

PUBLIC AWARENESS AND USE OF THE TOXICS RELEASE INVENTORY:

Program and Community Engagement Recommendations in Three New York Communities



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Project Description

In 1984, a deadly cloud of methyl isocyanate killed thousands of people in Bhopal, India. Shortly thereafter, there was a serious chemical release at a sister plant in West Virginia. These incidents underscored demands by industrial workers and communities in several states for information on hazardous materials.

Public interest and environmental organizations around the country accelerated demands for information on toxic chemicals being released "beyond the fence line" -- outside of the facility. Against this background, the Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986.

One of EPCRA's primary purposes is to inform citizens of toxic chemical releases in their areas. EPCRA Section 313 requires EPA and the States to collect data annually on releases and transfers of certain toxic chemicals from industrial facilities and make the data available to the public through the Toxics Release Inventory (TRI).

In 1990 Congress passed the Pollution Prevention Act which requires facilities to report additional data on waste management and source reduction activities to EPA under TRI. The goal of the Toxics Release Inventory Program is to provide communities with information about toxic chemical releases and waste management activities and to support informed decision making at all levels by industry, government, non-governmental organizations, and the public.

TRI is a database containing data on disposal or other releases of over 650 toxic chemicals from thousands of U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment. One of TRI's primary purposes is to inform communities about toxic chemical releases to the environment.

The Toxics Release Inventory Program compiles the TRI data submitted by regulated facilities each year and makes the data available through the TRI Data Files and Tools webpage.¹

For this project, Capstone Fellows researched potential uses of the TRI data by EPA and different stakeholders. We conducted our research in three communities in central New York: Binghamton, Syracuse, and Ithaca. This report is the final outcome of that research. It includes analysis of different types of TRI communities—stakeholders who could use, contribute to, or be affected by TRI data—and community engagement recommendations based on local context. The report also outlines replicable methodologies for analyzing TRI user needs of communities because ultimately determining the usefulness of TRI is a task that must be undertaken at the local level.

¹ "What is the Toxics Release Inventory Program?," United States Environmental Protection Agency, accessed May 4, 2012, <http://www.epa.gov/tri/triprogram/whatis.htm>.

Methodologies include gathering information from surveys, interviews, focus groups, and interactive TRI user sessions.

The report also provides background information on types of toxic release in our research communities, environmental concerns among the respective populations, industry trends, and an overview of community engagement strategies. The case studies developed in the following sections recommend strategies to EPA for engaging these communities and establishing persistent relationships.

Methodology

In spring 2012, the Environmental Protection Agency's Toxics Release Inventory program began a partnership with the Cornell Institute of Public Affairs at Cornell University in Ithaca, New York. Our class, all second-year Master of Public Administration candidates, undertook research for the EPA in order to improve the effectiveness and outreach capacity of the TRI program. Our class members come from different educational backgrounds—from financial public administration, to international development, to environmental public policy—and also different geographical backgrounds. Students come from Kenya, China, the United States, Nigeria, and Colombia. Prior knowledge of EPA and its programs varied widely among the nine researchers.

EPA asked our class to identify users and potential users of the TRI, to what extent these parties use the TRI and why, how EPA can disseminate TRI information more effectively, and how EPA can raise the public profile of the program across the country. EPA also asked us to suggest ways to work with communities to increase awareness and use of the TRI to decrease toxic releases around the country.

We included several questions about the TRI in the annual state-wide Empire State Poll, conducted by the Survey Research Institute at Cornell. We framed the questions to determine current knowledge of the TRI program in general, and more specifically the website and database. Data from responses give a baseline from which to measure the effectiveness of future community engagement efforts around the TRI. Approximately 15% of those polled in spring 2012 knew about TRI. Of the respondents who knew about TRI, 20 percent had visited the website; half of these had used the TRI database.

We collected demographic data about each city and its county, and examined industry trends over the past decade in TRI reporting by industry or by geographic area: Ithaca (Tompkins County), Syracuse (Onondaga County), and Binghamton (Broome County). We asked people in each community to review the TRI website and the database tool "TRI Explorer" as well as other tools that map the TRI data. We worked with local stakeholders—government officials, students, and community activists, among others—to reach people in each of the three communities. In addition, we researched best practice community engagement techniques and tools for this type of government program.

We also worked with Professor Katherine McComas of Cornell's Communications Department, who discussed community engagement and surveying for information regarding environmental and government programs in New York State and elsewhere. Our conversations with Professor McComas led to the identification of certain key "intermediaries" on whom we focused our

research. Intermediaries are well connected and civic-oriented individuals in a community who are positioned to pass along information to a greater number of people; they include government officials and community group leaders, professors, and journalists, among others. Professor McComas also directed our attention to the “carrying capacity” of an individual or community, which is the limit on the number of problems or issues one can care about. We kept this in mind as we proceeded with our interviews.

We developed an interview protocol so that we could perform comparative content analysis. We conducted interviews using the "snowball" sampling technique: at the end of each interview, we asked each participant to suggest other individuals in their city whom we could interview. To those not reachable by telephone, we sent a questionnaire by e-mail. College students also filled out the e-mailed questionnaire.

Through these interviews and questionnaires, we were able to determine the general public's (1) awareness and knowledge of TRI; (2) opinions of and suggestions for the Starter Kit; and (3) opinions of and suggestions for the TRI website and tools.

Binghamton and Broome County

Executive Summary

We conducted our research on the use and usability of the Toxics Release Inventory in Broome County, New York. Very few public administrators, university professors, college students, environmental and community group leaders, and other individuals whom one might expect to use TRI as an environmental resource had heard of the program. After viewing the website, our interviewees agreed that the TRI program is beneficial to the general public, but they found the presentation of information—including the initial choice between tools—intimidating and confusing. Interviewees were also disappointed in the slow and infrequent updates of the data, which falls behind the tide of daily information about environmental degradation in their community and state. Most people requested easier access to more about chemicals and their risks and health implications.

Our research points to three main recommendations:

1. Restructure and simplify the website and tools. Outdated tools should be discarded as newer tools are introduced, or incorporated into newer tools. One umbrella tool that can funnel users into options for more in-depth research or technical data downloads should be featured on the homepage, and information on risk and health implications should be available contemporaneously with chemical and geographic data. Utilize color codes to create info-rich maps, and utilize hovering pop-ups to supply extra information.

2. Work with intermediaries to improve community engagement. Working with intermediaries—community and environmental group leaders, policymakers, and educators, among others—who have the skills to understand and synthesize TRI data and the local capital to publicize TRI data to their larger communities will conserve EPA resources. It will also allow the TRI program to develop specific, long-term interpersonal relationships in order to become a key environmental contact in any community of interest.

3. Help database users understand chemicals and EPA expectations. Users want to understand the released chemicals: how they behave in the environment; how they might travel or bio-accumulate; and their risk and health implications. They also need to understand the role EPA expects them to play as TRI database users. Explain how private citizens can monitor and pressure reporting facilities in their areas to make the program a de facto regulatory program. Highlight on the webpage how users can contact EPA and what they should do with the information TRI provides. Give users specific contact information for other organizations they can contact in order to effect change in

the toxics situation in their communities: the Office of Enforcement and Compliance Assurance, state environmental agencies, local or national journalists, local environmental organizations, reporting facilities, and local, state, and national policymakers. Make it extremely easy for users to effect change.

Methodology

Three members of our Capstone team—Lindsey Cunneen, Linda Majani, and Kun Qiang—conducted research in Binghamton and the larger Broome County area. The Binghamton team first identified various groups and individuals that would likely have reason to use the TRI—environmental reporters, city officials, environmental activists, realtors, bankers, industry employees—and then used these communities to identify people whom we could interview about their knowledge and use of the TRI.

We worked with educators, students, and community leaders to increase our reach as we conducted interviews. For example, we worked with Professor David Campbell, director of SUNY Binghamton's MPA program, to connect us to the community foundation, students, mayor's office, neighborhood assemblies and faculty, among others. We spoke with these key “intermediaries” to help focus our research, and also interviewed the individuals they suggested.

We first spoke with individuals to find out how much they knew about TRI and how to make the existing tools more likely to engage community members—that is, to learn how EPA can provide more information and make the website and the display in the TRI database more user-friendly. Conveying information effectively to the appropriate audience is critical to any community engagement strategy.

We also received information from email questionnaires received from graduate students at Binghamton University with expertise and interest in environmental policy. This information helped us hone recommendations for making the TRI database and website more accessible and useful for the general public in Binghamton and Broome County.

Demographic Information

Figure 1: Demographic Information for Broome County, New York

Basic Statistics (2006-2010) ²	Broome County	New York
Population	200,600	19,378,102
Median Household Income	\$44,457	\$55,603
High School Graduates (ages 25 and up)	88.3%	84.4%
Bachelor's Degree or Higher (ages 25 and up)	25.1%	32.1%

Manufacturing, retail trade and the health care and social assistance are the three major industries in Binghamton in terms of labor. Figure 2 displays the number of employers in the past ten years from 2001 to 2010.

Figure 2: Number of employees in the top three industries in Broome County³

Years	Manufacturing	Retail Trade	Health Care and Social Assistance
2001	16,487	12,143	12,385
2002	14,495	11,819	12,827
2003	13,009	11,525	12,903
2004	12,861	11,447	12,913
2005	12,333	11,470	13,048
2006	12,274	11,516	13,239
2007	12,237	11,591	13,567
2008	11,946	11,420	13,826
2009	10,759	11,179	13,966
2010	10,127	11,083	14,303

² Bureau of Labor Statistics, bls.gov/cew/cewlq.htm

³ <http://epa.gov.tri/>

Industry trends

From 2001 to 2010, the number of employees in the manufacturing industry decreased; the industry lost more than one third of its employees over those 10 years. The number of health and social assistance jobs has increased slightly each year. The retail industry has decreased only slightly (about 9%) since 2001.

The decline of the manufacturing industry has hit Binghamton hard because historically it has been the largest industry in the city and Broome County. This decline mirrors a national trend of a marked decline in manufacturing as the percentage of jobs provided by service industries and health care continues to increase in the American workforce. A decline in manufacturing in upstate New York may explain a decline in the number of releasing facilities reporting their toxics emissions to the EPA. Other possibilities remain, however, to explain that decline: an increase in delinquent facilities simply not reporting their emissions, improving pollution technologies and waste prevention strategies, or the export of the state's dirtiest industries to other states or abroad.

TRI on-site and off-site Releasing Facilities, Broome County

The number of total releasing facilities in Broome County remained at 19 from 2001-2003, then dipped down to 14 in 2008 before increasing again in 2009 and 2010 to 17 releasing facilities. Over the decade, the total number of releasing facilities reporting their emissions to EPA decreased from 19 to 17, a decrease of about 10%.

This trend corresponds to the decrease in manufacturing jobs from 2001 to 2010. However, releasing facilities increased from 2008 to 2010, while manufacturing jobs were still decreasing in those years.

The current major employers in the Greater Broome County area:⁴

Aerospace and Defense

Lockheed-Martin MS2 – Owego, Tioga County (3,000 employees)

BAE Systems – Westover (1,600)

Rockwell Collins - Johnson City, New York

High Technology

Endicott Interconnect (1,600)

IBM (founded in region) (1,450)

Universal Instruments – Broome Corporate Park, Conklin (Headquarters)

McIntosh Laboratories (Headquarters)

Education

Binghamton University – Vestal and Downtown Binghamton (2,300)

⁴ <http://quickfacts.census.gov/qfd/states/36/3606607.html>

Broome Community College (454) – Dickinson
Clinical Campus of Upstate Medical University at the Greater Binghamton Health Center
Food Services & Distribution
Maines Paper & Food (1,100) (Headquarters)
Frito Lay (540)
Crowley Foods

Some major employers were also TRI releasing facilities from 2001 - 2010. In the aerospace and defense industry, BAE systems was also a releasing facility. In the high tech sector, Endicott Interconnect, IBM, McIntosh laboratories were also releasing facilities. Finally, Frito Lay, in the food service industry, also reported to TRI.

Environmental concerns

Marcellus Shale Natural Gas

The rush to drill in the Marcellus Shale has drawn a great deal of attention in Broome County. Landowners are scrambling to sign leases, industries have dispatched teams of lobbyists to Albany, and most media coverage continues to focus on the immediate economic boom to the area.⁵

The Marcellus Shale issue is upstate New York's local debate over hydrofracking. Hydrofracking has been a hot topic in New York state. There are debates over the cost-benefit analysis on "fracking," and residents near the fracking area are concerned about water quality and living conditions.

