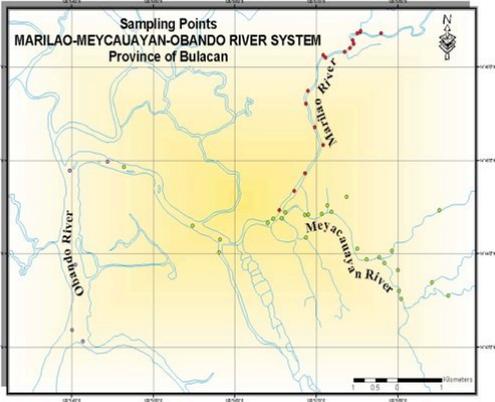




**Project Completion Report:  
Marilao Industrial Waste Contamination**



**Project Details:**

**Performance Metrics:**

Location	Bulacan Province, Philippines
Contaminant	Heavy Metal Pollution in the River Systems
Project Duration	2005—2009
Project Cost	\$300,000 over four years
Implementing Partners	MMO Water Quality Management Board, DENR-Environment Office, Meycauyan Environment Office

Toxin	Arsenic, Lead, Cadmium, Chromium
Affected Population	160,452

- **Background and Scope:**

Heavy metal pollution of the Marilao-Meycauayan-Obando River system (MMORS), located in the province of Bulacan, Philippines, has caused environmental degradation and numerous public health problems. The contamination of this waterway comes from both formal and informal industries, such as used lead acid battery recycling, gold and precious metals refining, jewelry making, and open dumpsites. Many of these toxic metal pollutants far exceed national standards and therefore create a significant human health problem.

The river systems from these municipalities are “hot spots” of water quality. The emissions and wastes from the industrial processes find their way into the atmosphere, river system and eventually to fishponds before finally exiting the Manila Bay. The fishponds form the basis of a thriving aquaculture industry that provides both an important source of income for coastal families and food for hundreds of thousands of people in Metro Manila. The likelihood of disease due to heavy metal poisoning decreases life spans and becomes a serious and widespread threat to public health and environmental well being.

These conditions in the MMO have spurred Blacksmith Institute to address these environmental-social concerns. Since 2005, Blacksmith Institute has been organizing and mobilizing the stakeholder’s group in the area to address the pollution problems in the river system. It has supported river quality monitoring of the Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB) Region 3 and NCR to help identify the MMO River System as a non-attainment area (NAA). This is a requirement to proclaim the MMORS as a Water Quality Management Area.

- **Solution Implemented:**

In 2008, Blacksmith received funding to undertake pilot projects for the mitigation and remediation of industrial pollution, particularly that of heavy metals, and for the mobilization of the community and local stakeholders to clean up the river system.

Extensive testing to evaluate water quality and worker health was performed to establish a baseline data set. The tests showed that high levels of toxic heavy metals were found in all three rivers around Marilao; additionally, they found that contamination of shellfish and other seafood far exceeded national standards, and that workers were consistently exposed to hazardous chemicals. Many residents living near tanneries and refiners attributed health problems such as asthma, tuberculosis, heart disease, and skin problems and to these industries. Soil samples were also taken from a variety of public areas to identify hotspots that required immediate treatment.

- **Project Performance:**

Personal protective equipment, safety education, and regular monitoring were all recommendations proposed by the study. Educational workshops have been held with tannery operators and gold refiners, in which best practices to minimize pollution were

322 8<sup>th</sup> Avenue, New York, NY 10001—t: 212.647.8330—f: 212.647.8334

[blacksmithinstitute.org](http://blacksmithinstitute.org)

identified. They also recognized that employers like Philippine Recyclers Incorporated play a significant role in the local economy, and requested that industries take measures to decrease their pollution. Different technologies are being explored for the remediation of toxic metals created by the industries: a chrome recovery facility is now in its second year, a wastewater treatment plant that uses aerobic bioremediation for tannery waste is completely finished and being used as a model for other tanneries, and a pilot test of a scrubber that controls air pollution from gold and precious metals refining is currently being assessed for effectiveness. The local government has agreed to place contaminated soil in drums for storage in local facilities, but work is still ongoing to find enough safe locations. The MMORS was formally declared as a Water Quality Management Area (WQMA) by the Department of Environment and Natural Resources on May 14, 2008, seven months ahead of schedule.

○ **Outcomes and Follow Up:**

The clean up and rehabilitation of the MMORS is a challenging and daunting task for all local and even national stakeholders. Significant improvements in the river quality may take months and even years. Through the pilot demonstration activity, the building blocks required for a comprehensive and integrated river system rehabilitation have been already laid: increased awareness of the heavy metal pollution, showcase of cost-effective anti-pollution technologies; participation and initial commitment of industry to control pollution at source; commitment of the multi-stakeholder group for a collective action for the clean-up and long-term river management and development; baseline data gathered on the industry practices, community awareness, and health risks.

The next steps likely involve long term funding from the Asian Development Bank, which is in discussions with the Philippines Ministry of Environment and Natural Resources regarding the project.