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Assessing the Capabilities and Limitations of Privatizing State Environmental Remediation Programs

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ASSESSING THE CAPABILITIES AND LIMITATIONS OF PRIVATIZING STATE ENVIRONMENTAL REMEDIATION PROGRAMS

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ABSTRACT

ASSESSING THE CAPABILITIES AND LIMITATIONS OF PRIVATIZING STATE ENVIRONMENTAL REMEDIATION PROGRAMS

by Robert B. Oleksy

In 2012, environmental remediations in the state of New Jersey were modified to proceed under the supervision of a Licensed Site Remediation Professional (LSRP), rather than under the management of the New Jersey Department of Environmental Protection (NJDEP). The LSRP program was set forth in the Site Remediation Reform Act (SRRA), which was established to accelerate the investigation and remediation of over 20,000 contaminated sites in the state. The program created major modifications to the management of site remediations by privatizing the process. Under the new program, a licensed individual from the private sector is designated as a LSRP, and can act as a remediation supervisor and provide oversight for remediation activities. These types of programs have already been employed by two nearby states into their environmental regulatory framework. The New Jersey LSRP program has been largely modeled after the Massachusetts Licensed Hazardous Waste Site Professional (LSP), a program that has been in practice since 1993.

The privatization of public environmental services has many variations, ranging from outsourcing portions of the remediation activities with the state maintaining full control over the remediation process to a large-scale privatized system that significantly lessens government's direct involvement in the remediation process. This dissertation study undertook a systematic analysis of state-run programs to examine the states' methodologies in determining the demands for a privatized system, determined the type of the privatization of a large-scale privatized

system, and understand program impacts. This study determined that the greatest impacts have been the increases in the closure rates of contaminated properties in large populated cities. The study used a modified Strength Weakness Opportunities Threat – Analytical Hierarchy Process (SWOT-AHP) to identify the strengths, weaknesses, opportunities and threats of the New Jersey LSRP Program. The most significant areas of successes and needed improvements are acknowledged to assist in future strategic planning. Finally, the study identified acceptable conformance of the New Jersey LSRPs by verifying their commitments towards the strict codes of conduct by using the elements of the International Organization for Standardization 14001 audit process.

The initial goal of the study was to assess how New Jersey's privatization of their state-run remediation programs can help protect public health, safety, and the environment from known contaminants. The long-term goals may provide insights to policymakers, practitioners, researchers, and businesses alike on how a large-scale privatization process can help accomplish their specified goals in determining if privatized programs may be implemented within their states, or modifying their existing programs.

Keywords: environmental remediation, privatization assessment, SWOT-AHP, Licensed Site Remediation Professional

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To my family

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List of Abbreviations

ARRCS - Administrative Requirements for the Remediation of Contaminated Sites

BTO – Business and Trade Organizations

CAPM - Corrective Action Project Managers (Texas)

CNS - Covenant-Not-to-Sue

CP - Certified Professionals (Ohio)

DHSS - Department of Health and Senior Services

ECRA - Environmental Cleanup Responsibility Act

EMS - Environmental Management System

GLE – Governmental and Legal Entities

LEP - Licensed Environmental Professionals (Connecticut)

LRSP – Licensed Remediation Specialist Program (Virginia)

LSP - Licensed Site Professional (Massachusetts)

LSRP - Licensed Site Remediation Professional (New Jersey)

ISRA - Industrial Site Recovery Act

NFA - No Further Action

NJDEP - New Jersey Department of Environmental Protection

NJSRPLB - New Jersey Site Remediation Professional Licensing Board

NGO - Non-Governmental Organizations

OSHA - Occupational Safety and Health Administration

PI - Preliminary Assessment

RAO - Response Action Outcomes

RAP - Remedial Action Permit

RAR - Remedial Action Report

RAWP – Remedial Action Work Plan

REC - Registered Environmental Consultant (North Carolina)

RELPE – Review and Evaluation Licensed Professional Engineer (Illinois)

RI - Remedial Investigation

RP - Responsible Party

SI - Site Investigation

SRRA - Site Remediation Reform Act

SWOT-AHP - Strength, Weaknesses, Opportunities, and Threats – Analytical Hierarchy Process

VAP - Voluntary Action Program (Ohio)

VCP - Voluntary Cleanup Program (New Jersey)

WHP - Well Head Protection Areas (Community)

WP - Work Plan

UHOT - Unregulated Heating Oil Tanks

USEPA - United States Environmental Protection Agency

1 INTRODUCTION

1.1 Background

During the 20th century, numerous uncontrolled and unregulated activities led to negative impacts on public and environmental health within the United States. These activities included both public and private sectors, and included industrial, commercial and transportation operations. The unregulated and unmonitored generation, management, storage, and disposal of hazardous materials from these sectors led to the contamination of air, water, and soil. Exposures to contaminated media have resulted in detrimental effects on both public and environmental health, including both acute and chronic health problems (Vrijheid 2000). These activities were guided by the premise that, unless additional revenue was generated from the prevention of pollutant discharge (e.g., from reclaiming materials), no additional actions were warranted (Omarova 2011).

In order to minimize and correct the negative effects created by past unregulated and unmonitored activities, federal or state regulatory entities historically adopted the use of a "command and control" management style similar to that prescribed in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Staff 1973). Researchers see command and control style as a centralized and regulating method incorporating a top down approach system of governance (Holling & Meffe 1996). This style of governance promotes autocratic direction by a governing regulatory agency in directing how a site is studied and remediated. (McManus 2009). This style of management often taxed the resources and expertise of state agencies. However, if state administrations use the NCP's step by step process to remediate sites to acceptable clean-up levels, it can become a long and drawn out process resulting in an inefficient and unnecessarily costly environmental remediation.

A different process which are, by administrative priorities are more economic-growth oriented than environmental, then a significant relaxation of "command and control" may result in a compromised environmental remediation. (Omarova 2011). However, if a governing administration wants to maintain a strong environmental compliance program, while streamlining an inefficient, costly program, considering a program structured on privatizing some, if not all, of the functions of remedial activities currently being performed by governmental personnel. In theory, by doing "more with less", costs associated with resources and operation of agency programs, plus an increase in outputs (remediated sites) could result (Greene 1996, Lundy & van Wormer 2007).

Privatization has been seen as a potential alternative approach to this "command and control" regulations. Generically, privatization is when a public entity moves their goods and service responsibilities to private for-profit entities, which promises to increase efficiency, and reduce costs (Mercille & Murphy 2017, Naegele 2004). Privatization can occur in four models: corporatization, outsourcing, public-private partnerships, and divestiture / assist transfer (Mercille & Murphy 2017). Corporatization is the complete transfer of goods and services to a for-profit entity; however, the property and financing remains in the public domain (Mercille & Murphy 2017). Outsourcing refers to the short-term partial transfers of the goods and services, but allows the public domain to governor the management of the contract and to conduct performance evaluations. (Jensen & Stonecash 2005). Public-private partnerships are longer term transfers which allows for-profit entity to be responsible for financing, constructing, maintaining, and operating the goods and services, while the public entity repays the for-profit entity, maintains input in the goods and services, and will receive the final assets after the transfer has ended (Mercille & Murphy 2017, Hall 2012, Reeves 2013). Divestiture / assist transfer refers to

the full or partial transfer of the public entity's assets to the for-profit entity through ether a sale or transfer. (Mercille & Murphy 2017, Mercille & Murphy 2015). This is the model which the NJ Site Remediation Program is most closely aligned. For a privatized program to occur, social, economic and political drivers must be considered and accounted. If all three are not considered in the change, then the privatization may not successfully occur (Greene 2009, Vatn 2018).

In the case of the New Jersey Licensed Site Remediation Professional (LSRP) program, the social driver for privatization stemmed from public reactions to a poorly managed and regulated industrial site, which was converted to a daycare facility located within Franklinville, New Jersey (NJDEP v. Navillus Group, 2016). The facility, owned and operated by Accutherm Inc., began manufacturing thermometers and instruments at this location in 1984. During their operations, the NJDEP and the Occupational Safety and Health Administration (OSHA) identified that the owner improperly used the facility's septic system for industrial wastes, including mercury, while also exposing workers to mercury vapor. In an effort to minimize the occupational exposure, Accutherm attempted to comply with OSHA regulations by upgrading their ventilation system. However, Accutherm was not able to meet occupational standards for mercury.