The fracking issue raises the question of "carrying capacity". Basically, carrying capacity describes people's emotional caring capacity, which means one can only care about a few things in one area. For environmental concerns, when issues exceed the maximum number one can handle and care about, one cannot pay attention to items beyond the carrying capacity. In Broome County, people tend to pay significant attention to the hydrofracking issue, so other issues are hardly or no longer in the domain of environmental concerns. People cannot "afford" the energy to care about other issues.

In this case, TRI is mainly competing with hydrofracking for people's carrying capacity in Broome County.

IBM Lawsuit

One of our interviewees states: "As for the spill in Endicott, it first occurred in 1979, with a few

⁵ http://en.wikipedia.org/wiki/Binghamton,_New_York#Economy

following spills from the IBM manufacturing site. This involved a few chemicals, most notably TCE and TCA. It was not until about 25 years later that this was a noticeable problem. TCE is a known carcinogen. A process known as vapor intrusion caused this chemical to surface to buildings and homes in Endicott. Since then, the DEC has required IBM to mitigate the contamination from the spill, which is still ongoing.” This individual is very knowledgeable about the IBM spill in Broome County and still pays close attention to issues arising from the spill. From his description, it is easy to get an overall idea on the IBM spill.

This interviewee also informed us that the New York State Department of Environmental Conservation (DEC) has been working on solving the IBM spill. The following description is from a DEC report on IBM spill:

“In 1980, after a reported spill at its facility, IBM began addressing contaminants that were found to have entered the groundwater. There have been several investigations at or near the site since that time, including the current remediation efforts. The nearest public water supply wells are located 4,000 feet to the southwest of the facility and take in water from the lower aquifer. Historically, contaminant levels unacceptable for drinking water have been recorded at these wells. Treatment to remove contaminants began in 1983 and continues today. The wells are also routinely tested and have consistently exhibited contaminant levels acceptable for drinking water since 1983. Although IBM sold the property in 2002, it has continued to cooperate with the investigation and cleanup at the site. Investigation and remediation activities previously performed under a hazardous waste management permit will continue to be performed under a consent order issued by the Department in August 2004.”⁶

The aftermath of the spill is continuing. In 2008, there were about 1,000 plaintiffs accusing IBM of releasing contaminants causing illness and death, damaged property values, and loss of business. “The lawsuit seeks unspecified damages for property devaluation and loss of business value and income, and for personal injuries. Plaintiffs also seek punitive damages, as well as attorney’s fees. The first trial is slated to begin by Oct. 1, 2012 according to a case management order filed in Broome County Supreme Court in June 2011.”⁷

TRI was launched in 1986, seven years after the IBM spill, and thus does not cover release data from 1979. However, IBM has also been a major polluter in Broome County since 1990. There is data available for the public to track the facility pollution. The interviewee who presented the details on the IBM spill reported above surprisingly did not know about the TRI. If the TRI data is more visible and user-friendly, it could be a great source for the lawsuit and a reference for people who are

⁶ <http://www.cityofbinghamton.com/department.asp?zone=dept-planning&pid=59&pm=page> “Binghamton fact sheet”

⁷ <http://www.pressconnects.com/article/20120122/NEWS01/201220339/Lawsuit-against-IBM-will-held-Broome-County>, http://news.cnet.com/8301-10784_3-9839383-7.html#ixzz1oChPupW8

living near the releasing facility.

Lead Related Protection Movement

According to the Environmental Management Council, the major concern related to toxic chemicals in Broome County is lead release. After talking with people living in Broome County, we learned that there are many old properties in this area with lead paint. Accordingly, besides the lead released by industry, everyday lead poisoning has already been brought up to attract people's attention. There are a large number of programs related to lead poisoning. Below, we have listed a few from the Lead Related Protection Movement website.

"Partnership Provides Specialized Training in Lead Safety"

The Broome County Health Department and Broome Tioga BOCES are working in collaboration to bring Environmental Protection Agency's Lead Renovator Training to the current participants of the 'HEW: Health, Environmental, Weatherization' class. Individuals participating in the class will learn how to protect themselves and the families living in the homes where they are working from the effects of toxic lead particles. "⁸

HUD Lead Hazard Control Program

"On August 3, 2011, First Ward Action Council (FWAC) will begin accepting applications for the U.S. Department of Housing and Urban Development (HUD) Lead Hazard Control Program in Broome County. In April, the Broome County Health Department was awarded a \$2.1 million federal grant to control lead paint hazards and address health issues in local low-income housing. The Health Department is partnering with local community-based non-profit organization First Ward Action Council to enroll and remediate over 100 properties in need of lead hazard control work, primarily within the City of Binghamton."⁹

Prevention of Lead Poisoning

"The Broome County Health Department has initiated a project in the City of Binghamton designed to identify ways that property owners and parents can reduce the risk of exposure to lead by young children. "¹⁰

By carefully checking the TRI reports of Broome County, we discovered that lead is one of the most heavily released chemicals in Broome County. There are some major releasing facilities that only release lead. Figure 3, below, summarizes TRI facilities with lead releases between 2001 and 2010.

⁸ <http://www.gobroomecounty.com/hd/partnership-provides-specialized-training-lead-safety>

⁹ <http://www.gobroomecounty.com/countyexec/hud-lead-hazard-control-program>

¹⁰ <http://www.gobroomecounty.com/hd/prevention-lead-poisoning>

Figure 3: TRI Facilities with Lead Releases in Broome County¹¹

Year	Total Releasing Facilities	Releasing Toxics Including Lead	Releasing Lead Only
2001-19	11	6	6
2002-19	11	6	6
2003-19	10	6	6
2004-17	11	7	7
2005-16	11	7	7
2006-16	10	6	6
2007-15	10	6	6
2008-14	10	6	6
2009-16	9	6	6
2010-17	9	7	7

Lead releases, while detrimental to Binghamton, presents a great opportunity for the TRI program to reach out because people in Broome County care about lead poisoning. If TRI data is combined with the program on lead poisoning mentioned above, the community could be better informed and more prepared to deal with lead poisoning.

Limitations of Our Research

In our research, we encountered a few expected limitations and roadblocks. It was difficult to find willing respondents and it was difficult to schedule an interview with an adequate amount of time to go through all of our questions. Though we wish we had had enough time to interview more Broome County residents, those we interviewed represented a satisfactory swatch of educators, community leaders, students, and public administration representatives. Another limitation we encountered was that many interviewees immediately thought of fracking and other local issues that TRI does not cover. They were then slightly preoccupied with why TRI does not cover those issues, as opposed to focusing on what the program does cover.

Also, because it is expensive to create a random sampling survey, we had to limit ourselves to adding a few TRI questions onto Cornell University's statewide Empire Poll (described above on page 8). We would have liked to ask more questions of the whole state. Another limitation was the short time frame of our research. Had we had more time, we would have been able to put together

¹¹ TRI Explorer Tool, <http://iaspub.epa.gov/triexplorer/tri_release.chemical>

a focus group in Binghamton. Finally, the scope of our research is limited compared to the TRI program: our class dealt with only New York state and our team only investigated Broome County; TRI covers the entire United States. We ask that you keep these limitations in mind as you view our findings and suggestions.

SWOT Analysis

Strengths

The Toxics Release Inventory Program's main strengths at this point are its online presence, willingness among administrators to improve its engagement strategies, and its national coverage. Overwhelmingly, the people we interviewed felt positively about the TRI's existence and its usefulness to communities and individuals. Interviewees felt that the TRI could be a good source of information when they are moving to a new city or home. Most people said that they were likely to tell their friends about the TRI. Also, the new rule requiring electronic reporting will be a great strength, because it will inch the program closer to being able to provide the public with data sooner and more often. Though we know it would take an act of Congress to increase the number of times per year that facilities are required to report their emissions, in the end this is one of our strongest recommendations. We will discuss this in detail later, but suffice it to say that electronic reporting is a single step on the way to creating an inventory that is more useful and more often utilized by the public.

Weaknesses

Timeliness and frequency are the main weakness of the TRI program. Interviewees in Binghamton were disappointed to learn that TRI data is only updated on an annual basis; this annual gap in updates seems antithetical to the Emergency Planning and Community Right-to-Know Act. This weakness is cited widely in public administration articles on TRI and environmental justice: "another concern is that the TRI release estimates are aggregated across the entire year and contain no information about the distribution of the releases across the time frame. The chemicals could be released evenly over the course of the year, or in one shot—there is no way to tell from the TRI. This can make a huge difference in terms of health implications, especially because the patterns of diffusion may vary seasonally with climatic conditions" (Bowen, William M., Wells, Michael V. *The Politics and Reality of Environmental Justice: A History and Considerations for Public Administrators and Policy Makers. Public Administration Review*; 2002, Vol. 62 Issue 6, pp. 688-698). The annual, national reports produced by the TRI seem similarly untimely. We suggest that EPA and the TRI attempt to discover exactly who uses those reports and to what ends. This will help the TRI frame its reports for particular audiences. Perhaps the TRI could ask for community partners to create several state or city reports per year instead of one huge national report; in this way the TRI could discover its most ardent users and perhaps incite a competitive element between states to determine who most needs or wants this analysis.

The TRI program is relatively unknown, even by those community members one might expect to know about it; beyond that, it is rarely used. Interviewees complained that the online tools and the raw data are not useful unless users can clearly ascertain what amount of each chemical is dangerous to people. How close does a toxic have to be before one should worry? How does it behave in the environment? How much of a toxic is a short-term danger or long-term danger? Interviewees could not find this information on the screens or tools in which they found releasing facilities. Exposure levels were not present (or they could not find them if they do exist on the TRI website).

Generally, people could not find all of the information for which they were looking: they might find the number of facilities in a county but could not narrow it down to their city; they might find facilities and chemicals released but not pounds of each chemicals or toxicities. Overall, they were able to find only pieces of information about toxics in their areas. These individuals, we should remind you, are extremely computer literate. The most important piece of information they could not ascertain was which level of which chemical is dangerous, and how dangerous. They wanted to know the health effects of exposure to each chemical. They also wanted it to be more obvious which emissions were on site versus off-site, and if they were off-site, where were those chemicals eventually taken or released? If there are waste transfer reports available on the TRI site, our interviewees could not find them when they tried.

Overall, interviewees lamented the unfortunate amount of “legwork” necessary to find information on the TRI website. Too many clicks were necessary for the simplest questions. The site almost seems like a rabbit hole—they found themselves returning to the homepage just to start their search over again. It is impossible to ascertain the basic structure of the entire site from the homepage. Other weaknesses of the program include the very little interaction the public has with TRI employees. Except for the annual conference, the public does not get a chance to put any names and faces with the work that is evident online. It is a fairly small program, so it might do some good to have some personalization on the website. The TRI homepage has a “contact” button—but whom are they contacting? Adding a human element to the TRI website will help the public want to communicate with TRI administrators and discuss issues and suggestions. EPA needs to overhaul the tools and website to be far more user-friendly. The website simply offers too many tools, and it is not immediately clear once at the site what an individual can find deep in the recesses of the site.

TRI needs to be in contact with communities who *should* be using the TRI database and with individuals who are *trying* to use the database. The listserv created from the annual conference should be a starting point. Currently, its use does not seem effective. People have signed up and given TRI their email addresses, meaning they *want* information from the program—not every day, certainly, or even every month, but a quarterly or bi-annual report is not an intrusion to individuals

who want to hear from TRI. Community engagement strategies, which we will deal with later in this report, will require a sensible use of the contacts TRI already has.

Opportunities

Fortunately, citizens in Broome County are concerned about environmental issues, especially local issues. TRI can use this to its benefit by attaching the TRI database to the importance of other everyday things. This is an opportunity for TRI to insert "check TRI database" into the checklist of things to research when a person is moving. According to our interviewees, people do care about the toxic releases in their communities, and they are thinking about the environment on a regular basis. News about global warming, fracking, and other issues is already on their radars; TRI just needs to insert itself into the everyday language of environmental concerns. National publications and news sources are tools that TRI could use to increase public awareness of its existence. On a more local level, Broome County often reads news about its many brownfields, the history of the IBM pollution, and the prospect of high-volume hydrofracking. In its news releases and email updates to the public, TRI should use this concern for public health and the local water supply to publicize its own usefulness. To connect with residents in Broome County, TRI should also work with the DEC because interviewees said that they would contact the DEC to find information on toxics. Interviewees also depend on local and national newspapers, the Internet, TV, and radio for news about the environment.

