

National Science Foundation, Science, Technology, and Society (STS) Program  
Standard Research Grant

**Title: Mapping Knowledge Investments during the Marcellus Shale Gas Rush: A Study of Public, Private, and Academic Water Quality Monitoring Efforts**

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**PROJECT SUMMARY**

**Intellectual Merit**

What are the social forces that structure what we know and do not know about the impacts of industrial activities on the environment? The proposed research contributes to a growing body of research in sociology and science and technology studies (STS) that analyzes the features and social causes of ignorance (Gross, 2010; Proctor & Schiebinger, 2008). Using large-scale spatial mapping as well as key informant interviews and focused case studies, the research will examine the *social production of knowledge and ignorance* about the impacts of unconventional shale gas drilling on surface water in the areas of New York and Pennsylvania that are affected by recent natural gas development. By considering the social forces that shape knowledge production related to public policy and regulation, this project integrates two areas of the NSF's STS Program: Social Studies of Science and Technology (SSS) and Studies in Policy on Science and Technology (SPS).

The extraction of natural gas from a geological formation called the Marcellus Shale has been highly controversial because of its environmental consequences. Building on recent advances in the study of "undone science" (Frickel, et al., 2010; Hess, 2007, 2009, 2010a) and the socio-spatial distribution of "knowledge investments" (Frickel, Campanella, & Vincent, 2009), this project aims to provide a sociological explanation for what appear to be significant gaps in knowledge about the impacts of gas drilling on fresh water sources. More specifically, the proposed research will answer the following questions:

1. Where are public agencies investing in watershed monitoring, and why are these public efforts unevenly distributed across the Marcellus Shale region?
2. To what extent does civil society research (volunteer or activist water quality monitoring) fill knowledge gaps about the impacts of gas drilling on water quality, and why are these civil society efforts unevenly distributed across the Marcellus Shale region?
3. How and to what extent do academic scientists aid in filling knowledge gaps about the impacts of gas drilling on water quality?

To answer these questions, the proposed research project uses mixed methods, including A) qualitative interviews with key informants in government, academic science, environmental advocacy groups, and volunteer water monitoring groups, B) a survey of volunteer watershed organizations, water monitoring groups, and county conservation districts, C) socio-spatial and statistical analysis of the distribution of knowledge investments, using Geographic Information System (GIS) software, and D) comparative qualitative analysis of six focused case studies.

**Broader Impacts**

There are significant public policy implications of this research. The analysis will identify communities and watersheds that have received the most and least public investment in watershed monitoring. This information will be useful to regulatory agencies, funding bodies, academic research institutions, and community groups as they assess the effectiveness of current monitoring practices and prioritize areas for future knowledge investments. Furthermore, by documenting the extent of private knowledge investments and analyzing their outcomes, this study will generate knowledge that will be essential to any efforts to strengthen the capacity of volunteer watershed groups. Therefore, in addition to conventional publishing of research findings in scholarly journals in the fields of STS, environmental sociology, and environmental studies, results of this research will be shared in a variety of public and online venues.