Being unable to meet the regulatory standards, Accutherm ceased their operations in 1992, without properly remediating the facility and filed for bankruptcy in 1994. The following year, the NJDEP issued a directive for Accutherm to conduct a facility wide cleanup. Accutherm did not reply to the directive. The NJDEP then transferred this matter to the United States Environmental Protection Agency (USEPA). The USEPA, in turn, conducted a site investigation. The investigation concluded that small amounts of mercury were found on countertops and floors, and two of fourteen wipe samples exceeded the NJDEP's levels for mercury. However,

since the building was sound, secure, and unoccupied the inspectors found that there was no concern of immediate threat to human health. Acting upon the USEPA's findings, the NJDEP determined that the site was not considered a priority and placed it as a site pending assignment on the NJDEP's "Known Contaminated Site Lists". In an effort to revitalize the idle property, the township foreclosed under the State's Tax Sale Law, and ownership of the property was transferred to the Navillus Group, who in turn sold to it to James Sullivan, Inc. (JSI), a developer who leased the site to Kiddie Kollege. Prior to the foreclosure, the township provided the USEPA report to a principle at the Navillus Group. However, during the course of all the transactions, an Industrial Site Recovery Act (ISRA) trigger should have been activated, but apparently was not (Eisen 2007).

In 2004, Kiddie Kollege began its daycare activities at the old Accutherm location. In 2006, the NJDEP conducted an inspection of the site and determined that previously identified problems were not mitigated at the site. In turn, the NJDEP sent JSI a letter informing the owner of several existing environmental issues, including a mercury contamination which was above the NJDEP's limits. JSI verified the contamination by conducting additional wipe tests and indoor air quality sampling. On July 28 2006, the site was finally closed. Urine tests were conducted on the employees and children of the daycare, which concluded that the children were exposed to mercury. The discovery that children might be exposed to mercury triggered a tremendous outcry, after which the parents of the children secured a toxic tort lawyer (Steinzor 2006). To prevent reoccurrences of similar situations, New Jersey legislators acted to pass S-2261, known as the "Madden Law". S-2261 required the Department of Health and Senior Services (DHSS) to establish standards for safe building interiors, submit of documentation of investigation and remediation as a condition to issuance of construction permit for certain sites,

and also required the remediation activities to be conducted within the standards, procedures, and time frames established by the NJDEP. This social driver for policy change should be considered a significant contributing factor towards changing the existing system.

The economic driver for privatization stemmed from the backlog due to the inefficiency of the NJDEP's regulatory process, staffing and budgetary constraints. Many of backlogged sites included brownfield properties; *brownfields* are "any former or current commercial or industrial sites, that are currently vacant or underutilized and which there has been, or there is suspected to have been, a discharge of a contaminant" (Brownfields 2011). Redeveloping brownfields tend to be focused towards returns on investment as well as their ancillary goals, including limiting uncontrolled growths in suburban areas, limiting the reduction of open space, and farmlands preservation (USEPA 2012). In the case of New Jersey's Brownfield Program, the Voluntary Cleanup Program (VCP), due to the nature of being considered a voluntary action, gave the Responsible Party (RP) a degree of leadership to encourage them to perform environmental remediations. Under the Site Remediation Recovery Act (SRRA), the RP is required to employ the services of a licensed professional experienced in the remediation process as a primary environmental decision maker. This, allows the RP to be more confident that the remediation will occur in a timely manner, in turn increasing the likelihood that the RP will be more committed to redeveloping their contaminated site.

The political driver for privatization stemmed from NJDEP Commissioner Lisa Jackson, who led the efforts to restructure environmental remediations within the state. In 2006, the NJDEP site remediation had accumulated a large backlog of approximately 20,000 sites, which determined the demands for changes in the state's remediation program (Rath 2011). On October 26, 2006, Commissioner Jackson delivered a testimony before the Senate Environmental

Committee whereby she supported reforms to the Site Remediation Program. In her speech Ms. Jackson referenced the "Madden Law", because of sweeping changes to the DHSS and identified that additional changes were needed to the NJDEP as well. She said "*I firmly believe that additional changes in how the DEP manages and cleans up contaminated sites are definitely needed. A number of these changes can be accomplished through regulatory and management improvements*" (Jackson 2006). Senator Robert Smith, Chair of the Senate Environmental Committee, pursued the concept of a change to the remediation process and asked Commissioner Jackson to convene a stakeholder group to develop a framework for legislation and provide recommendations to the legislature. On February 20, 2007, the stakeholders' sessions began under Assistant Commissioner Irene Kropp to determine the stakeholders' recommendations. On April 15, 2008, the findings of the stakeholders' session were presented at the Joint Hearing of Senate Environment and Assembly Environment and Solid Waste Committees. Ms. Kropp testified that the recommendations included enacting a licensing of environmental consultants, streamlining case reviews, and creating a licensure process for individuals to oversee investigations and remediation activities (Jackson & Kropp, 2007). On May 7, 2009, Governor Jon Corzine signed the SRRA into law. SRRA revamped the Site Remediation Program and created significant changes in the laws and regulations for site remediation, by minimizing the "direct oversight" management style that was required by the NJDEP Case Managers before, and moving towards privatization, in turn creating a paradigm shift. Finally, on May 7, 2012, the State of New Jersey initiated the phasing in of the LSRP program.

The privatization of remediation programs has been implemented in several states. A total of five states, Connecticut, Massachusetts, North Carolina, West Virginia, and New Jersey, have adopt a large-scale privatized remediation program. Three states, Illinois, Ohio, and Texas,

have chosen to adopt a target specific privatized remediation program and only outsourced specific remediation tasks. States such as Texas, Illinois, and Ohio have modified their program for specific target remediations, such as storage tanks, and voluntary programs which all must be reviewed and accepted by the state at each step of the remediation process.

In cases for state demonstrating target specific programs, Texas has a narrowly targeted program, consisting of Corrective Action Project Managers (CAPM), which are individuals form the private sector that are licensed by the Texas Board of Professional Geoscientists. The primary goal is to manage leaking petroleum storage tank cases involving soil and groundwater remediation goals. This licensure does not cover any additional remediation activities (TexReg 2007). Illinois's Review and Evaluation Licensed Professional Engineer (RELPE) is another version of a professional licensure program. In this case, the RELPE works on behalf of the Illinois Environmental Protection Agency and the program is under the direct supervision of the Agency (Illinois Environmental Protection Agency 2002). The Ohio program uses Certified Professionals (CP) who works within the Voluntary Action Program (VAP). Under VAP, a CP is allowed to remediate a property and submit a "No Further Action" (NFA) Letter. However, all NFA letters must be reviewed by the Ohio Environmental Protection Agency to verify that the remediation has been complete until the Agency issues a Covenant-Not-to-Sue (CNS) (Ohio 2012)

In terms of a large-scale privatized remediation system, the Massachusetts's LSP program has issued a total of 30,763 Response Action Outcomes (RAO) (Massachusetts Department of Environmental Protection 2014). Since 1996, Connecticut accepted 706 verifications via their Licensed Environmental Professionals (LEP) program. North Carolina initiated the Registered Environmental Consultant (REC) program in 1987, but only 465

remediation actions have been completed, of which only 123 were generated from the RECs (North Carolina Department of Environment and Natural Resources Division of Waste Management Superfund Section 2012). In West Virginia, the Licensed Remediation Specialist Program (LRSP) has issued 115 Certificates of Completion since its implementation in 2009 (West Virginia Department of Environmental Protection 2012). (Table 1-1)

Table 1-1: States with privatized Remediation Program Managers

State	Program	Sites Completed as of 2014.
Massachusetts	Licensed Site Professional	30,763
Connecticut	Licensed Environmental Professional	706
New Jersey	Licensed Site Remediation Professional	3,373
North Carolina	Registered Environmental Consultant	465
West Virginia	Licensed Remediation Specialist Program	115

The extent of a state's demand for the privatization of their remediation programs differs from one state to another. A state may adopt a large-scale privatization program. Whereas, the governing body has little or no governance control over the remediation program and no operational issues, but maintains regulatory control (Jensen et al. 2005); the state may also adopt a target specific privatization of their services, or not privatize at all.

1.1 Literature Gaps / Research Objectives

In 1993, Massachusetts took the lead in the privatization of environmental remediations by the addition of Chapter 21E into the Massachusetts Contingency Plan (MCP). States including New Jersey have looked to this as be a potential model, and have implemented their own programs version. Since the first implementation, there have been several studies in

identifying the potential outcomes of these privatized programs. However, a majority of them have mostly relied on published literature.