Threats

The TRI program should be aware that people have a carrying capacity, which limits the number of things they can care about at once. If people are overwhelmed with economic problems or other issues, sometimes they just do not have the energy to care about more ancillary things like toxics. Because toxics are not an everyday issue and the information is updated only annually, people will devote even less energy to attempting to decipher the TRI website and determining what danger toxics pose to them. Finally, a main threat to the TRI program's effectiveness is the complex nature of its subject; chemicals are complicated and people are just not sure what the threat actually is. When they see that X number of pounds of a chemical was released into the ground, people simply do not know what that means, especially in comparison to a few ounces of a different chemical or if it was released into the water instead. They do not have the scientific literacy to decipher the information.

Findings

Before we contacted them, every one of our interviewees, except one, had not heard of TRI. The lone interviewee with prior knowledge of TRI had heard about it as a result of the Endicott Spill in the area. The interviewee's attention was brought to TRI at a stakeholder meeting to address the spill.

Overwhelmingly, participants quoted media (newspapers and television) and friends as their sources of information about environmental issues. A few brought up the library, local convenience store, mail, grass root groups, bi-annual newsletter, informational sheets and fliers. No one sought out information specific to toxics releases, but when it came to their attention, it was from local news media.

Once we introduced them to the TRI, most people felt that it was designed for the general public. All the participants are concerned about environmental issues in their cities, stating that it is important for them to know about toxics releases in their neighborhoods. When it comes to environmental issues, hydrofracking is the number one issue on their minds. Other worries include water contamination and quality, and past toxics releases from now defunct manufacturing industries.

Upon looking at the website, all the interviewees agreed that it was a useful tool but balked at its complexity. For something directed at the general public, the information seemed complex and intimidating. The participants felt that to navigate the site, one needed specialized knowledge. Most could locate the TRI tool but had mixed results when it came to finding information on facilities reporting release of toxic chemicals. Interpretation of results was difficult; the numbers did not mean much without the level of danger to individuals explained. In spite of these hurdles, all participants said they were likely to use it in the future as it provides useful information. They were also willing to refer their friends to the website. Suggestions for improvement ranged from using larger font, organizing tabs that were self-explanatory, to making the explorer tool more prominent for easier access.

According to the participants, users of the website should include: companies dealing with chemicals; investors; relocating businesses and individuals; government officials including municipal, state and federal planner; community and environmental activists; community members; various non-profits that focus on health and the environment and/or food and farming; Department of Health employees and policy makers (mayors, legislators). TRI is a good reference point for organizations and community members with environmental concerns.

Our findings demonstrate that there are advantages to having the information from the TRI. This information educates individuals, thereby raising awareness and understanding for both individuals and groups in the community. It helps with planning and policy-making because it allows for informed decisions concerning policy and legislation. It also shows risks/rewards of staying in and/or moving to an area, making it useful for relocation purposes. The downside of this information is that it is too technical. One cannot compare one's community with other areas easily. It would be good to have a comparison tool so users can see what is going on with similar industries in other areas. With confirmation of presence of toxics from the TRI website (either truly or in

error), people may panic. This might scare off residents and investors, thus diminishing the tax base of the city.

Suggestions

In Binghamton, the environment is on the minds of most people. This is good news for EPA because it will be easier to introduce TRI to an audience that overwhelmingly expressed concern for its environment. Hydrofracking is the current hot topic locally, but EPA can use this opportunity to raise awareness of the TRI. Most of the respondents had not heard of TRI before we spoke to them. A Public Administration student at Binghamton University suggested that TRI should advertise more because he had no idea about this program. The EPA should raise awareness of its existence and use to communities. However, EPA should not attempt to communicate with every person or every tiny niche group. The target population for this awareness should be community leaders, environmental groups and city groups. EPA should communicate directly with intermediaries; it is a waste of resources to target "the public" because the scope is too broad.

EPA should contact intermediaries and let them do the work of creating list serves and posting fliers and getting stories into the newspaper. Intermediaries have a better handle on what is important in the community and will be able to disseminate the information in a way the community will embrace. Unless something specific happens in an area, most people do not pay attention to it and are not likely to seek out information on toxics. This is because it is a specialized topic, not an issue that is likely to occur on a day-to-day basis.

In Binghamton, familiarity with environmental issues stemmed from the spills at Endicott and Hillcrest. The reason environmental issues are on their minds is because of the ongoing fracking debate in the Finger Lakes Region of New York. EPA should find a way to weave the TRI tool into this ongoing story to increase the chance of community absorption. An example of applicability is relocation. One respondent was pleased to find out about the TRI resource and plans to use it in the future for relocation purposes. He believes that he can use the tool to direct him on potential areas to avoid because of high levels of toxicity. The EPA should explore this avenue, figuring out ways to apply the TRI to day-to-day activities that will transform the TRI from being a specialized scientific tool to something more accessible.

One way of making the TRI familiar would be through the general news sources: national, state, and local news. Most of the respondents stated that they got information on environment and toxics through the news media. Other communications can be made through environmental networks like the Sierra Club, which seems to be active in Binghamton. The Sierra Club sends their members emails and publications on environmental issues. The Group Chair of the Sierra club, a respondent in this study, was the only person who knew what the TRI was about because it was mentioned in

the group after the spills in Endicott. This shows how useful these networks can be to the EPA when it comes to disseminating the TRI to the public.

Our interviews revealed that a lot of people had trouble with the layout of the TRI website. One respondent said that when he gave it a quick glance, he was intimidated by the amount of data that did not make much sense to him. Another thought was that the reports generated by the TRI were meant for experts, reiterating that the compounds and data in the TRI were so extensive that it felt overwhelming. Most respondents agreed that the information is confusing for non-specialists. The opportunity is in simplifying a tool that is perceived as useful by the respondents of this study. EPA should simplify the website. The starting point should be the font size to increase clarity and reduce strain. Having fewer tools or use of images instead might ease the process. Respondents took time searching for TRI tools and links; therefore, more prominent placement would be helpful to potential users.

A simpler, more informative format would be useful. For example, some respondents were able to obtain information on toxics but were not aware how much of it was dangerous. Information regarding a chemical and its toxicity levels would be more useful to people. The website/tools need to show the toxicity of each chemical emitted. This could come up in a search rather than having to go to other pages. Also, a user should be able to understand how the chemicals behave in the environment. For example, which ones dissipate or which ones bio-accumulate? Right now, one sees a particular chemical that was emitted this year, and two years prior but has no idea of how much is actually in the environment now.

Finally, for the long term, TRI should work with science teachers to put TRI use into their curriculum so that students graduate knowing that it exists and they have a single point of initial contact (the teacher) to help them understand how to use it. Raising awareness at an early level will teach people to care about their environment and introduce them to resources that will help them protect it further.

Community Engagement Strategies

Community engagement strategies consist of three key elements: “(1) enlisting the support and involvement of community stakeholders; (2) developing a diverse and complementary set of dissemination methods; and (3) presenting research findings strategically to create a foundation for positive community action.”¹²

We recommend that the individuals at TRI work to identify key stakeholders before starting a new community engagement strategy. TRI’s first and greatest hurdle will be awareness. Most individuals

¹² http://www.urban.org/UploadedPDF/311411_Informing_and_Engaging.pdf

are not even aware that TRI exists. If they know about the program, they do not often know how it works, what its goals are, or how they need to be involved as citizens. TRI can achieve its goals only with increased public visibility, understanding, and stakeholder contact.

When our class asked TRI officials about the goals of the program and about the target audience of the program, the answers were vague and far too inclusive. It is acceptable to want all US citizens to know about and use TRI tools. Taking stock of where the program is now, however, twenty years after it began, those goals are perhaps too lofty. TRI needs to understand its limitations, especially its limited time and financial resources, so that it does not waste effort on a community engagement strategy that attempts to engage the entire country and ends up engaging no one. Even if TRI would ideally like all 305 million Americans to use the database, it needs to realize its limitations and visualize what its limited budget and time can do. TRI needs to identify the most involved citizens and the most effective avenues of communication.

The initial step is to understand that program's ultimate mission and goals.¹³ Is the goal to provide data to the public in ways they can understand? If so, an engagement strategy will focus only on the usability of the website and TRI tools. If the goal also includes positively inducing citizens to use that toxics release information to improve their communities, then TRI's engagement strategy and its online and real-world presence need to lean in that direction. The website needs to devote as much screen space to facilitating civic engagement and action as it does to presenting data in the most simple and useful way. Once the goals of the program are rock-solid, it will be far easier to envision how and what EPA will communicate to the country.

After nailing down the goals of the program, TRI should identify its stakeholders. Though the program is meant for the benefit of the entire American public, stakeholders to identify for a community engagement strategy consist of a limited number of people: those who are on the TRI listserv, those who attended the annual conference, and intermediaries. Intermediaries are individuals in communities across the country who are positioned to publicize the TRI database to groups and constituencies who would care about toxics information and also be able to use it. Intermediaries will be different city to city, but a general list can begin with: educators, environmental groups and leaders, community leaders, public policymakers, and journalists. Setting up focus groups in various cities across the country will help make TRI familiar to individuals most likely to come to such an event. These are the citizens at whom EPA's community engagement strategies should be aimed.

Furthermore, after identifying its mission and target audiences, TRI should answer the following questions: (1) What resources does the organization have to pursue its mission?; (2) Where does

¹³ <http://www.health.state.mn.us/communityeng/>

the organization need to grow to pursue its mission?¹⁴ TRI needs to identify where it puts its resources now and compare that to how its target audience interacts with the database. Since no one we interviewed had heard about TRI prior to our research, it is safe to say that resources expended on publicizing TRI in Broome County were wasted. If most people across the country interact with TRI through the website but few people read the annual report, perhaps TRI should look into shifting its resource use. If many people read the annual report, but no one uses it to pass along information, talk to the releasing facilities, work with policymakers, or publicize the information in any way, TRI ought to consider a different format for its annual report. All of these considerations, of course, should be tied firmly to the organization's ultimate goals. Does EPA want people to be aware of the database, to be aware of the toxics in their community, or to take action in their community to reduce toxics? This key question will inform key community engagement decisions.

Next, the EPA's Community Engagement Initiative Implementation Plan sets out further elements of a strong strategy: work with state and regional officials (of the EPA and other environmental departments like the DEC), community groups, tribal governments, and county governments.¹⁵ Ongoing input from this community of stakeholders will improve the TRI program; perhaps more importantly, it will increase their stake in the success of TRI in their communities. EPA can solicit input by using focus groups, public meetings and roundtables, and short email surveys.

Community engagement will be a huge undertaking for TRI because so few individuals are aware of TRI. However, partnering with other lesser known EPA or state environmental programs may decrease the workload and increase the payoff. Community engagement is usually a "local" option. It requires person-to-person communication and the development of trusting relationships. TRI cannot accomplish a true national community engagement program without state and regional organizations. Those organizations will then engage with city and university groups, and those in turn will create long-term relationships with individual citizens. It is impossible for TRI to reach its potential users efficiently without utilizing a vast network or intermediaries. We do not recommend that EPA attempt to reach all environmental academics or community leaders. Rather, we feel it would best suit TRI to develop relationships with regional and state groups like the DEC. Use the trust citizens have in more local organizations to get the TRI name out there. In addition to creating those relationships, TRI needs to facilitate the education of groups further down the line. If TRI wants a regional EPA office or local Sierra Club Chapter to hold a roundtable about TRI, provide all the materials, including Powerpoint presentations, handouts, scripts, and minute-by-minute agenda. Provide feedback cards, and always allow individuals and leaders to sign up for the listserv. Finally, use that listserv, and if possible split it into states or regions so you can tailor messages to specific areas.

