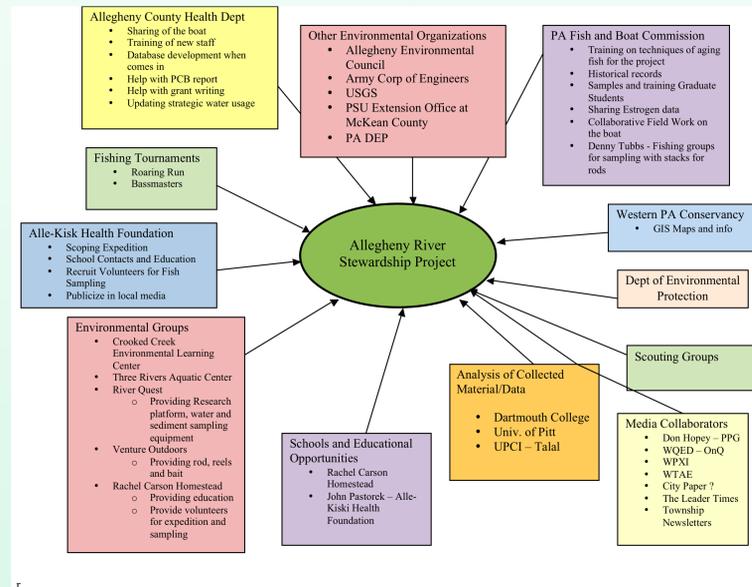
The Allegheny River Stewardship Project (ARSP) is a large community based participatory environmental research project, focusing primarily on communities along the lower Allegheny River. This study of fish, sediment and surface water is based on the premise that bio-magnification of contaminants occurs up the food chain from river bottom deposits and contaminated water to predatory fish. Some of the processes involved include the concentration of organic pollutants in lipids and the binding of heavy metals to fish proteins. The sediment at the river floor acts as a sink and a source of contaminant dispersion during high water periods. Mercury, arsenic and selenium are of primary interest in fish protein because they are like fingerprints of coal fired power plant pollution.

There are also over 400 sewer overflows (SOs) in the southwestern Pennsylvania area that release untreated sewage directly or indirectly into the main water streams. The water released by these SOs is hypothesized to contain both pharmaceutical and xenoestrogens which have known effects in aquatic species and may have significant public health implications. The river water contaminated by SOs is the primary drinking water source for Allegheny County residents potentially exposing large, susceptible population groups. Fish caught in the area are also thought to have bio-accumulated these contaminants and can serve as sentinels for the magnitude of the contamination.

Objectives

1. Engage river community members to become involved in the stewardship of the Allegheny River.
2. Understand the concentrations of important contaminants in river fish species, especially those caught for consumption.
3. Associate contaminants in fish with potential pollution sources.
4. Identify human exposures to these contaminants.
5. Understand the risks to human health and the environment from these contaminants and pollution sources.
6. Obtain and share data with policymakers to provide evidence for the necessary policy change to solve identified problems and
7. Form strategic partnerships with stakeholder groups along the Allegheny River to help insure ongoing stewardship activities.

Figure 1. ARSP Groups and Organizations Involved



Methods

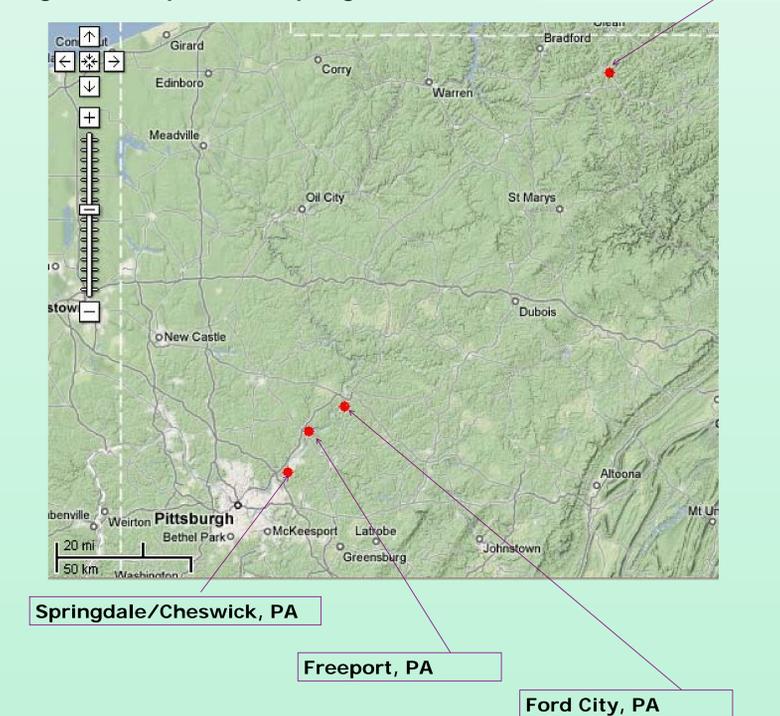
A variety of systematic techniques were used to achieve the objectives of the study. Figure 1. illustrates the interaction between a number of diverse groups and organizations. Information from the systems approach formed the basis of extensive community organizations. Community organizing consisted of three town hall meetings, numerous presentations on the ARSP to community organizations, schools and various groups as well as radio, television and print media. The internet was an important tool for sharing information with the community as well as providing an expeditious means for volunteer recruitment. Pollution narrative statements were used extensively throughout the community to assess community needs and concerns related to environmental issues. Window walks and participant observation were employed in order to better understand the issues and key locations for each site selected for sampling. Focus groups and one on one interview's such as oral histories with volunteers gathered from community organizing efforts were also employed. Written materials on environmental issues were provided to volunteers as well as passerby's at each of the community fishing days.

Based on community input from pollution narratives, sites for water, sediment and fish sampling were selected. The fish caught were dissected, systematically labeled and frozen. These samples are currently under laboratory assessment for heavy metals, estrogenicity assays using MCF-7 cancer cell proliferation, and identification of specific estrogenic compounds.

Results

- One result of employing this variety of CBPR techniques was to create one of the largest community based environmental studies in Southwestern Pennsylvania.
- Figure 2. illustrate the four major sites which were selected for water, sediment, and fish sampling based on community input gathered from pollution narratives .
- Fifty to approximately one hundred community volunteers attended the four community fishing days at each of the collection sites.
- Registered community volunteers permitted ongoing dialogue with researchers resulting in a feedback loop affecting study variables and study parameters.
- The amount of community information gathered resulted in important knowledge about how to communicate results as well as inform future initiatives.
- The size, types and number of fish collected are more highly indicative of fish generally caught by people living and recreating on this river.

Figure 2. Map of 4 Sampling Sites



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Conclusions

There are numerous benefits and challenges to this type of environmental study. The major benefit from this study is the high degree of collaboration and knowledge gained from the community allowing for targeted communication of results as well as ongoing information sharing.

This project has also created a wonderful chance of ongoing information and support allowing for numerous opportunities for future research, with this study as a foundation.

Across the Allegheny Watershed, trust has been built with many community components.

Figure 3. ARSP researchers



Public Health Implications

Knowledge and pathways have been created which can be beneficial to communicating results from this study which may be important for health behavior changes, as well as environmental policy adjustments.

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