Pioneer researchers studying privatized environmental remediation programs have identified that within the Massachusetts LSP program audit program uncovered significant amounts of compliance nonconformities, mostly caused by allowing the privatized professional to use an expansive set of discretion in determining the site remediation without the guidance of a regulator leading to the poor choices (Seifter 2006). While other researchers have identified in respect to the brownfield development areas in New Jersey, that the privatized LSRP program enacted by the SRRA promised to increase the amounts of sites remediated, which previously were not primarily due to resources (Maro 2011). The main focuses of these researchers were on the legal viewpoint of the privatized environmental remediation programs' consequences of a system with minimal regulatory oversight.

Few researchers have generated or used significant quantitative or qualitative data for their privatized environmental remediation program studies. Researchers using this type of data have identified that in regards to the LSP program; the physical remediations of properties were more likely chosen as site remediations remedy but a small percentage sites were remediated to background levels; many of the properties still carried a deed restriction after the remediation; not all residents were exposed to the same remedies, and there were a significant increase of risk based remediation determinations made in Environmental Justices areas; increases in property values were observed, but there was no determined evidence that there was an impact to the surrounding properties; and an evaluation of the properties determined that there were significant issues with deed compliance (Matos-Perez 2015).

While more recent researchers have identified in their studies that the Massachusetts LSPs were more likely to side with the responsible parties in the evaluation process; the remediation process standards have shown to be lowered do to their responsive party association, including the reliance more on deed restrictions; and the same associations created issues were more pronounced in socioeconomically disadvantaged neighborhoods (Mariona & Westa 2019). The latter two studies were conducted subsequently after this study was developed. Both studies were critical of their area of study, the Massachusetts LSP program. In neither study the impacts of deed restrictions, nor engineering controls were taken into consideration and/or assessed if they actually protected public health and safety, and the environment. The first researcher also noted that this research was not an absolute evaluation of the Massachusetts Contingency Plan and that the plan went through major revisions in 2014. The revisions included the implementation of newer cleanup standards including post closure vapor intrusion evaluations. The latter study's conclusion was based on premise that established mitigation practices were inferior to completely removing the contamination. Therefore, there was a large gap that needed to be filed which embraced the use of both qualitative and quantitative data, and there was no overlap with the latter two studies. The gaps included identifying the drivers for the change, the effects on remediations, the perceptions and adaptations to the modifications of the privatized program.

To accomplish this task, an analyzes of the demands for and the outcomes of privatizing state-run remediation programs, including identifying the factors behind Massachusetts and New Jersey's decision to go forward with a privatized remediation program, and identifying the benefits and challenges within the newest state to privatize their program, New Jersey will be conducted. The study may allow the following research questions to be answered:

- What were the drivers that required the initiation of the privatization of the remediation program?
- What were the major influences in the privatized program?
- What were the major hindrances to the program's implementation?
- What effects did the privatization have on remediations?
- What are the strengths, opportunities, weaknesses, and drawbacks of implementing a fully privatized program?
- Do the newly licensed LSRP professionals uphold a strict level of acceptable ethical judgment?

Specifically, the research objectives of the study are to:

- Identify leading drivers and obstacles of the states' implementation of the privatization
- Identify reasons for success and failures of the implemented programs
- Identify strengths and areas for program improvement
- Identify the integrity of the remediation professionals

In Chapter 2, the state's interests in opting for the privatization of the state's remediation programs are studied. In doing so, the drivers and barriers of the privatization are highlighted along with how those barriers were overcome. The key drivers for a program change are identified through the systematic assessment of relevant literature and interviews with key individuals including the states' political and Environmental Protection representatives responsible for implementing the change; the representatives overseeing remediation efforts; and a random selection of the state's remediation case managers. The drivers are recognized in terms of facets of remediation and quantified using both coded and non-coded processes (Sabharwal & Corley 2009). The coded factors use a five-point Likert scale questionnaire to determining the

factors that led to the privatization and the implementation success. The targeted respondents were individuals that played essential roles in determining these programs in Massachusetts and New Jersey, while the non-coded factors are determined from state documents. The coded factors included identifying the amount of the state's workforce used for reviewing submitted documentation, pressures from Non-Governmental Organizations, pressures from local communities the departments administrative support, the duration for implementation of the privatized program, and the states' experiences with privatization prior to the remedial privatization. The non-coded factors included new and closure rates of sites before and after the SRRA implementation including both the direct and indirect effects of the program on the amounts of remediated sites.

In Chapter 3, the hierarchy of each stakeholders' perceptions of the LSRP program are identified with the use of a Strengths, Weaknesses, Opportunities, and Threats - Analytical Hierarchy Process (SWOT-AHP). The modified SWOT-AHP uses an extensive survey process consisting of key program implementation stakeholder interviews, and a two-stage online survey process. The stakeholder groups consisting of Governmental and Legal Entities, Business and Trade Organizations, Non-Governmental Organizations, and the LSRPs weigh in their perceptions to determine what aspects of the program may lead to success and which aspects are considerable programs risks.

In Chapter 4, the study focuses on the LSRP's commitment to upholding the LSRPs "Professional Judgment" and "Code of Conduct". Under the premise that the licensed professionals take on the role of Remediation Case Managers, it is imperative that the professionals be considered the leaders in terms of the remediation activities. It is expected that the professionals maintain ethical standards as a leader. The general standards of a leader include

being fair and transparent and engaging in open communications, being concerned for the well-being of others, being able to clearly express the "Code of Conduct", being aware of concerns of stakeholders and society, and committing to their word (Kalshoven, Den Hartog, & De Hoogh 2011). In order to build these general standards, the LSRPs are required to stay knowledgeable on any changes to the program that may impact their decision-making process known as "Professional Judgment" and adherence to the "Code of Conduct".

In 2019, changes were introduced into the SRRA, also known as SRRA 2.0. The changes would potentially influence all practicing LSRPs. Using a modified Environmental Management System (EMS) audit program, a questionnaire was developed (Pinero n.d.). The questionnaire focused on the key changes of law and administered online to a group of twenty percent randomly selected LSRPs. The results of the survey were to determine how quickly an LSRP can adopt to changes to the regulations.

1.3 Study Area, Survey Design and Administration

1.3.1 Study Area

As of 2014, a total of eight states, Connecticut, Illinois, Massachusetts, New Jersey, North Carolina, Ohio, Texas, and West Virginia have adopted a form of privatization of their remediation programs. However, only Massachusetts and New Jersey opted for a large-scale privatization, and are the focus of this study. Connecticut had implemented a lighter version in 1996 known as the Licensed Environmental Professionals (LEP) program. It was not until 2009 that an LEP Board was established. Since 1996, the LEP has submitted on the average of 59 verifications per year. It was not considered as part of the study. Prior to a state committing to establishing a privatization of their remediation programs, each state was required to conduct a

study, such as including stakeholder sessions to identify if a need for privatization existed, and how it was to occur. During the study, the states identified experts to characterize the needs and consequences for a privatization of their remediation process, including the types of programs implemented outside their own states for guidance. The experts analyzed the pros and cons of the desired levels of privatization, along with inputs from stakeholders, and submitted their findings to the governing body. New Jersey is the main focus for all three studies, while Massachusetts is used for identifying how the programs were developed in their respected states.

The all-encompassing goal for this dissertation is to conduct a comparative study that assesses the consequences between the states needs for implementing a large-scale privatized remediation program, which has not been academically conducted yet.

1.3.2 Survey Design and Administration

The surveys were designed into multiple sections, and various target respondents. All the surveys relied on primary and secondary data. The initial study was conducted through systematic assessment of relevant literature and initial phone surveys with key individuals of the three target states. The phone surveys focused were developed to include the state's political and Environmental Protection representatives responsible for implementing the change; representatives overseeing remediation efforts; and a random selection of the New Jersey's remediation program managers. The findings from New Jersey initial phone surveys were used to develop the SWOT-AHP factor priority survey which was used to develop the ranking level of each factor for the four targeted stockholder groups. The stockholder groups included Governmental/Legal Entities (GLE), Business and Trade Organizations (BTO), Non-Governmental Organizations (NGO), and the currently licensed LSRPs. The findings from the

SWOT-AHP factor priority were used to generate a SWOT-AHP global survey, whereas each stakeholder groups ranked on the top SWOT category factor against the other highest ranked category factors. The SRRA 2.0 Questionnaire was generated based upon the changes to the SRRA. The SWOT-AHP factor priority, SWOT-AHP global, and SRRA 2.0 Questionnaire were administered via SurveyMonkey®, an online survey service. The survey was approved by the Montclair State University (MSU) Institutional Review Board (IRB) under # L-001785 the survey response rates and data analysis are discussed in subsequent chapters.