¹⁴ <http://www.health.state.mn.us/communityeng/>

¹⁵ http://www.epa.gov/oswer/docs/cej_imp_plan_0510.pdf

The following is a list of key elements of a successful community engagement strategy according to the California Institute for Local Government.¹⁶ These ideals are echoed in a similar list from the National Coalition for Dialogue and Deliberation and the International Association for Public Participation.¹⁷

- **BUILD COMMUNITY CAPACITY TO PARTICIPATE**
- **DEVELOP RELATIONSHIPS** – Personal relationships developed by elected officials and local agency staff with community, leadership and advocacy organizations will reap many rewards.
- **FIT YOUR PROCESS TO THE PARTICIPANTS**
- **GET HELP** – Identify and seek the help and advice of community-based and intermediary organizations, including neighborhood and grassroots leadership groups, local clergy, faith-based organizations, community and ethnic media, and others that can as provide two-way conduits for communication between local officials and community residents on specific issues and policies.
- **COMMUNICATE EFFECTIVELY AND RESPECTFULLY** – Stay current with your communities changing demographics, and develop in culturally and linguistically appropriate communications material and strategies.
- **BE FLEXIBLE** – Holding public meetings or other public engagement processes in community settings that are known and accessible to the communities you wish to reach, perhaps co-sponsored by respected intermediary organizations, can help achieve your goals for broader participation.
- **HAVE SPECIFIC GOALS** – For public engagement efforts, take the time to create targeted goals for harder to reach communities. In general, encourage attention and learning about inclusive engagement throughout your local agency, and include public information officers in these discussions. Individual departments can develop their own outreach plans to reach specific less-engaged communities or populations.
- **STAY IN TOUCH** – As appropriate, keep up to date lists of organizations and groups concerned about given issues and keep them informed of opportunities to participate.
- **SAY THANK YOU & FOLLOW-UP** – Let participants know how their input was considered and impacted decisions.
- **KEEP LEARNING** – Follow up after specific engagement efforts to determine what worked and what could be improved.
- **BUILD IT IN** – Think about this kind of inclusion beyond the occasional public engagement effort. Explore the invitation and integration of diverse community voices as a part of your overall strategy to inform and support the goals and programs of local government.

¹⁶ <http://www.ca-ilg.org/post/beyond-usuals-ideas-encourage-broader-public-involvement-your-community>)

¹⁷ <http://www.ca-ilg.org/post/principles-local-government-public-engagement>

To conclude, we believe TRI has the potential to reach all Americans and help them to improve their communities. To engage this vast community, TRI needs to be clear about its ultimate mission and its intermediary audiences. Second, it needs to establish relationships, build trust, and seek input from regional, state, and local groups. In New York, the DEC is a useful statewide organization with which to work. In Broome County, groups like Binghamton University's Center for Civic Engagement would be strong partners. EPA's community engagement strategy needs to delineate realistic processes for each level of community to participate in TRI education and toxics policy action. It is essential that TRI partner with and consistently communicate with communities; it should not assume the TRI information is in an adequate format for understanding. TRI should be continuously asking users how it can improve. We recommend a citizen-centered approach,¹⁸ which includes such elements as: start young (i.e. our recommendation to insert TRI into school curricula); use technology to encourage and facilitate citizen-centered dialogue, deliberation and organization; explore nontraditional mechanisms of communication; look at where people are already interacting (at schools, organizations, workplaces); and research what works and why (use exit surveys when people visit the TRI website).

¹⁸ http://www.casefoundation.org/spotlight/civic_engagement/summary

Appendix A: Intermediaries Interviewed

Title	Organization
Professor/Director	MPA Program; Binghamton University
Student/President	MPA Program; Binghamton University
Assistant to Mayor	City of Binghamton
Executive Director	Community Foundation for South Central New York
Group Chair	Sierra Club Susquehanna Group
Director	City of Binghamton Planning, Housing & Community Development
Student/ Community Activist/Board member	Binghamton University/ Binghamton Books Not Bombs

Syracuse and Onondaga County

Executive Summary

A quantitative and qualitative analysis of Onondaga County has shown that there is need to restructure the current TRI in order for it to fully realize its intended purpose. To continue being the premier authority on information regarding toxic releases and the facilities releasing them, we suggest several recommendations highlighted below. We believe that this will make TRI a powerful tool for both the layperson and the academic in effecting positive environmental change.

All but one of our interviewees had not heard of the TRI. The single person who knew of it only knew of the antiquated paper-based version from the 1980s. From remarks made by interviewees, there is a need for a tool that is both in-depth and user-friendly, where a diverse group of potential users from environmental journalists and environmental groups to local politicians and laypeople can access toxic release information to better protect their environment and themselves.

After viewing the website, the interviewees found the data confusing, overwhelming, difficult to comprehend, and in some cases incomplete and outdated. Their preference for the Syracuse Community Geography website which provides similar but less in-depth and comprehensive information shows the community's desire for a more user friendly tool. To this end, we recommend a renovation of TRI that includes easy-to-use, interactive tools for people to find toxics releasing information pertaining to their community. It should be more detailed, covering specific aspects of their environment being affected like the soil, air, or water bodies.

Our recommendations with regards to restructuring the website are as follows:

1. **Simplify and visualize the website** The TRI website could be simplified by stratifying data targeted for both regular and more advanced users. This will ensure that the regular users are not intimidated by complex technical terms but still meet the needs of the more advanced ones by leaving the technical information on the page.
2. **Complete and interpret the data:** Incorporate more complete data by including factories and toxics releasing facilities that are missing from the current TRI. Also interpret the effects of these toxics on the residents of Onondaga County; this would better serve them.

3. **Provide outside links.** External links should be provided that enable users to seek redress and, in some cases, forward any concerns to the right parties.

Methodology

For the purpose of the research in Syracuse, the team made use of academic articles and online resources such as the American FactFinder and the TRI website to gather information about the demographics of the city of Syracuse and the industries located there. With these tools, we were able to get a clearer picture of the environmental concerns of the people of Syracuse, and Onondaga County at large.

We conducted interviews and approached residents of Onondaga County to fill out questionnaires to get their perspectives on the environmental issues in their community and also to get their opinions on the TRI. Phone interviews were conducted with environmental activists, policy makers and leaders of a few environmental institutions such as the Onondaga Environmental Institute, Syracuse United Neighbors and Citizen's Campaign for the Environment Central New York/Finger Lakes. The team also took a trip to the Syracuse Public Library and selected people at random to fill out questionnaires. We opened the TRI website and the Syracuse Community Geography website for them to navigate while they filled out the questionnaires. The input gathered from these interviews and questionnaires make up the second section that details our findings. Also, questions were included about the TRI in Cornell University's annual Empire State Poll (described above on page 8). Though not specific to Syracuse, the survey provides general information about people's perception of the TRI.

Demographic Information

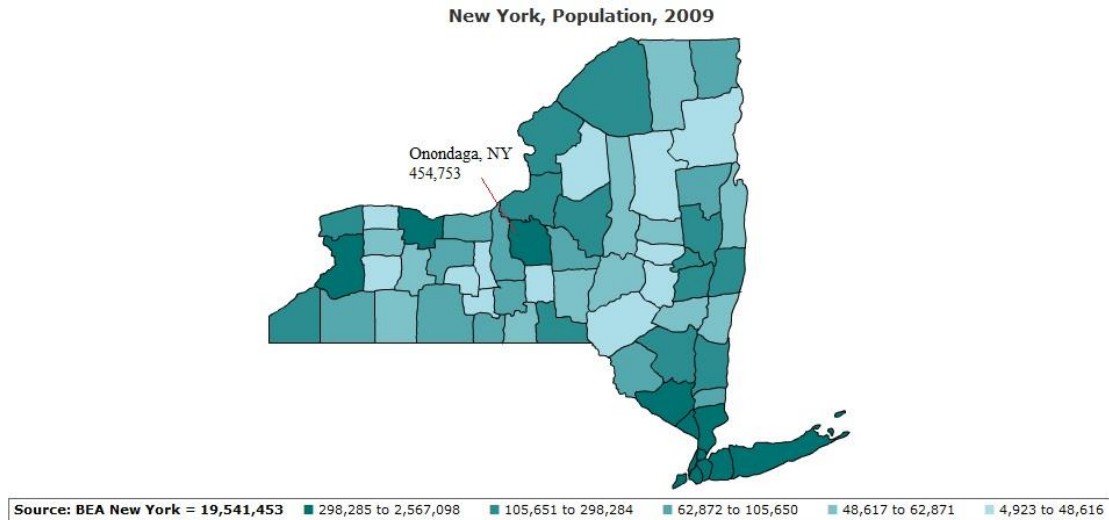
Onondaga County

Onondaga is one of 62 counties in New York. It is part of the Syracuse, NY Metropolitan Statistical Area. Its 2009 population of 454,753 was ranked 11th in the state. The 2010 population was 467,026. In 2010, the age group distribution of the population was as follows: 5.9% of the population was under 5 years, 23% under 18 years, and 14% over 65 years; females made up 51.9% of the total population; and Caucasians constituted the majority at 81.1%.¹⁹

¹⁹ Bureau of Economic Analysis

In terms of education, 89.3% of the population graduated from high school while 32.0% of people aged 25 years old and above held a Bachelors' degree or higher. The total number of households was 183,542 and as of 2006-2010, the average persons per household were 2.45.

In 2009, Onondaga had a per capita personal income (PCPI) of \$39,311. This PCPI was ranked 13th in the state and 85 percent of the state average, \$46,516, and 99 percent of the



national average, \$39,635. The 2009 PCPI reflected a decrease of 0.1 percent from 2008, higher than the 2008-2009 state change which was -3.4 percent and the national change which was -2.6 percent.

In 1999 the PCPI for Onondaga was \$27,164 and ranked 14th in the state. The 1999-2009 average annual growth rate of PCPI was 3.8 percent, again both higher than the average annual growth rate for the state at 3.6 percent and for the nation was 3.4 percent over the same ten-year period.

The total number of firms in Onondaga County in 2007 was 36,708 while as of December 2011 the unemployment rate of Onondaga County was 7.3 percent.²⁰

²⁰ Bureau of Labor Statistics

Syracuse

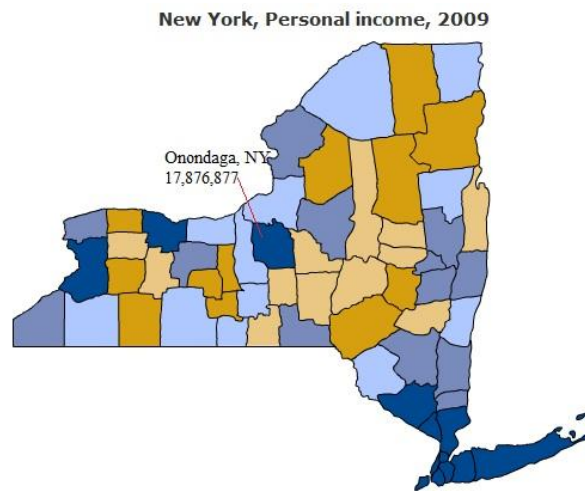
Syracuse is one of 366 Metropolitan Statistical Areas (MSAs) in the nation. Its 2009 population of 646,084 was ranked 81st in the nation. The 2010 population was 662,577. In 2010, age group distribution showed that 7.0 % of the population was aged less than 5 years old, 23% under 18 years, and 10.6% over the age of 65; females constituted 52.3% of the total population; and Caucasians made up 56% of the total population.

The percentage of high school graduates is 80.6% while 25.6% of the population aged 25 years and above hold a Bachelor's degree or higher.

In 2009, Syracuse had a per capita personal income (PCPI) of \$36,833. This PCPI was ranked 139th in the United States and was 93 percent of the national average of \$39,635. The 2009 PCPI reflected an increase of 0.3 percent from 2008. The 2008-2009 national change was -2.6 percent. In 1999 the PCPI of Syracuse was \$25,543 and ranked 160th in the United States. The 1999-2009 average annual growth rate of PCPI was 3.7 percent while that of the nation was 3.4 percent.

Current major employers in the Onondaga County

The major employers in Onondaga County are listed below. The number of people they employ is shown in brackets.



Source: BEA New York = 908,997,016 ■ 13,746,586 to 171,952,876 ■ 3,604,237 to 13,746,585 ■ 2,316,360 to 3,604,236 ■ 1,428,994 to 2,316,359 ■ 178,399 to 1,428,993

Life Sciences

- Upstate University Health System (6,717)
- St. Joseph's Hospital Health Center (3,142)
- Crouse Hospital (2,700)

Loretto (2,427)
Syracuse VA Medical Center (1,400)
Welch Allyn (1,300)
Community General Hospital (1,080)

Education

Syracuse University (6,507)

Service/Retail

Wegmans (4,100)
Raymour & Flanigan (1,400)
United Parcel Service (1,230)

Finance & Back Office

National Grid (1,856)
Verizon (1,100)
AXA Equitable Life Insurance (943)
Excellus Blue Cross/Blue Shield (900)

Environmental Systems

Carrier Corporation (1,300)

Radar & Sensor Devices

Lockheed Martin MS2 (2,300)
SRC, Inc. (885)

Religious

Roman Catholic Diocese (1,000)

Precision Manufacturing

L&JG Stickley, Inc. (934)

Employment Trends

From the 2011-2010 employment quotients with reference to NY State (See Figure 1 below), we find the following trends:

Industry sectors that show an upward trend in employment from 2011 to 2010 are mining, quarrying, oil and gas extraction, manufacturing, wholesale trade, professional and technical services, administrative and waste services, transportation and warehousing, finance and insurance, arts, entertainment, and recreation. On the other hand, except for public administration, the

industry sectors that show a downward trend from 2011 to 2010 include agriculture, forestry, fishing and hunting, utilities, retail trade, management of companies and enterprises, educational services, information, and other services.

