

## **Capacity building for GIS applications and pollution prevention in the U.S.-Mexico Border Region**

### **1) PARTNERS**

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### **2) PROJECT TITLE:**

Development of a Geographic Information System (GIS) for PROFEPA's (Procuraduría Federal de Protección al Ambiente) role in regulating industrial pollution in the Municipality of Tijuana, Baja California.

### **3) BACKGROUND INFORMATION ABOUT LEAD ORGANIZATION, AND OTHER PARTICIPANTS/PARTNERS:**

The Regional Workbench Consortium (RWBC), based at the University of California, San Diego and the San Diego Supercomputer Center, is a collaborative network of university and community-based partners dedicated to enabling sustainable city-region development. The RWBC promotes partnership-driven research and service learning aimed at solving interlocking problems of environment and development. The RWBC specializes in GIS, data integration, visualization and on-line interactive mapping.

Planificación A.C.'s personnel has extensive experience in the application and operation of GIS and land use planning. As a whole, its personnel have approximately 40 years of experience. In the year 2001, this team, working for *IMPlan Tijuana* (Tijuana's Municipal Planning Institute), was awarded first place in the Grand Show Case Award of ESRI-URISA in San Diego.

### **4) SUMMARY OF THE PROJECT**

The project consists of the creation of a GIS for PROFEPA in the municipality of Tijuana. Its goal is managing and regulating the pollution produced by industrial facilities by implementing an industrial tabular and graphic (maps) database. With this tool, PROFEPA will be able to improve its inspecting and monitoring and regulatory capabilities in terms of all environmental pollution by industries (firms) located in the municipality of Tijuana. All relevant Mexican and transborder regulations and environmental regulations will be compiled. All relevant cartographic and documented information for the elaboration of databases will be compiled and systematized. The structural base of a geographic information system and its database will be designed and digitized. This will enable the development of an industrial inventory as a pilot project to model, manage and regulate industrial pollution. Various analysis will be carried out that will allow PROFEPA to account for all pollution and its impacts on the environment and the people of the region, improving the speed and effectiveness of PROFEPA's decision making and regulatory activities. The GIS and its database will also contribute in preventing terrorist activities that may use dangerous materials and cause harm on both sides of the border.

## **5) PROJECT GOALS AND OBJECTIVES:**

### What will be achieved?

The creation of a GIS spatial database with land uses and additional variables that permits locating contaminating industries that represent a health hazard for the inhabitants of the region. A manual describing all necessary resources for the administration and implementation of the system. Some direct analysis (queries) will be made to identify fixed or mobile sources of contamination of water, air or land pollution. Simulation analysis of the impacts of pollution to the natural environment and its impacts on the population in the area. Simulation of the phenomena before and after regulation. Identify substances that may be used by terrorists by themselves or in combination with other substances.

### What environmental or human health issues will be addressed?

The contamination of water by industrial waste, including dangerous substances and solid waste. Air pollution by industries. Impacts on health such as diseases related to these pollutants. Review of existing information on health and sampling throughout the municipality. Types of impacts on health such as gastrointestinal, dermatological and respiratory diseases, birth defects and others.

### What will the impact of the project be?

Reinforce the capacity of PROFEPA to regulate and administer pollution. Reduce or eliminate the environmental pollution and its effects on the health of the people in the San Diego-Tijuana region, as well as preventing terrorist acts using dangerous substances.

### Who will the project benefit?

The project will benefit PROFEPA. This institution will have an instrument that will allow it to fulfill its attributions in an efficient and effective manner by establishing the basis for decision making. Ultimately, the environment and the population of the San Diego-Tijuana region will be benefited.

## **6) PROJECT RESULTS**

### What are the deliverables?

An operative GIS with its geographic database, a system's management team with all required operational manuals. Several analysis (environmental and health impacts, etc.). Improvement in the annual inspections of the polluting industry, speeding of the regulatory process.

### How will the results be measured?

Database maps and number of establishments in the digitized inventory.  
Number of direct analysis and simulations.  
Implementation of the GIS administrative system.  
Number of inspections.  
Number of probable cases of diseases caused by industrial pollution.

## **7) DESCRIPTION OF TASKS TO IMPLEMENT PROJECT**

- Contact with governmental and non-governmental agencies related with the project and compilation of information.
- Compilation of Mexican and transborder environmental resolutions, laws and regulations and of institutions related to the project.
- Compilation of existing databases and systematized and digitized information for the area under study.
- Division of Tijuana's metropolitan area into sectors, using as basic criteria the location of the contaminating industry.
- Selection of the pilot project area for the application of the program with PROFEPA,
- Compilation of field and photo interpretation data of the pilot area.
- Systematization and digitalization of the information and the creation of databases.
- Reports, maps and manuals.

## 8) PROJECT TIME-LINE

TASKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Contact with governmental and non-governmental agencies and departments related with the project for the compilation of information.	X	X												
Compilation of Mexican and transborder environmental resolutions, laws and regulations, with institutions related to the project.		X	X	X										
Preliminary conclusions.				X	X									
Compilation of existing databases and systematized and digitized information for the area under study		X	X	X										
Division of Tijuana's metropolitan area into sectors, using as basic criteria the location of the contaminating industry.		X	X	X										
Selection of the pilot area with PROFEPA, for the application of the program.			X	X										
Compilation of field and photo interpretation information of the pilot area.			X	X	X	X	X	X						
Systematization and digitalization of the information and the creation of databases.				X	X	X	X	X	X	X				
Reports, maps and manuals.								X	X	X	X	X	X	X