2. Identifying the Drivers and Barriers of Privatizing State-run Remediation Programs and Their Effects on Environmental Remediation

2.1 Introduction

In determining the type of program that New Jersey required, the regulatory authorities looked at the Massachusetts LSP program as a model. In the LSP program, the Site Professionals are able to remediate a contaminated site via licensure process created by a Licensing Board. Massachusetts was used as a model because of its numerous similarities to New Jersey, such as population density (New Jersey has 1,195.5 individuals per square mile (NJ Census 2010) compared to Massachusetts' 839.4 (MA Census 2010), the amount of available land (7,354 and 7,800 square miles respectively), industrial history, major port systems and transportation hubs. In 1993, Massachusetts became the forerunner in crafting a large-scale privatization of their remediation program to accelerate the remediation process. Researchers have suggested that this process would return contaminated properties back into productive uses at a quicker pace (Johnson, Rizzo Jr, Hughto 1997). This action did in fact begin to narrow the gap between notifications and site closures (Figure 2-1).

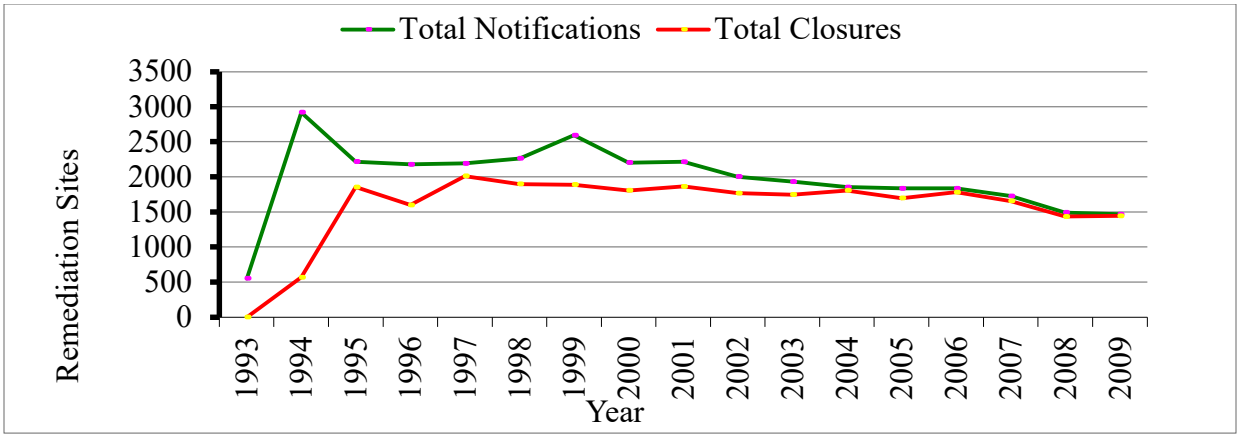

Figure 2-1. Massachusetts Notifications versus Closures 1993-2009
Source: Data from "MassDEP 21E Program Notification Statistics" and "MassDEP Sites Cleaned Up"

At the same time in 1993, the state of New Jersey passed a legislative action that updated the Environmental Cleanup Responsibility Act (ECRA) and replaced it with ISRA. This was New Jersey's initial response to the amount of backlog remediation sites. The implementation of ISRA did have some positive impacts on remediation activities. However, the continuance of "command and control" mindset still existed and was prolonging the rates of timely remediations. New Jersey still maintained a large backlog of sites in need of remediation activities. An increase of notifications from 2000 to 2010 can be observed in the Figure 2-2.

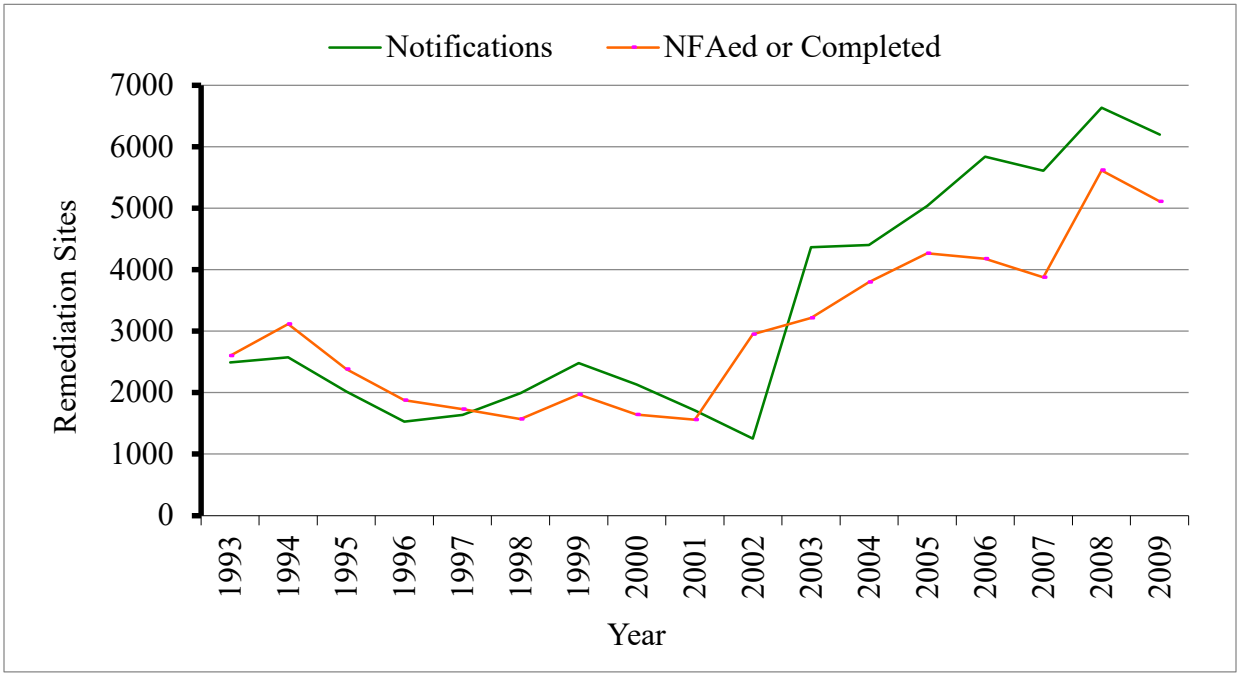

Figure 2-2. New Jersey Notifications versus Closures 1993-2009
Source: Data from "NJDEP Known Contaminated Sites in New Jersey Reports"

ISRA did lead to a narrowing of the gap between total notification and total closure, but was not a significant as expected. This occurrence can be partially explained by a population increase, which created a higher demand for property. New Jersey's population increased by 4.5% between the specified years, while Massachusetts' population increased by just 3.1%. Another reason for this occurrence is the notification process. The closure rate between the New

Jersey and Massachusetts demonstrated that in 1993, Massachusetts created a more efficient remediation management program as compared to the New Jersey program (Figure 2-3).

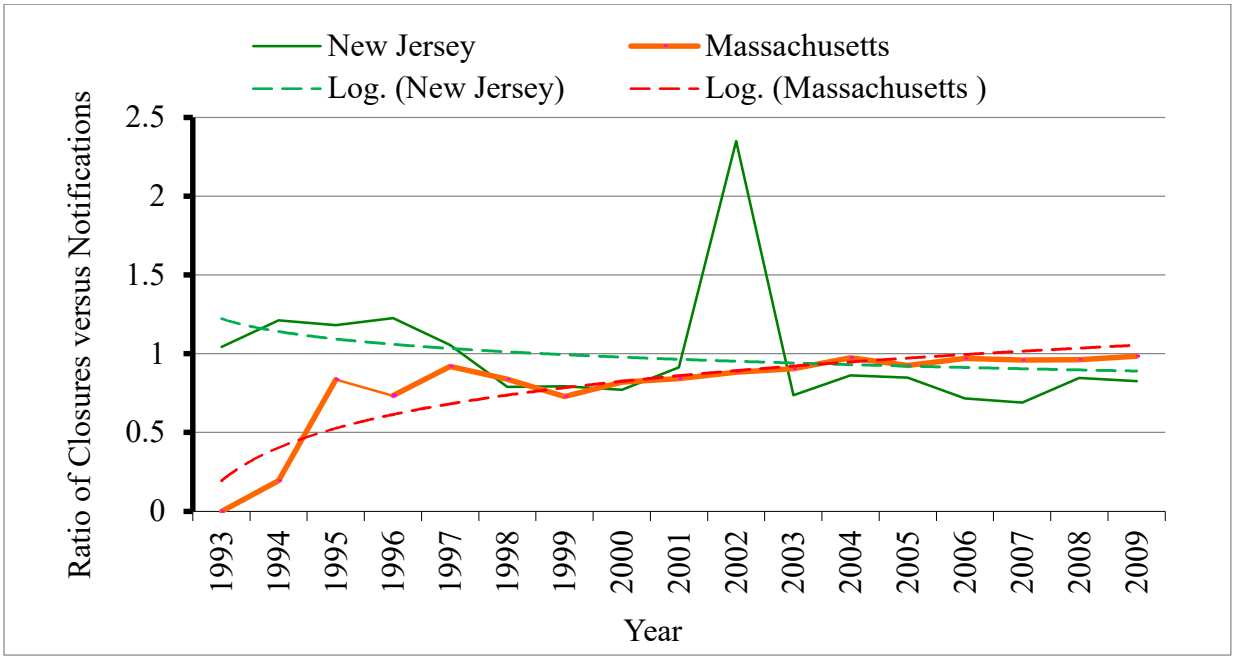

Figure 2-3. Comparison of Massachusetts and New Jersey Notifications versus Closures rates 1993-2009,