Industries with the most significant changes in employment trends are mining, quarrying, and oil and gas extraction which show the greatest increases. Sectors in utilities, management of companies and enterprises represent the greatest decreases.

Figure 1: Employment Location Quotient with Reference of NY State

Industry	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Base Industry: Total, all industries	1	1	1	1	1	1	1	1	1	1
NAICS 11 Agriculture, forestry, fishing and hunting	0.83	0.83	0.83	0.8	0.72	0.71	0.93	0.93	0.94	0.94
NAICS 21 Mining, quarrying, and oil and gas extraction	1.35	1.22	1.1	1.27	1.26	1.14	1.12	0.89	0.81	0.9
NAICS 22 Utilities	1.45	1.27	1.32	1.29	ND	ND	ND	1.73	2.19	2.34
NAICS 23 Construction	1.05	1.02	0.98	0.99	1.01	0.99	1.01	1.04	1.03	1.04
NAICS 31-33 Manufacturing	1.62	1.62	1.63	1.62	1.58	1.53	1.5	1.54	1.57	1.56
NAICS 42 Wholesale trade	1.34	1.33	1.28	1.26	1.28	1.26	1.26	1.27	1.28	1.28
NAICS 44-45 Retail trade	1.08	1.08	1.09	1.08	1.09	1.11	1.1	1.11	1.12	1.11
NAICS 54 Professional and technical services	0.83	0.81	0.78	0.81	0.81	0.8	0.79	0.75	0.74	0.7
NAICS 55 Management of companies and enterprises	0.69	0.97	0.9	0.92	0.96	0.96	0.97	1.01	0.98	1.07
NAICS 56 Administrative and waste services	1.14	1.1	1.1	1.06	1.05	1.06	1.07	1.06	0.85	0.83
NAICS 61 Educational services	1.03	1.02	1.03	1.04	1.04	1.06	1.08	1.06	1.06	1.19
NAICS 62 Health care and social assistance	0.85	0.85	0.85	0.85	0.85	0.84	0.84	0.81	0.83	0.82
NAICS 48-49 Transportation and warehousing	1.34	1.31	1.34	1.33	ND	ND	ND	1.2	1.19	1.17
NAICS 51 Information	0.61	0.61	0.65	0.66	0.67	0.72	0.75	0.7	0.67	0.72
NAICS 52 Finance and insurance	0.83	0.82	0.8	0.78	0.77	0.76	0.75	0.77	0.76	0.74
NAICS 53 Real estate and rental and leasing	0.65	0.67	0.67	0.67	0.69	0.67	0.65	0.64	0.64	0.62
NAICS 71 Arts, entertainment, and recreation	0.85	0.86	0.85	0.85	0.87	0.89	0.83	0.8	0.79	0.72
NAICS 72 Accommodation and food services	1.03	1.04	1.03	1.02	1.03	1.04	1.06	1.06	1.08	1.05

NAICS 81 Other services, except public administration	0.88	0.86	0.9	0.91	0.91	0.91	0.94	0.97	0.98	1
NAICS 99 Unclassified	0.25	0.24	0.22	0.33	0.35	0.3	0.31	0.3	0.31	0.29

Industry Trends in Onondaga County

There is a slow decline in the number of establishments in the Onondaga County, as presented on the table below. The manufacturing industry’s steady decline correlates with the TRI report that indicates a steady decline of chemical releases. We can infer that the reduction in the number of manufacturing facilities has resulted in the decrease of chemical emissions in Onondaga County.

Figure 2: Businesses in Onondaga County and the number of establishment in each Industry

NAICS code description	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Forestry, fishing, hunting and Agriculture support	11	9	7	7	6	8	10	10	10	13
Mining, quarrying, and oil and gas extraction	5	6	6	7	6	7	7	7	6	7
Utilities	23	23	25	29	26	26	15	18	17	13
Construction	1,137	1,153	1,144	1,111	1,121	1,126	1,099	1,080	1,111	1,122
Manufacturing	464	476	484	488	484	496	481	513	512	506
Wholesale Trade	791	811	846	859	863	892	899	894	911	924
Retail Trade	1,699	1,744	1,774	1,806	1,817	1,831	1,826	1,896	1,846	1,865
Transportation and warehousing	296	295	288	303	299	296	294	262	268	262
Information	251	277	270	249	249	245	231	239	231	236
Finance and Insurance	762	780	760	759	735	732	721	703	699	670
Real estate and rental and leasing	610	619	627	639	631	620	596	529	458	431
Professional, scientific, and technical services	1,189	1,197	1,248	1,220	1,228	1,228	1,216	1,204	1,133	1,128
Management of companies and enterprises	90	93	95	80	78	77	81	81	87	78
Administrative and Support and Waste Management	606	609	590	600	571	573	567	571	585	582
Education Services	137	132	125	117	122	117	110	114	105	105
Health Care and Social Assistance	1,263	1,277	1,268	1,249	1,230	1,203	1,186	1,183	1,132	1,095
Arts, entertainment and recreation	192	202	200	213	197	196	198	194	175	177
Accommodation and food services	1,060	1,081	1,104	1,084	1,085	1,076	1,040	1,033	1,021	1,019

Other services (except public administration)	1,187	1,215	1,223	1,223	12,237	1,256	1,257	1,290	1,264	1,236
Industries not classified	6	12	5	18	31	46	41	37	139	109
Total Establishments	11,779	12,011	12,089	12,061	12,016	12,051	11,875	11,886	11,737	11,602

Environmental Concerns

Water Protection

Onondaga Lake is located along the north side of the city of Syracuse and serves as an important resource for the people of central New York State. The lake covers an area of 4.6 square miles and receives water from a drainage basin of 248 square miles, which is located almost entirely within Onondaga County.



The protection of Onondaga Lake and its tributaries has long been a concern for Onondaga County. As a result of excessive municipal population discharge and pollution, Onondaga Lake is experiencing excessive nutrient loading which causes eutrophic and low oxygen conditions in the

lake. To combat this, The Water Resource Development Act of 1999 established the Onondaga Lake Partnership to develop and implement projects for the environmental restoration, conservation, and management of Onondaga Lake. This act replaced the Onondaga Lake Management Conference approved by Congress in 1989. Representatives of the EPA, the State of New York, Onondaga County and the City of Syracuse coordinate actions in accordance with the Onondaga Lake Management Plan to restore, conserve, and manage the lake.²¹

In addition, there are currently several other water protection programs carried out by the Onondaga Environmental Institute in the Onondaga Lake area. These include: 1.) Manual Water Quality Monitoring on the Onondaga Nation; 2.) Onondaga Lake Tributary Assessment; 3.) Microbial Trackdown Study.²²

Hydrofracking (hydraulic fracturing)

Hydrofracking or fracking is a new environmental concern for Onondaga County.²³ Fracking, which is commonly used for much of today's natural gas extraction, shoots chemicals mixed with millions of gallons of sand and water thousands of feet underground to break apart the rock thus allowing more gas to escape and flow out of a well. According to Joseph Heath, General Legal Counsel to the Onondaga Nation, the drilling process will put the Onondaga's water system at risk of contamination. The air coming from these sites can give people headaches and health problems. The Onondaga County is trying to draw the attention of the New York State Department of Environmental Conservation to this issue while the EPA has announced a comprehensive study intended to investigate potential impacts of fracking.

Out of concern for the water quality in Onondaga Lake, Syracuse mayor Stephanie Miner and Onondaga County Executive Joanie Mahoney wrote letters to the New York State Department of Environmental Conservation calling for bans of fracking around Onondaga Lake and Skaneateles Lake, which serve as the main water supply for Syracuse City.²⁴

Environmental Groups and Local Initiatives

Onondaga Environmental Institute (OEI) is the largest environmental non-profit organization in Onondaga County. Its mission is to advance environmental research, education, planning, and restoration. It has five programs undergoing: Habitat Enhancement, Non-Point Source Pollution

²¹ Onondaga Lake, EPA Home: <http://www.epa.gov/region2/water/lakes/onondaga.htm>

²² Onondaga Environmental Institute Program web page:
<http://www.onodagaenvironmentalinstitute.org/OEIwaterqualitymonitoring.html>

²³ Terri Hansen, "Onondaga Nation faces new environmental threat: Fracking":
<http://marcellusprotest.org/onondaga-nation-fracking> Nov. 30th, 2010

²⁴ Teri Weaver, "Syracuse Mayor Stephanie Miner seeks hydrofracking ban around Onondaga Lake":
http://www.syracuse.com/news/index.ssf/2012/01/syracuse_mayor_stephanie_miner_21.html

Reduction, Water Quality Monitoring, Assessment, and Remediation, Public Outreach, and Environmental and Community Planning.

In addition, OEI serves as fiscal sponsor to two other environmental groups: Onondaga Earth Corps (OEC)²⁵ and Partnership for Onondaga Creek (POC)²⁶. OEC has a mission to grow the next generation of environmental justice leaders in Syracuse while POC is a community-based environmental justice organization that focuses mainly on the Combined Sewer Overflows (CSO) problem in Syracuse.

There are also a few other community-based organizations that focus on the environmental issues in Syracuse. F.O.C.U.S Greater Syracuse²⁷ is a community-wide program with the goal of making Syracuse a better place to live and work. It promotes integrating economic vitality, social equality and environmental stewardship towards a more sustainable central New York. Syracuse United Neighbors (SUN)²⁸ is another grassroots community organization in Syracuse. They are dedicated to improving the living of families in the neighborhoods on the south, southwest and near-west sides of Syracuse. Most of the environmental organizations in Onondaga County have cooperative relations with Syracuse University and the State University of New York (SUNY).

Figure 3: The TRI reported chemicals in pounds for Onondaga County

Year	Total On-site disposal or other releases	Total Off-site Disposal or other Releases	Total On-and Off-site disposal or other releases	Total Chemicals Reported
2000	3,891,077	249,594	4,140,671	49
2001	3,421,592	249,841	3,671,433	49
2002	3,798,578	166,188	3,964,766	50
2003	3,345,429	176,183	3,521,612	51
2004	3,363,967	149,804	3,513,771	49
2005	3,389,273	83,325	3,472,598	47
2006	2,596,285	265,255	2,861,539	47
2007	2,421,117	106,346	2,527,462	48

²⁵ OEC webpage: <http://www.onondagaearthcorps.org/>

²⁶ POC webpage: <http://www.onondagacreek.org/>

²⁷ F.O.C.U.S Great Syracuse webpage: <http://www.focussyracuse.org/>

²⁸ SUN webpage: <http://sunaction.wordpress.com/>

2008	1,920,687	97,688	2,018,376	45
2009	1,531,603	48,450	1,580,054	45
2010	1,549,114	52,353	1,601,467	39

Limitations of our Research

First, limited time and resources made it difficult for the project to be very exhaustive. Secondly, the information provided in the report only factors in the findings from a small sample size. It was difficult to get interested parties on phone interviews and even more difficult to randomly get people to answer the questionnaires at the library. Lastly, majority of the people interviewed and those who filled the questionnaires had no prior knowledge of the TRI; this made it difficult for people to answer questions posed to them.

SWOT Analysis

Strengths

From our phone interviews and those interviews conducted at the Syracuse Public Library, all interviewees indicated that the information provided by TRI website was useful. This information is useful to policy makers who are concerned about environmental issues, environmental journalists, releasing facilities that may want to know about release levels in the industry, academics, and members of the general public who are concerned about the neighborhood environmental safety. TRI's provision of information on toxics releases is perceived as its biggest strength.

Weaknesses

No Clue

Among our 11 interviewees, 10 of them had never heard about the TRI database before being contacted for our interviews. The single interviewee that did had used the paper file of TRI database in the early 1980s. He was not aware of the current TRI website. Hence, we conclude that the first weakness of the TRI website is that general public has no awareness of its existence.

Navigation Difficulty

From data collected, about 30% of our interviewees indicated that they had difficulties navigating the TRI website. A major concern was about how to find the toxics releases for a certain area. While there is a column for viewers to type in the zip code on the TRI website, it was reported confusing. An interviewee suggested that the toxics releases be listed by zip code. Another concern was the overwhelming amount of references in the toxics releasing report – another interviewee expressed concern at the amount of time it took to track down all the references.