Therefore, the LSP program served as a model with minor modifications for the LSRP program, including the creation of the New Jersey Site Remediation Professional Licensing Board (NJSRPLB). The Board is a quasi-governmental body comprised of thirteen individuals: the NJDEP Commissioner or designee, a state geologist, and eleven Governor-appointed and Senate approved members. Out of the eleven appointed individuals, at least seven are required to be LSRPs. The Board's primary functions are to establish the licensing requirements and to assure that all the professionals conducting remediation adhere to the prescribed licensing standards. The functions of the board include (NJSRPLB 2013):

- Review and approve or deny applications for licensing site remediation professionals
- Administer and evaluate licensing examinations for site remediation professionals
- Issue licenses and license renewals

- Establish standards and requirements for continuing education of LSRPs
- Approve or offer continuing education courses, and track fulfillment of continuing education requirements by LSRPs
- Establish and collect fees for examinations, licenses, renewals, or any other services required for the licensing of site remediation professionals
- Adopt and administer standards for professional conduct for LSRPs
- Investigate complaints, impose discipline, and suspend and revoke licenses of site remediation professionals who violate the provisions of SRRA
- Publish and maintain the names and contact information of LSRPs, and a list of site remediation professionals whose license has been suspended or revoked by the board
- Provide public information on the LSRP program
- Maintain a record of complaints filed against LSRPs and provide the public with information upon request

The LSRP licensure is an accreditation process consisting of eligibility and examinations. In terms of education, the LSRP must have at least a bachelor's degree in natural, chemical, physical science, or engineering from an accredited institution. In terms of professional experience, the LSRP must have a minimum eight years of full-time experience in the site remediation field of which at least five years, including five thousand hours of relevant professional experience within New Jersey is spent on sites under the direct regulatory guidance of the NJDEP. The LSRP must attend and complete specified and required environmental health and safety, and departmental courses in technical requirements for site remediations. The LSRP must not be convicted or plead guilty to any environmental crimes, or have their license revoked

in any other state within the past ten years. Once the LSRP is licensed, they are required to maintain their licensure by complying with continuing educational requirements and annual fees. New Jersey's LSRP program is a major modification to the site remediation program. The pre-privatized remediation program (Figure 2-4) within New Jersey required the NJDEP Case Managers to review and approve each step of the remediation process. The process consisted of reviewing the supplied documentation from the RP actions whether for the Preliminary Assessment (PI), Site Investigation (SI), Remedial Investigation (RI) and Work Plan (WP) in addition to the remediation sites Progress Reports, and the sites Remedial Action Report (RAR). From both the NJDEP and the RP perspective, this process was both costly and time consuming. The implemented privatized remediation program overhauled the remediation system and streamlined the remediation process (Figure 2-5). This revision allows a Licensed Professional to act as a remediation Case Manager, and follow the NJDEP to generate guidelines, such as Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) and Technical Guidance documents for the LSRP to follow while conducting remediations.

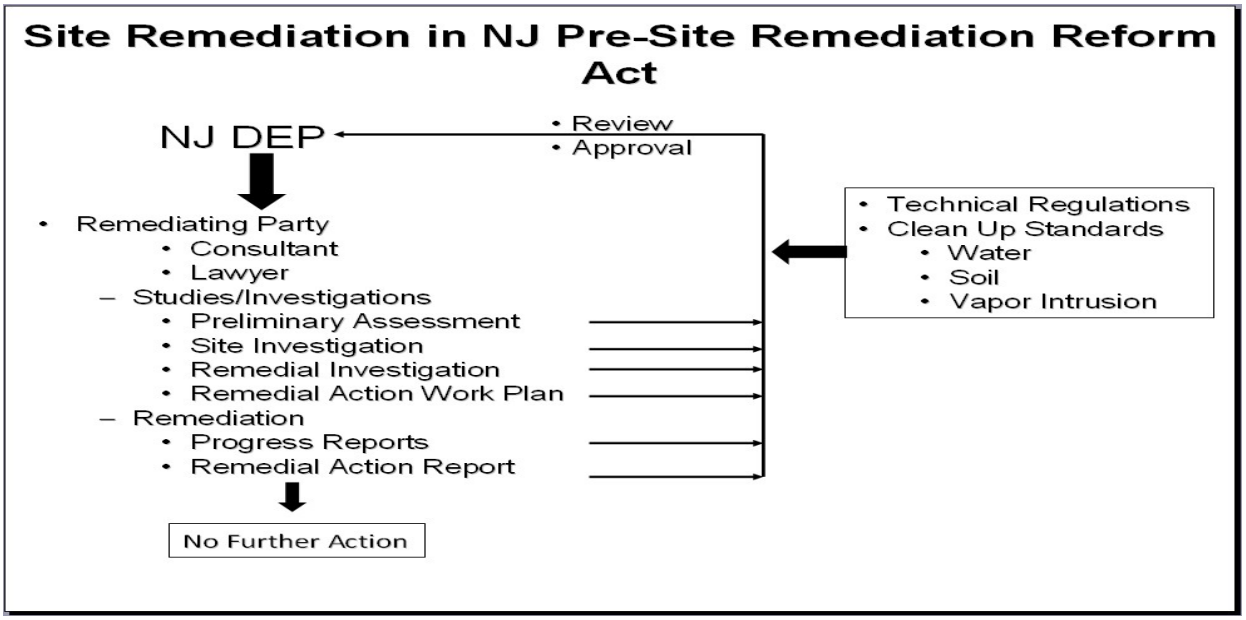

Figure 2-4: Pre-Privatization Methodology. Source: Data from "Site Remediation Reform: The Confluence of Public Opinion, Politics, Policy and Government in New Jersey."

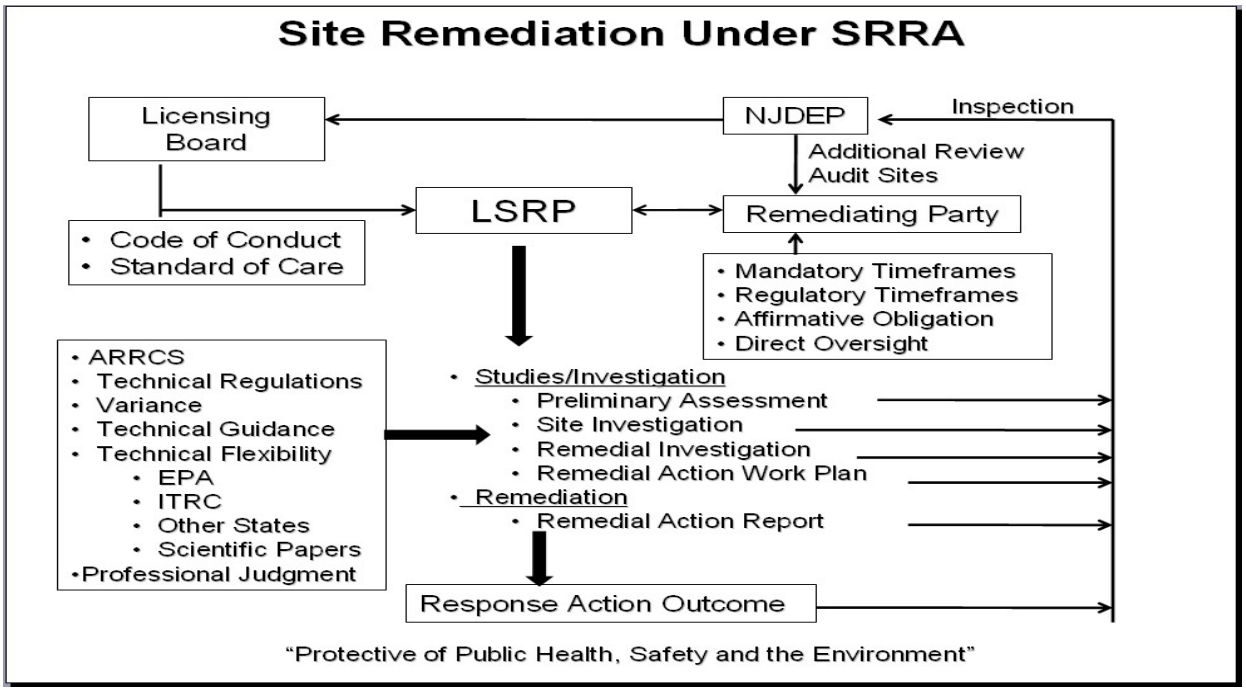

Figure 2-5: Post-Privatization Methodology. Source: Data from "Site Remediation Reform: The Confluence of Public Opinion, Politics, Policy and Government in New Jersey."