Comprehension Difficulty

All the interviewees indicated that they had difficulty interpreting TRI data. The availability of data is appreciated but the interviewees had a difficult time comprehending what it meant. The TRI data by itself cannot achieve the goal of empowering the public with information if they cannot understand it. A major concern was the determination of threshold levels, the point where a certain toxic became harmful to people's health. According to our interviewees, the legal amount of toxic levels and the potential effects of these toxics humans are essential for people to understand the data.

Even though TRI data quantifies releases to air, land and water, many interviewees did not recognize that the toxics released have not been categorized according to the environmental media to which they were released. This leads to a reduced incentive for people to put pressure on the releasing facilities. According to one of our interviewees, it would be hard to rally people up without the knowledge of implications of the toxics released.

Incomplete Information

We also identified that incomplete information was being presented on the TRI website. 4 of our interviewees who searched the TRI website for the toxics releasing information in their residential area, expressed their doubt about the limited amount of facilities that had been listed on the website and the fact that some facilities were reporting to have zero releases. As local residents, they recognized that there were other larger facilities in the area that had not been reported. Also, the interviewees found the data presented to be outdated. At the time of our interviews, the most recent data on TRI website was from year 2010. The outdated data reduced the importance of the toxics releasing information.

Opportunities

Over 60% of the interviewees said that they would definitely use the TRI tool in the future. Others were not so sure, marking their responses as maybe. After walking some respondents through the TRI website, they thought it provided useful information to them. Since Onondaga County has several individual and group environmental activists, there is a need and willingness to know, understand and use the TRI information. There is an opportunity for TRI website to make it more publicly known.

Threats

Although the TRI tool has a niche in providing toxics releasing information, there are still threats that need to be considered. According to our interviews, all the participants are getting information on environmental issues from the news, newspapers and environmental journals. As such, it may be difficult to get people's attention because of their reliance on traditional media, some of which exaggerate and misinform on environmental issues.

TRI has a competitor in the Syracuse Community Geography website. This site provides TRI information along with a better visual representation of the toxics releasing facilities sites on the Onondaga County map. It provides interactive tools so that people can identify schools and homes in proximity to toxics releasing sites. Although the site provides no other information about toxics releasing facilities other than the location of the facilities, almost 70% of the interviewees indicated that they preferred the Syracuse Community Geography website after comparing the two.

Findings

10 out of our 11 interviewees had never heard about the TRI database before being contacted for this interview. There was 1 interviewee, however, who had used TRI data in the 1980s.

Environmental issues are generally perceived as important in Syracuse. The clean-up of Onondaga Lake has long been the major environmental issue in Onondaga County. Air pollution is another concern as expressed by respondents from Partnership for Onondaga Creek and Syracuse United Neighbors. They indicated that "there are breathing issues" and "asthma is a predominant illness in the neighborhood". Recently, the threatening effect of hydrofracking also raised people's concern for it. Not surprisingly, all of our interviewees got information about environmental issues from TV news or local newspapers, especially those interviewees we talked to at the Syracuse Public Library. The environmental activists in Syracuse got information from web mailing lists, personal networks with colleagues, and environmental journalists to get the latest environmental issues.

Although all the interviewees indicated that being aware of toxic releases was important to them, they generally had no access to toxics releasing information unless there was news about it. After being introduced the TRI website, they all agreed that the TRI is a useful tool for not only policy makers, academics, industries but also the general public concerned about toxics releases. Most of the participants would like to use the TRI website in the future and recommend it to friends. However, some respondents expressed that the toxics releases issue was not as important as in the 1980s since a lot of industries had moved out of the County. These interviewees might use the TRI website depending on their future project needs.

Participants also made several other comments regarding the TRI website after they explored it by themselves. The primary concern was the difficulty navigation. They had difficulty in finding information on toxic releases for a particular area, and the overwhelming and miscellaneous references took too much time to track down. Every respondent had difficulty comprehending: it is hard for the participants to understand the raw data without explanation of the toxics' effect on human's health and the legal amount that can be released. The concern of incomplete information was also raised: the latest data being back in year 2010. They believed that there are limited facilities listed on the website for a certain zip code area in Syracuse, and there are facilities reporting zero releases.

According to the participants from Syracuse Public Library, the Syracuse Community Geography is a useful tool. It provides a better visual representation of the toxics releasing facilities sites on the Onondaga County map. It is also interactive as people can identify schools and homes in proximity to toxics releasing sites. However, it provides no more information other than the facilities sites. All the participants from Syracuse Public Library indicated that they would like to see a combined website tool in the future to present the toxic releasing information in a more visual way.

Considering the advantages of using the TRI website, interviewees generally agree that the toxics releases information will empower people. Policy makers could use this to make more informed environmental policy decision. Citizens would be able to make more informed decisions about whether to move in/out of a certain neighborhood. The downside to this would be that people would be overwhelmed by the amount of information and may exaggerate the detrimental effect of the toxics releases. Areas with more toxic releasing facilities may also suffer from residents leaving.

Suggestions

Simplify and visualize the website.

Our first suggestion is that the website be simplified in order to make it easier to navigate. At the very least, the number of tools should be reduced. The TRI website could color code the toxics in terms of their danger to health, which will help people understand the data better. A comparison tool for toxics released by Country, State and Federal levels should also be provided for people to frame their situation. Considering the interviewees' preference for the Syracuse Community Geography tool, we also suggest that TRI website could get the Syracuse Community Geography to provide hyperlinks to the TRI website for better knowledge of the toxics.

Complete and interpret the data.

To help users understand data, the most important information that TRI website should provide is a quantitative and qualitative analysis of the toxics being released that includes a scientific explanation, the long- and short-term effects of toxics on human health, and the legal limit of release to the environment.

Provide an outside link.

Each area across the state has its own environmental issue. Onondaga County's primary concern is the cleanup of Onondaga Lake alongside the more common issue of fracking shared in Central New York areas. We suggest that the TRI website provide links to environmental concerns corresponding to each zip code. This way, people from different areas can access area-specific information on environmental problems and toxics releases. In addition to that, links should provide information on the location of off-site disposals so that people are aware of it. It would enable residents to report or raise the alarm if levels become dangerous. For this, the TRI website should provide instructions for how people could seek redress on the toxics releasing problem.

Community Engagement Strategies

Before the Community Engagement

Before community engagement, TRI should clarify their objectives and bottom line to better assist the strategy-making process. Conducting a demographic, socioeconomic analysis of the community is important to become knowledgeable about it in terms of its economic conditions, political structures, norms and values, demographic trends, history, and experience with engagement efforts.

Enlisting the support and involvement of community stakeholders:

Seeking relevant community stakeholders within the community can help TRI figure out the intermediaries and audience of community engagement. For the Community Stakeholders in the City of Syracuse and Onondaga County, the following categories of people can be taken into consideration:

- Residents (especially those that have experience with toxics releases)
- Neighborhood organizations (such as Syracuse United Neighbors)
- Local business owners and employers
- Non-profit and government service providers
- Environmental advocacy organizations (such as Upstate Freshwater Institute, Onondaga Environmental Institute, Nine Mile Creek Conservation Council, Atlantic States Legal

Foundation, Onondaga Lake Bottom Sub site Remedial Design Program Lead Community Participation Working Group, CNY Chapter-Izaak Walton League, FOCUS Greater Syracuse)

- Local government officials
- Media organizations

After listing the community stakeholders, TRI can consider their functions and impacts in this involvement and prioritize those that can be done by the intermediary organizations.

Partnership with Intermediary Organizations

In this stage, TRI can go into the community, establish relationships, build trust, work with the formal and informal leadership, and seek commitment from community organizations and leaders to create processes for mobilizing the community. Intermediary organizations are important for the community engagement of TRI since they are more informative about local environmental concerns and are more efficient in reaching out to community members.

Consolidate TRI Information to national-level community information platform

Community Platform Modules from Urban Institute contain data of all kinds for community users with respect to the needs of the community. A partnership with CPM would allow it to add TRI data onto their platform. This would help publicize TRI while at the same time community users on toxics releases.

Partnership with local community geography resources

Syracuse Community Geography (<http://www.mapsonline.net/syracuse/>) provides mapping of relevant information including environmental information to the region. Connecting this mapping with TRI data will inform the community users about toxics releases information.

Developing other Engagement Methods

A strategic community engagement plan also employs a wide array of events to approach multiple stakeholder audiences, including written work, media outreach, and events. We suggest that the EPA develop these engagement methods with the collaboration of partners and intermediaries.

These are the approaches:

Training

Training on how to use the TRI website and tools is an important community strategy. During our investigation, many environmental activists mentioned the lack of training in TRI information. They believe that they will not take action since they do not know what the data means. They seem willing and eager to learn about the TRI. The content of training should include

how to navigate the TRI website, what TRI tools can be used to find toxics release information, how to interpret data, how to get updates on data, and how to contact TRI employees on local toxics release issues.

The training can be in several forms: inviting intermediaries to join TRI training conference, sending weekly emails, issuing written documents, developing software of TRI starter kits, etc. The intermediaries can then disseminate the training takeaways to local communities after they receive the training.

School-based activity

Since interpreting TRI data involves basic knowledge on chemistry, toxics, and other information, the curriculum of high schools can be a useful platform for teenagers to learn about TRI information. Specifically, finding TRI data on the website as a component of their homework can be an interesting and informative way for students to familiarize themselves with the website.

Monitor Community Engagement Progress

Regular communications and reporting can benefit both the TRI and communities in learning about the progress of community engagement. TRI can present findings strategically to create a foundation for positive community action, while the intermediaries can periodically report the recent progress and environmental related events. The community will also help maintain the relationship with the intermediaries and build trust.

Appendix A: Intermediaries Interviewed

Title	Organization
General Public	Onondaga County Public Library
Community Member	Community Geography Project/Partnership for Onondaga Creek
Director	Atlantic States Legal Foundation
Director	Onondaga Lake Bottom sub site Remedial Design Program Lead Community Participation Working Group
Founder	Central New York Chapter-Izaak Walton League
Member	Syracuse United Neighbors

Ithaca

Executive Summary

In spring 2012, we—Lincoln Bent and Xiaochun Li of the CIPA Domestic Capstone Course—conducted a series of surveys in Ithaca, New York, to determine the level of awareness of the EPA’s Toxics Release Inventory (TRI) program. Based on the information gathered, we have found a great deal of potential in the TRI tools, and we would like to highlight certain opportunities to the EPA. We want to recommend that TRI work with local communities as active partners in TRI outreach, and to that end we propose a specific community engagement plan based on the interviewees comments and suggestions. The core strategy in this community engagement plan is to define key stakeholders, include them in the TRI optimization process, and finally invite them to serve as intermediaries.

Our research leads us to recommend the following steps, all of which are described in-depth in our report:

1. Improve the user experience with TRI tools.

The first part of the interview was an invitation to use the TRI tool. Interviewees were then asked a series of questions about their perception of the tool and how user-friendly they thought it was. In all cases, interviewees complained about the complexity of the tool, the difficulty of understanding the information that they needed, and the many steps it took to reach the list of toxics. After they found the toxics released in their area, they could not understand the meaning of the chemicals and quantities in the report. Interviewees thought that some knowledge of chemistry was required to comprehend the importance and relative danger of the toxics on the list.

2. Create and execute a strategic engagement plan:

1. Determine a niche
2. Use GIS to locate facilities and make the tool more interactive
3. Allow community members to serve as watchdogs and suggest facilities to be included
4. Make the tool more user-friendly
5. Explain what the toxics represent
6. Include information for everyday decision-making
7. Work with stakeholders to improve community engagement
8. Find and use intermediaries
9. Seek out community leaders
10. Include an explanation of health risks of emitted substances

Methodology

Before researching public awareness of TRI in Ithaca, we first collected demographic information and industrial trends over the past decade, using the TRI website and the Bureau of Labor Statistics website. The demographic information gave us a portrait of Ithaca regarding population and education levels. The industrial trends provided us with the information about major employers and changes in the number of facilities reporting to the TRI.

Second, the class included several questions in Cornell University's annual Empire State Poll, which is conducted by the Cornell University Survey Research Institute. These questions were meant to decipher statewide awareness of the TRI program and online tools. This information will be useful in defining the scope and context of any TRI community engagement efforts.

Finally, we developed questionnaires and interviews with possible intermediaries within Ithaca City and Tompkins County. Face-to-face interviews and phone interviews were conducted with representatives of the private sector, environmental activists, and city officials (Appendix A). The interviews followed a class-wide interview protocol; we asked about an individual's awareness of the TRI website and tools, experience using the tools, environmental concerns, go-to resources for environmental information and suggestions for improving the TRI tools. We asked interviewees who had never used the TRI tools before to go through the TRI website for about 3 to 5 minutes, and then we recorded their thoughts and comments. We also distributed questionnaires to interviewees by e-mail who could not participate in in-person interviews. We also asked all interviewees to recommend other potential interviewees who might have knowledge on toxic releases and the TRI databases. As a result, we were able to find more influential and active members of Ithaca society.

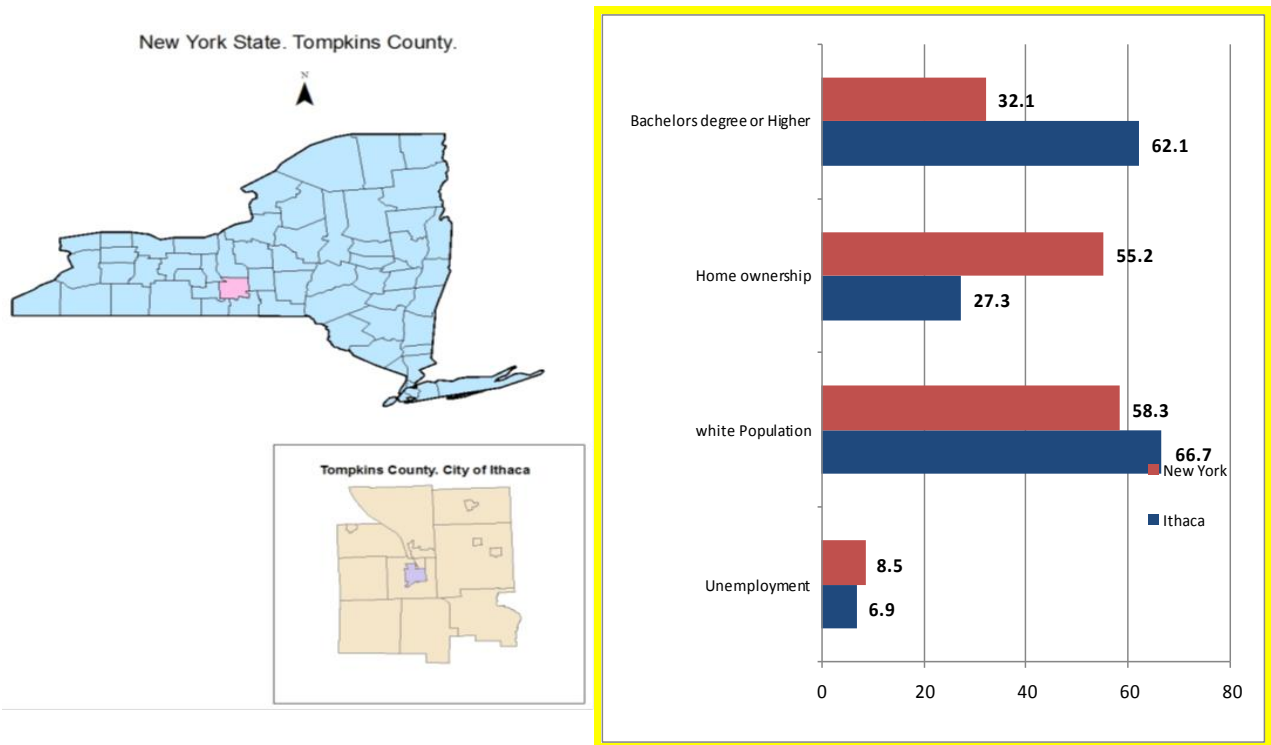
Through these methods, we uncovered intermediaries' knowledge and awareness of the TRI program, their feedback on its usefulness, and suggestions for improving the website and TRI tools.

Demographic Information

The 2000 census showed that Tompkins County had a population of 96,501 residents. Compared with the 2010 total population of 101,564, this shows an increase of 5.25 percent in ten years. In 2010, 82.6 percent of the residents are white, 4 percent are black, 0.4 percent are American Indian and Alaska Native, and 8.6 percent are Asian.²⁹

²⁹ U.S. Census Bureau

Figure 1: Social Demographics of Tompkins County



The population of the City of Ithaca fluctuates throughout the year due to students moving in and out of the area. The city is also more diverse than the county as a whole. According to the 2010 census, Ithaca has 30,014 residents; 70.5 percent are white, 6.6 percent are black, 0.4 percent are American Indian and Alaska Native, and 16.2 percent are Asian. Within ten years, the total population of Ithaca increased by 2.42 percent.

In addition, 62.1 percent of the population in Ithaca has Bachelor’s degree or higher. The city has a lower unemployment rate than the state of New York, indicating that civilians within the Ithaca area might have the time and emotional capacity to care more about their city’s environmental health and quality of life issues.

Industry Trends

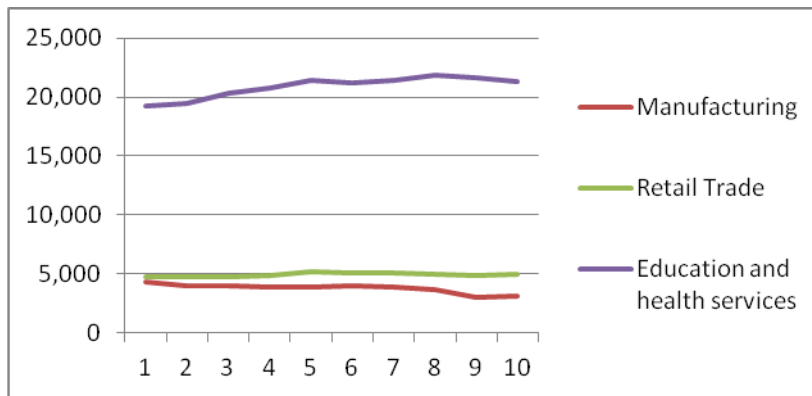
Figure 2: Major employers in Ithaca

	<i>Employer</i>	<i>Number of Employees</i>
Education	Cornell University	9,480
	Ithaca College	1,525
	Ithaca City School District	1,200
Manufacturing	BorgWarner Automotive	1,500
	Emerson Power Transmission	450
Government	Tompkins County Government	750
	City of Ithaca Government	400
Health Services	Cayuga Medical Center	1,000
Food Services	Wegmans	570

As Figure 2 above shows, the major industries within the Ithaca area are education (Cornell University and Ithaca College), health services (Cayuga Medical Center), manufacturing (BorgWarner Automotive), and retail trade (Wegmans). Figure 3 summarizes ten-year trends in both numbers of employees in the major industries, as well as the trend in number of toxics-releasing facilities.

Figure 3: Number of employees and reporting facilities, Tompkins County

Years	Manufacturing (number of employees)	Retail Trade (number of employees)	Education and health services (number of employees)	Total Number of TRI-Reporting Facilities
2001	4,282	4,696	19,227	4
2002	3,999	4,774	19,442	4
2003	3,943	4,770	20,349	4
2004	3,918	4,871	20,803	4
2005	3,904	5,174	21,455	4
2006	3,946	5,059	21,215	4
2007	3,847	5,074	21,391	4
2008	3,683	4,963	21,844	3
2009	3,042	4,897	21,617	3
2010	3,085	4,939	21,294	3



From 2001 to 2010, the number of employees in the manufacturing industry decreased each year. The sharpest decrease occurred in 2009 when more than 600 employees were laid off when the Emerson Power Transmission site closed. Across the same time period, the number of retail trade workers remained steady. However, the number of employees working in education and health services has increased slightly during the period.

Figure 4: Total On-site and Off-site Releasing Facilities, Ithaca City

Reporting Facility	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AES-Cayuga	194,418	233,089	232,603	204,892	264,385	331,783	346,293	309,477	133,041	269,497
Borg-Warner	1,221	1,076	1,060	985	825	1,165	1,100	4,985	4,025	2,071
Emerson	0	1	10	10	255	25	19	N/A	N/A	N/A
MPL Inc.	0	0	0	0	0	0	0	0	0	0
Total Releasing	195,639	234,166	233,673	205,887	265,465	332,973	347,412	314,462	137,066	271,568

During the past decade, four industries have reported to the TRI: AES-Cayuga LLC., BorgWarner Morse Tec Corp., Emerson Power Transmission and MPL Inc. Throughout the decade, MPL Inc. reported no toxic releases (a “0” is reported each year). The Emerson Power Transmission released lead in 2002 and then released copper during 2002 to 2007, and the released amount reached a peak in 2005 and then decreased a small amount after that. AES-Cayuga and the BorgWarner each release a variety of chemicals and the total releases for AES-Cayuga increased from 2001 to 2007, reaching a peak in 2007 and then decreasing after that. BorgWarner releases decreased from 2001 to 2005, then increased quite a bit in 2008 and decreased in 2009. The total on-site and off-site chemicals releases by those two facilities increased from 2001 to 2007 and then decreased from 2008 to 2009.

Environmental Concerns

Emerson Site

The Emerson Power Transmission (EPT) facility had operated since the early 1900s as a manufacturer of steel roller chain. The facility used “cutting oils” for stamping and punching, and the oils must be removed from the pieces after the process. The removal steps involved a variety of solvents including mineral spirits, Freon, 1,1,1-trichloroethane, TCE, and tetrachloroethane.³⁰

Environmental investigations took place at and around the facility beginning in 1987; it was discovered that TCE had leached into the soil and groundwater. Since then, EPT has been worked with New York Department of Environmental Conservation and local communities to clean up the TCE and other site-related chemicals.

In 2011, when the newly elected mayor wanted to develop the Emerson site into residential housing, the plan was debated because so many toxic chemicals remained in the area and they would take a long time to clean up.³¹ Recently, the Tompkins County Area Development drafted a

³⁰ <http://www.ithaca-ship.org/morse.htm>

³¹ <http://theithacan.org/18653>, November 30th, 2011

long-term plan to develop the Emerson Site into a facility for high technology, manufacturing, and housing.³²

Ithaca Gun Site

The former Ithaca Gun Factory site operated as a firearm manufacturing facility and left large quantities of lead shot in the raceway and gorge areas. The EPA stepped in and initiated an emergency cleanup to remove the gross lead in the late 1990s; however, in 2006, an environmental activist, Walter Hang, found that there are still at least five areas at the site that had not been cleaned up.³³

In 2008, as the Ithaca Gun Factory was being demolished, three members of the Community Advisory Group were questioned about adequate safety precautions and whether neighbors were protected from potentially contaminated dust. As a result, sprinklers have been installed over stockpiled demolition debris on the site.³⁴

Environmental Groups and Local Initiatives

The Tompkins County Environmental Management Council (EMC) is the legislature's official citizen advisory board on local environmental issues. It consists of citizens with a variety of interests and backgrounds. Projects that the EMC is currently working on include: providing comments to DEC on the draft supplemental Environmental Impact Statement on gas drilling, pest control, climate protection, and the Cornell Wind Turbine Project.

Moreover, the town board has a fundamental commitment to its constituents to make decisions that protect and enhance economic, community, and environmental resources. Therefore, the town participates in the New York State Department of Environmental Conservation's "Climate Smart Communities Initiative," which commits Ithaca to reducing greenhouse gas emissions and adapting to climate change.³⁵

In addition, there are other active organizations and groups concerned about the local environmental issues. For example, the South Hill Industrial Pollution group ("SHIP") consists of a neighbors and other interested parties organized around an e-mail list and an informational web site at www.ithaca-ship.org. The website provides updated information about industrial pollution in neighborhoods around Ithaca's South Hill.

Founded by Walter Hang, an environmental activist concerned about toxic releasing issues, Toxics Targeting Inc. (www.toxicstargeting.com) provides information on toxic sites around New York State and many articles related to local environmental issues.

³² <http://www.theithacajournal.com/article/20120503/NEWS01/205030394/Emerson-site-re-use-seen-multi-year-project>

³³ <http://www.toxicstargeting.com/news/2006-09-27/ithaca-gun-pollution>

³⁴ <http://www.toxicstargeting.com/news/2009-05-05/sprinklers-installed-demolition-site>

³⁵ <http://www.town.ithaca.ny.us/sustainability>

Limitations of Our Research

Our research did have limitations within the Ithaca area. First, the short duration of the project restricted our ability to reach more interviewees. Second, the limited number of interviewees (and their non-random inclusion in the project) could not support a statistical analysis. The research results would be more convincing if a statistical analysis was conducted. Third, participants' knowledge about the TRI program was limited. While contacting potential interviewees, we found some individuals who wanted to help but thought they did not have enough knowledge or experience with the TRI database to be a suitable participant.