There is a good understanding of what happened and where the two states are in terms of environmental remediation privatization, but how did the stakeholders reach the determination that this privatization was good for the state? A determination of the drivers, influences and outcomes of the privatization was needed.

2.2 Literature Gaps / Research Objectives

As indicated in Chapter 1, there were no studies conducted that used both qualitative and quantitative data in identifying the capabilities and limitations of privatizing state environmental remediation programs. The following studies were used to create the framework for this portion of the study. In regards to quantitating human views, researchers have been able to in use social science techniques and identify the various determinants and satisfactions of a program implementation with the use of coded factors (Sprinz & Vaahtoranta 1998). As an example,

coded factors can be used to quality perceptions into numerical values (*1=very dissatisfied, 2=somewhat dissatisfied, 3=somewhat satisfied, 4=very satisfied*), to determine overall job satisfaction (Sabharwal & Corley 2009). This type of coding factors are also known as the Likert scale, which can be used to determine levels of agreement of items, in turn transferring the information to a scale to give specific measurement (Joshi, Kale, Chandel, & Pal 2015). Researchers have postulated that if the scale has more numeric values, then the respondents will be able to have more variable to choose form, in turn increasing the likelihood of achieving a correct value (Joshi et al, 2015). Likert scaling can be used for complex multi-items scales to get an overall view point on multifaceted concepts like environmental attitudes (Willits 2016). Hence, the coded/Likert scaling was chosen for determining the respondents' attitudes. For the non-coded portion was limited to conducting an empirical study of the data that was available online at the NJDEP's DataMiner, and GeoWeb.

2.3 Study Area, Survey Design and Administration

2.3.1 Study Area

Each state's remediation management programs tend to show variations in allowing Licensed Professionals to conduct remediation activities. Massachusetts and New Jersey have both implemented large scale privatized licensed professional guided remediation programs. The study was created to identify the state's interests in opting for privatization of the state's remediation programs and the barriers of the privatization and how those barriers were overcome. The study also focuses on the effects of the privatizations on environmental remediations within New Jersey. New Jersey had made significant improvements to their remediation program in 1993. Due to demising resources, the New Jersey's Site Remediation

Program was not able to compete with the influx of sites in need of remediations, Massachusetts did not have a successful program prior to its privatization and therefore was not focused on the non-coded portion of the study.

2.3.2 Survey Methodology

The study involved conducting a systematic assessment of relevant literature and interviews with key individuals including the state's experts and stakeholders that were conducive in the implementation of the New Jersey Site Remediation Program's Legislative Reform (see Table 2-1); state's experts involved in the Boston Bar Association's creation of the "white paper", and a random selection of New Jerseys' remediation case managers.

Table 2-1: Stakeholders conducive in the Legislative Reform

American Petroleum Council - NJ Chapter	NJ Builders Association
Assembly Democratic Office	NJ Business & Industry Assn.
Assembly Republican Office	NJ Chamber of Commerce
Camden County NAACP	NJ Chemistry Council
Camden Regional Legal Services, Inc.	NJ Environmental Federation (NJEF)
City of Elizabeth	NJ Office of Legislative Services
City of Trenton	NJ Work Environment Council
Coalition for Affordable Housing and Environment	North Jersey Environmental Justice Alliance (EJA)
Communication Workers of America	Riker, Danzig
DuPont Corporation	Senate Democratic Office
Environmental Research Foundation	Senate Republican Office
Fuel Merchants Association of NJ	Sierra Club - NJ Chapter
Hamilton Township	Smith Pizzutillo LLC
Interfaith Community Organization (Jersey City)	Sokol, Behot and Fiorenzo

Ironbound Community Corporation	Trenton BEST Committee
Langan Engineering	

The drivers were identified in terms of social, economic, and political drivers, and obtained through literature review. The influences in determining the type of remediation program privatization and the success of implementing the privatization are quantified using coded process (Sabharwal & Corley 2009). The impacts of the SRRA on remediations are quantified using a non-coded process. The coded factors were ranked using a five-point scale developed from the interviews, while the non-coded factors were determined from state documents.

Coded

- State's resources for accomplishing remediation activities
- State's workforce used for reviewing submitted documentation
- Pressures from Non-Governmental Organizations
- Pressures from local communities
- Departments administrative support
- Duration for implementation of the privatized program
- States' experiences with privatization prior to the remedial privatization

Non-coded

- Number of closures
- Number of new remediations
- Number and acreage of sites in need of remediations
- Impacts on ecologically vulnerable areas
- Impacts on of large populated cities

2.3.3 Survey Design and Administration

Study areas included New Jersey and Massachusetts for the literature review and coded areas, and New Jersey for the non-coded areas. The coded areas required a survey of acting participants who assisted in the determination for the privatization program within the represented states. This was used to determine the influences on each respective state. The first part of the survey questionnaire consisted of responses ranging from not influence, minimally influence, somewhat influence, mostly influence, to completely influence. The responses were than coded from 1 to 5, 1 being not influence to 5 being completely influence. The survey questionnaire focused on the development of the privatization remediation program regards to the following:

- States' pervious experiences with privatization in other sectors of government prior to the remedial privatization?
- the pressures from Non-Governmental Organizations
- the pressures from Business and Industry Groups
- the pressures from local communities
- the pressures from the Departments' Administration

The second part of the survey questionnaire included ranking questions which focused on the respondent satisfaction of the implementation and outcome of the privatization. The survey questionnaire consisted of responses ranging from not satisfied, minimum satisfied, somewhat satisfied, mostly satisfied, to completely satisfied. Once again, the responses were then coded from 1 to 5, 1 being not satisfied to 5 being completely satisfied. The portion of questionnaire

focused on the implementation and outcome of the privatization remediation program regards to the following:

- the department's administrative support available for the implementation
- the development of the Licensing Board
- development of the Licensure Process
- the remedial privatization addressing all the desired expectations
- the implementation of the remedial privatization
- the duration for the remedial privatization implementation

The final part of the survey questionnaire also included open-ended questions. In this case, the respondent was able to justify and gave more insight into their responses in the two previous parts. The questions consisted of the following:

- In regards to the implementation, how did the experiences with the states' previous experiences with privatization affect the outcome?
- In regards to the implementation, how were the Non-Governmental Organizations concerns addressed?
- In regards to the implementation, how were the Business and Industry Groups' concerns addressed?
- In regards to the implementation, how were the local communities' concerns addressed?
- In regards to the implementation, how were the concerns from Departments' Administrative addressed?
- In regards to the availability of the Departments' Administrative support, was it adequate for the implementation and what areas could be had been improved?

- In regards to the development of the Licensing Board, were there areas which could have be improved and how?
- In regards to development of the Licensure Process, were there alternatives available?
- In regards to the duration for implementation, what were the key factors that kept the implantation on time?
- In regards to the remedial privatization addressing all the desired expectations, were there areas could be improved and how?

The non-coded process was limited to New Jersey and determine the effects of the SRRA in regards to their complexity (see Table 2-2). No two sites are ever the same in context of their complexity, including contaminant, media, remedial active required, and the unknown(s). However, the complexity of a remediation can generally be segregated into several categories due to the nature of the remediation needs. The most complex cases are C2, C3, and D. C2 categorizes a remediation that has a formal design with a known contaminant source where ground water may be contaminated, C3 also has a formal design but consists of a multi-phase remedial action with an unknown or uncontrolled source of contamination, and D is a multi-phase remedial action with multiple unknown or uncontrolled sources in multiple media including ground water. Simple cases are referred to as category B, a simple phase remedial action for soil only, or C1 which has no formal design with a known contaminant source and/or potential groundwater contamination. Other cases refer to emergencies and any other miscellaneous categories not previously listed.