SWOT Analysis

Strengths

As indicated by our interviewees, since the TRI is the only official source of related information, the public feels the information is credible and accurate. Two out of three interviewees who had used the TRI tools before we spoke with them provided positive feedback about the TRI database's usefulness. They had previously used its data in research work. Most of the other interviewees, who were given a few moments to peruse the TRI website, were confused by the names of the chemicals and suggested that the tool would be useful to an environmental specialist or experts who have knowledge of chemicals. They also suggested that the website would be useful for developers or realtors trying to develop a new site, because those individuals could analyze and perhaps publicize local environmental conditions.

The greatest strength of the TRI is that the EPA and TRI are willing to improve the program. The interviewees had only a few minutes to look over the TRI website and make suggestions, but in that time period, they all indicated navigation problems. However, they also commented that the information is valuable and that they would like to try it if the website was made more user-friendly. Therefore, TRI has the potential to attract more users if the website's navigation was improved, and if the chemicals were more clearly explained online.

Weaknesses

The biggest weaknesses of the TRI database are outdated information and navigational difficulties. The most recent industry report is for 2010, which is almost a year and a half past. The reporting facility could be gone by now, or the reported quantity could have changed immensely since then; therefore the data could not be up-to-date enough for research uses.

Most of the interviewees were confused by the website when they faced it for the first time. And while they could get the information by simply typing in their zip code, it is difficult to find county or regional or city data. Moreover, when using the TRI Explorer tool, one interviewee found out that you have to go back and choose the area again if you want the report from a different year. She said that this takes too much time and although it is a relatively useful tool, she had some direct resources that would be more useful to her related work.

In addition, the TRI data does not seem to be a reference for decision-makers. The elected officials we interviewed get most of their environmental information from their social networks. They do not have the time to go over the database and analyze the data, and they have better resources that provide them with the already-analyzed data. Among the interviewees, people who knew about TRI before we spoke with them had heard about TRI from the personal networking. One environmental activist, who maintains a toxics-related website, researches toxics via other releasing websites and he communicates with public officials about the information he receives from those websites.

Also, TRI does not have an effective way to collect feedback from the general public. Feedback is important for the improvement of this program, although it might take time to analyze feedback information to find out the creative suggestions. Finally, the general public finds the TRI website and the subject matter difficult to understand; the chemicals do not have a place in everyday life, so learning about their effects and relative risks will feel like too much work for the average citizen. That is why TRI should strive to make its website as easy to understand and navigate as possible. The subject matter will feel intimidating, but the website does not have to.

Opportunities

The increased environmental awareness and activism from civil society indicate that the TRI has an opportunity to make connections, develop partnerships, and involve local residents in the program. The public is concerned about their local environment and they seek out media to find relevant environmental information. Therefore, there are a great number of potential users. One of the interviewees suggested that there could be small colored tags beside each released chemicals to define the risk level of the chemicals so that users see a quick, simple signal about which chemicals pose the greatest risk.

Threats

There is a competing tool in Ithaca called Toxics Targeting, Inc., from which some of our interviewees acquire toxics information. Also, some interviewees pointed out that knowing about the information (but not understanding it) might create panic. Moreover, the narrow spectrum of users threatens the further development of TRI. The interviewees who had used the TRI before had only used it briefly several years ago. Even though they had a positive view of TRI tools, in the meantime they had all found more user-friendly tools for their toxics-related work. Therefore, even the interviewees who appreciate the TRI tools have found better resources. This threatens the continued utility of TRI because word will not get spread around to use the EPA's tools.

Findings

Most of the intermediaries we interviewed had heard about the TRI before we talk to them. Among interviewees who had heard about TRI before, they rely on social networking as their major resource regarding environmental issues. They also get environmental information from local media

and newspapers, NY DEC, Internet searches, social networking resources, and the Toxics Targeting website.

When the other interviewees were introduced to TRI and clicked through the website, they were confused about the type and amount of data available and about the chemicals. They suggested that people who care about environmental issues would be interested in the TRI tools, but the environmental activists we interviewed do not use the TRI.

As for the advantages of using the TRI, the interviewees said that this data could inform better decision-making and promote the public action. On the other side, the data can be presented in so many different ways that it could be misrepresented—by industry, activists, or both.

Suggestions

Based on the interview results, we recommend the following strategies in developing the TRI:

1. Determine a niche

TRI would benefit from determining its exact clientele. Having a clear picture of who the EPA wants to use the tool would help in the design of strategies to reach out to those individuals. If TRI keeps targeting “all users,” it will be much harder to satisfy the needs of any users.

2. Use GIS to locate facilities and make the tool more interactive

The way people see things has dramatically changed in the last decades. Seeing an address on a map or in coordinates does not always provides a clear image of location. With the implementation of Global Information System (GIS) tools like Google maps, it is not only easier to locate a facility but it is also more appealing to do so. Interactivity can make TRI more attractive as a tool; it would not only provide necessary information but will also make it more appealing. Interviewees identified GIS as the most appealing element of the www.toxicstargeting.com tool and its flexibility is missing in TRI.

3. Allow community members to serve as watchdogs and suggest facilities to be included

Some interviewees suggested that TRI’s list for Ithaca was missing several facilities. This undermined the credibility of the tool as users were certain that there were more facilities than reported. They are interested in helping and offered themselves as watchdogs to provide the EPA with the necessary information to have an updated and accurate list of facilities. This initiative could not only make users feel a part of the reporting process, but it could also increase the credibility of the tool as they will feel that the information provided is accurate.

4. Make the tool more user-friendly

The interviewees did not find the TRI webpage easy to use. There were too many ‘clicks’ to get to the information on releases. Interviewees thought it was too much trouble to explore the tool and prefer using alternatives if there are any.

TRI Explorer may be the most useful tool for everyday consultations. An easier-to-understand display could encourage more people to use it. The website www.toxicstargeting.com is one of the most important sources on toxic releases in Ithaca. Most of the interviewees pointed to this website as a model for what TRI should look like. It requires minimal technical knowledge to explore its pages, and it provides a brief explanation about what toxics are and the risks they represent. The tool required little effort to explore, which made it very attractive to our interviewees.

5. Explain what the toxics represent

To solve the problem of uncertainty, TRI should offer more easy-to-digest information about each toxic and if it represents a health hazard. TRI users want straight-forward information on which to base decisions, but instead TRI provides complex data that confuses them.

Representatives of the private sector in Ithaca interviewed for this project commented on the dangers of data misinterpretation. Ithaca depends heavily on out-of-town investment, which could be scared away by misinterpreted information. They highlighted the fact that if a developer or an investor saw a list of toxics being released in the area, that person may decide to take his business elsewhere (even if toxics are released everywhere). The solution to that, local business people say, is to make a list with enough information about the risks these chemicals in these quantities represent.

6. Include information for everyday decision-making

Interviewees were not only interested in releases from industries and the overall effect it has on the environment but also on the impacts on their everyday lives. Interviewees repeatedly asked how the toxics on the list affected the air they breathe and the food they eat. They were interested in knowing if the facilities near their children's schools represent significant risks to their health. Interviewees would like to have a clearer interpretation of the environment around them, not only of the releases of big companies. Perhaps TRI can partner with other EPA programs to provide this.

7. Work with stakeholders to improve community engagement

TRI is difficult to understand. From our research, we found that even individuals with enough technical knowledge to understand the tool were not using it. Additionally, using the LEXIS-NEXIS online database, we also found that local journalists reporting on environmental issues are not and have not been using TRI as a source of information.

8. Find and use intermediaries

TRI depends on people using it and telling others about it to reach an acceptable level of awareness. Ithaca has a considerable number of environmental groups and an environmentally aware community. TRI offers precisely the kind of information they require to promote their initiatives, but they first need to be aware of the tool.

Helpful intermediaries could be local journalists. They are in constant need of information and should be made aware of the data and benefits of TRI. TRI could send out regular email updates on

the TRI's reports for an area. This will not only provide them with the latest information on environmental issues, but it will make TRI a go-to partner in their research efforts.

9. Seek out community leaders

Most of the interviewees rely on neighborhood listserves for information about the environment. That information is put together by neighborhood leaders who could also be asked to serve as TRI intermediaries. If TRI were to give them information they could distribute, the information would make it to entire communities.

10. Include a short explanation of health risks of emitted substances

Interviewees wanted to know exactly what the consequences of being exposed to the emissions are. A detailed explanation of the substances and their effects could help TRI users to take actions. Based on this, they can either avoid the substance or be sure that they do not represent a risk. Taking into account that interviewees prefer easy to understand information, it would be useful to keep in mind that if such addition is made to the tool, it should be in a clear and simple language.

Community Engagement Strategies

Community engagement refers to the process by which community benefit organizations and individuals build ongoing, permanent relationships for the purpose of applying a collective vision for the benefit of a community.³⁶ Before we get into specific strategies of community engagement, the purpose of the community engagement should be defined in this case.

The goal of TRI is to provide communities with information about toxic releases and waste management activities and to support informed decision-making by industry, government, non-governmental organizations and the public. Therefore the purpose of this community engagement is to raise awareness of citizens who have no knowledge on toxics and to provide additional information to decision-makers, environmental activists and organizational leaders. The steps and details on community engagement strategies are listed below:

1. Engaging community stakeholders

The range of individuals who could be affected by toxic releases is broad, and it is impossible to target all the residents within Ithaca, therefore the priority is to target intermediaries who could influence other individuals. Interviewees stated that there are several active neighborhoods in Ithaca (Fall Creek, South Hill) and websites (www.ship.no-ip.org, <http://www.toxicstargeting.com/>) where they get the environmental information from.

In the process of engaging community stakeholders, priority should be given to the representatives of the private sector, environmental activists, and elected officials. The intermediaries we interviewed would be a good resource to contact because they are all concerned about local

³⁶ Wikipedia, http://en.wikipedia.org/wiki/Community_engagement

environmental issues and most have been engaged in toxics work before. These intermediaries can contribute valuable knowledge and feedback to the website and they have the ability to influence the policymakers.

Then the focus should be on active neighborhoods, environmental organizations and colleges. Those organizations are working on the environmental issues that TRI addresses; they have access to the most updated data; and they have the professional knowledge about raising public awareness. TRI could cooperate with college students (Cornell University or Ithaca College) on developing the GIS tool and turning the threats to opportunities by communicating with local organizations.

The public is the most difficult to target due to variable locations and knowledge levels. Although the public library is a good place to reach the public, it is hard to maintain the same audiences each time. Therefore, the previous two intermediary-focused paths should be considered first. In addition, the stakeholders within the community engagement should feel trusted and that their opinions and suggestions matter to TRI. They should be able to see relevant change happen within the organization and the TRI website.

2. Public Dissemination Methods

The major component of a public dissemination campaign will likely include community events, written products, and media work.³⁷ This model could apply to Ithaca community engagement activities:

Community Events: In raising public awareness about toxics, community events would be a good way for the stakeholders to exchange information and findings. The style of the community events would vary from public forums to small group meetings. Local community groups (for example, the Ithaca City Advisory Group) meet periodically to discuss existing issues within the community; TRI could contact those groups to present at their meetings and then ask for feedback. In addition, working together with the neighborhoods and attending neighborhood events could also increase awareness.

Written Products: Written products aimed at multiple stakeholders are necessary in the dissemination process and should cover a range of topics. The written brief should be succinct and including the mission of TRI, guidance on using TRI tools, and the importance of understanding toxics releases in a community. In addition, interviewees stated that even though they could see the exact name for the chemicals, they have no idea about each chemical's risk level and health hazards. Therefore, TRI should work with local organizations to define the hazardous chemicals released around the communities and write it into the written materials for dissemination.

³⁷ http://www.urban.org/UploadedPDF/311411_Informing_and_Engaging.pdf

Media Outreach: Most of the interviewees considered their local media a main resource for environmental information. A media campaign could reach a broader scope of citizens than other approaches. As a result, TRI could collaborate with local media (such as, *The Ithaca Journal*, *The Ithacan*) to publicize the TRI program, the website, and the tools.

Appendix A: Intermediaries Interviewed

Title	Organization
President	Tompkins County Chamber of Commerce
Executive Director	Tompkins County Transportation Council
President	Toxics Targeting Inc.
Commissioner	Board of Public Works
Chair	Tompkins County Legislature
Chair	Ithaca-SHIP
Realtor	Audrey Edelman
Executive Director	Upstate New York's Ithaca Carshare
President	United Way