Table 2-2: Site Complexity

Category	Type	Definition
A	Simple	An emergency response
B	Simple	A simple phase remedial action for soil only
C1	Simple	No formal design with a known contaminant source and/or potential groundwater contamination
C2	Complex	Formal design with a known contaminant source where ground water may be contaminated
C3	Complex	Formal design but consists of a multi-phase remedial action with an unknown or uncontrolled source of contamination,
D	Complex	Multi-phase remedial action with multiple unknown or uncontrolled sources in multiple media including ground water

Under the SRRA, not all potentially contaminated sites within New Jersey are required to be remediated under the direction of an LSRP, such as Unregulated Heating Oil Tanks (UHOT, 2017). Within the SRRA, UHOTs are defined specifically as tanks limited for the storage of heating oils for residential homes with unlimited capacity or non-residential properties with an aggregated capacity of 2,000 gallons or less tanks, which can be ether stored above or below ground. Gasoline and diesel tanks are considered regulated tanks. UHOTs can be remediated by a non-LSRP individual as long as both the individual and the firm employing the individual both maintain a valid New Jersey Underground Storage Tank (UST) certification in Subsurface Evaluation. The end result would be a No Further Action letter given by the NJDEP, instead of a RAO. No Further Actions and cases closed have fallen under the same reporting criteria pre- and post-SRRA. The amounts of closed cases outside of the direct oversight of the LSRP will be categorize as indirect effects of the SRRA, and used for the highly populated areas, Tier-1 Well Head protection areas, and vernal pool habitat case closed comparisons. The duration for these indirect studies was limited to 10 years prior to the SRRA and 10 years after. The non-coded

process included gathering information from the Site Remediation Program's DataMiner, NJDEP-GeoWeb, and literature review.

In terms of the SRRA affecting the most populated cities in New Jersey, the study focused on Newark, Jersey City, and Paterson. The use of DataMiner was the main source of data. In terms of the Well Head Protection Areas (Community) (WHP), GeoWeb was that used to identify the greatest amounts of contaminated sites within the Tier-1, 2-year locations in 2019.

The highest interactions occurred in areas Well Heads in Paterson City - Hawthorne Borough, Montclair Township - Glen Ridge Borough, and Orange City Township - East Orange City as referenced in Figure 2-6; the figure is used solely to demonstrate the location and magnitudes of the Tier-1 areas. The Tier-1 areas were overlaid onto Google's Maps to identify the Lot/Block within the irregular polygons, and then identify the addresses. The addresses from DataMiner' s subcategory "No Further Action or Completed Case Report by Municipality" were crossed referenced by year from 1999 to 2018, with the known address in the polygons. Only positive determinations were used for the study. The technique was applied for the Vernal pool habitat determinations.

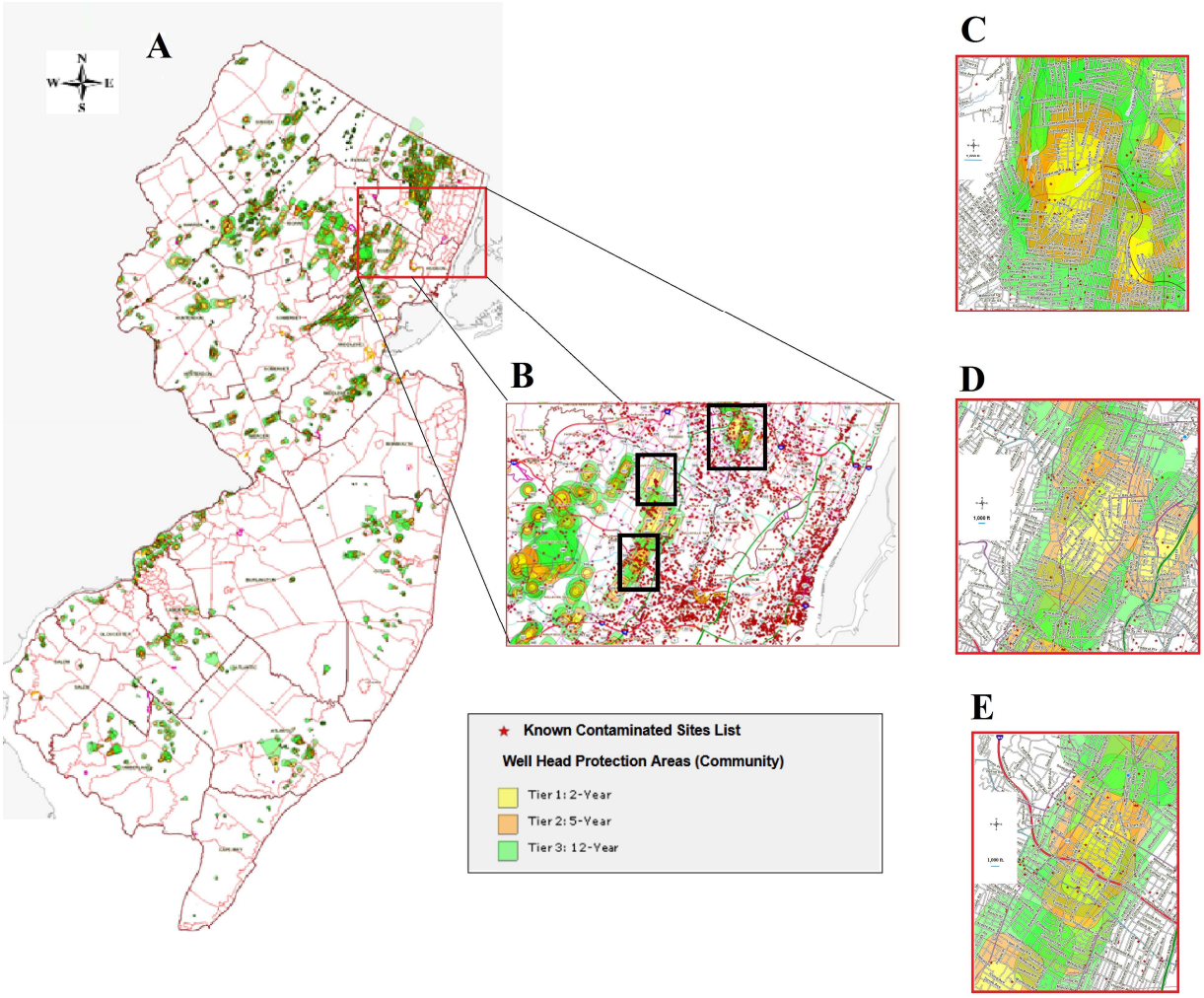

Figure 2-6: Well Head Protection Areas (2019) **A** [Well Head Protection Areas within New Jersey], **B** [Well Head Protection Areas within Northeast Metropolitan New Jersey], **C** [Well Head Protection Area in Paterson City - Hawthorne Borough], **D** [Well Head Protection Area Montclair Township - Glen Ridge Borough], **E** [Well Head Protection Area Orange City Township - East Orange City] Source: NJDEP- GeoWeb

WHP areas are locations whereas surface water is able to pass through soils that are porous enough to eventually reach aquifer. An aquifer is natural geological underground water storage area were permeated surface water accumulates, the water in the aquifers is considered groundwater and can be used as a public water supply (Boving, Stolt, Augenstern, & Brosnan 2008). In order to access the groundwater, pumping wells are installed. This pumping creates a lower pressure gradient in the aquifer causing adjacent ground water and distant surface water to move at a quicker rate towards the wellhead. The more the wells pump, the greater zone of

influence the pumping has on the aquifer (Diamantino, Henriques, Oliveira, & Ferreira 2007). This activities area of influence is identified as the time for the water to travel in its flow path (Green 1996). The WHP areas are categorized into three risk tiers reflecting particles time of travel within these areas; Tier 1, Tier 2, Tier 3 being equal to 2, 5 and 12 years, respectfully (Spayd & Johnson 2003). This travel time are based on findings that bacteria have polluted wells as far as a 170 day, and that viruses have survived in ground water for up to 270 days (Canter, Knox, & Fairchild 1987). Poor land uses and uncontrolled activities including leaks and spills have contributed to ground-water contamination (Pye & Patrick 1983). Not all polluted groundwater flows uniformly, so the time of travel may vary and in case can arrive at the well head sooner than two years (Liu, Li, Mei, & Dong 2007).

The technique used for identifying sites within the vernal pool habitat areas followed the same mythology used in the Well Head Protection Areas (Community). The Vernal pool habitat areas included ID 2929, ID 2988, and the combined ID 2994 and 2994 were used. ID 2994 and 2994 were as one, because the distance between the two areas was only 75 feet as referenced in Fig 2-7; the figure is used solely to demonstrate the location and magnitudes of the Vernal pool habitat areas.

Vernal pool habitat ID 2988 consists of 2,369 acres, is located in Netcong Borough, Roxbury Township, Mount Arlington Borough, and still have 6 active site remediations. Vernal pool habitat ID 2994 and 2995 have a combined 1,757 acres, is completely located Rockaway Township and have 3 active site remediations. While, Vernal pool habitat ID 2929 consists of 7,206 acres that is located in Harding Township, Chatham Township, Long Hill Township, and has a total of 10 active site remediations.

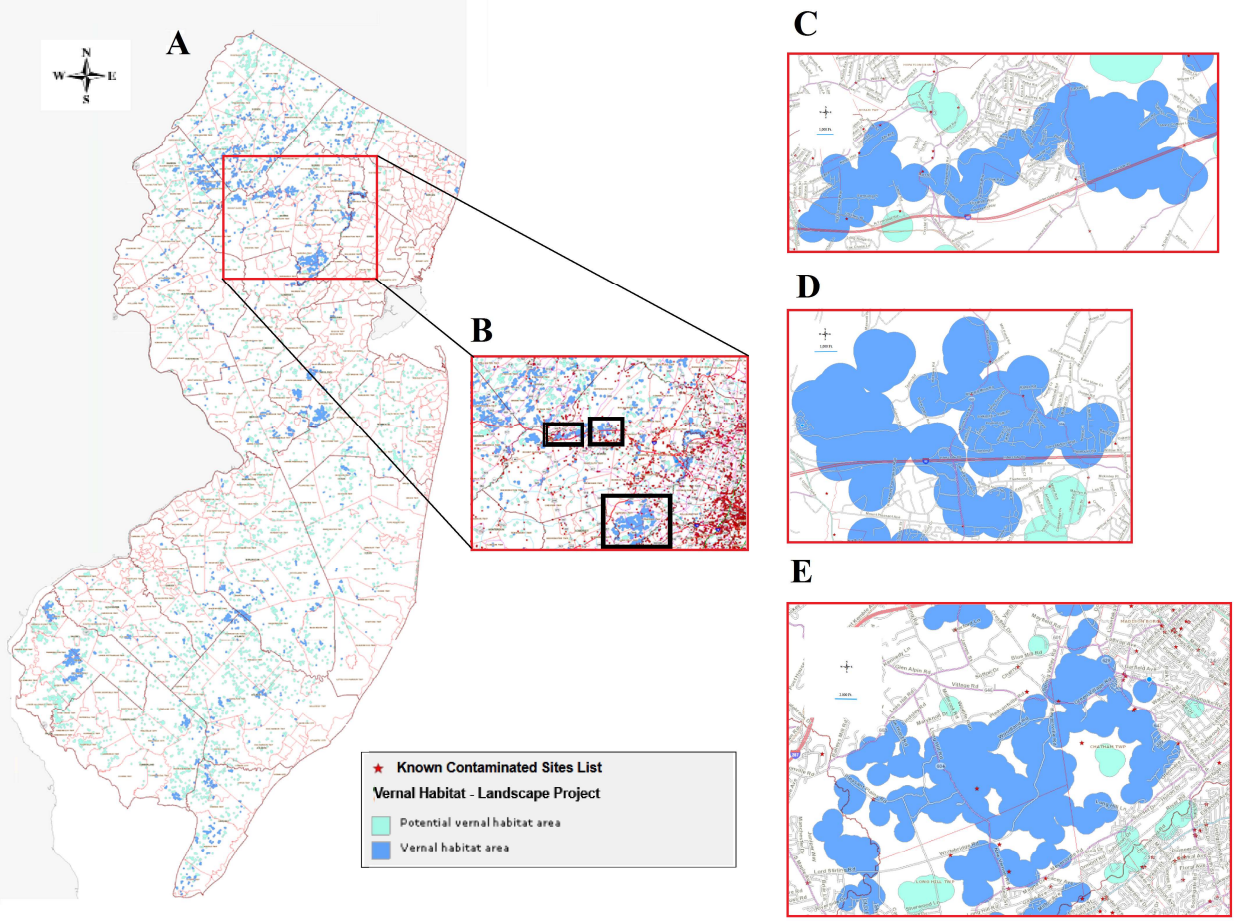

Figure 2-7: Vernal pool habitat (2019) **A** [Vernal pool habitat within New Jersey], **B** [Vernal pool habitat within Northeast Metropolitan New Jersey], **C** [Vernal pool habitat ID: 2994 and 2995], **D** [Vernal pool habitat ID: 2988], **E** [Vernal pool habitat ID: 2929] Source: NJDEP-GeoWeb

Vernal pools are seasonal ponds and pools that occur in wetland depressions, in either natural or man-made that are not part of a waterway such as a stream (Brooks & Hayashi 2002). This increases the likelihood of species survival, due to lessening of predation from fish and insects (Stoks & McPeek 2003). Under normal conditions the pools fill up during the spring precipitation, and can maintain the water throughout the summer months, and onward (Tavernini 2008). The pools primarily serve as critical habitat areas for a diverse range of amphibian species (Colburn, Weeks, & Reed 2008), but can also serve as habit for reptiles, birds and mammals (Anderson 2006). The habitat area for the pool includes the pool plus a 1,000-foot buffer.

2.4 Results and Discussion

2.4.1 Drivers

The initial social, economic and political drivers in both New Jersey and Massachusetts were similar in respect to change being engaged (Greene 2009). The social driver in New Jersey stemmed from public reactions to a poorly managed and regulated industrial site, which was converted to a daycare facility located within Franklinville, New Jersey. In contrast, Massachusetts' inability to have sites cleaned up in timely manner was put to a vote in 1986 as part of the Massachusetts Identification of Hazardous Waste Sites Act, also known as Referendum Question 4 (Secretary of the Commonwealth of Massachusetts 1986), which was approved by seventy-four percent. This referendum required the Massachusetts' Department of Environmental Quality Engineering to identify hazardous waste sites state to being listed known contaminated sites, prior to this there was no inventory.

In respect to the economic drivers, there were similarities between both states. In New Jersey, the economic driver for privatization stemmed from the backlog due to the inefficiency of the NJDEP's regulatory process, staffing and budgetary constraints. Many of backlogged sites included brownfield properties. In Massachusetts, significant burdens were placed on the private sector such as transactions cost and extensive delays of property transfers due to site remediations (BBA 1990). In both states, these substantial delays placed a hardship on the private industry.

The political driver in New Jersey came directly from NJDEP Commissioner Lisa Jackson in 2006. Commissioner Jackson identified that a change needed to be made to eliminate a significant bottleneck in the Site Remediation Program's management of contaminated properties. In Massachusetts the political driver for change was motivated by a white paper by

the Boston Bar Association in 1990. The paper stated “Development, financing and property transfers at contaminated sites are frequently precluded or inordinately delayed, with adverse economic consequences for Massachusetts business and industry. With pending budget cuts and DEP staff reductions, these problems will only get worse, unless the Massachusetts Contingency Plan process is fundamentally reformed.” (BBA. 1990). The paper led to the Massachusetts DEP study committee to identify how to comply with the recommended changes. The findings from the committee led to the amendments in Chapter 21E in 1992, and an improved version of the MCP in 1993.

2.4.2 Influences and Satisfaction

In terms of influencing the program development in the Massachusetts LSP program the most significant came from the business and industry groups and the Department's Administration, as shown in Table 2-3. The business and industry groups were the key push for the change in management style of the Massachusetts DEP. There were many properties that were idle, not being cleaned up, and not being put back into productive use. Massachusetts had a powerful economy, and the contaminated sites were preventing Massachusetts from maintaining it. The Administration groups played a pivotal role in the development of the program, since they had the most at stake. In New Jersey’s case, the NGOs and previous experiences with privatization had the most influence in the development of the program. The business and industry groups also played a significant role, but the pressure was not as great as in Massachusetts.

In both cases, the pressures from local communities did not have a significant impact due to the fact that there weren’t many concerns. The biggest difference between the Massachusetts

and New Jersey program was that the Massachusetts program was the forerunner of privatization within the state at that point in time that could have influence the program, such as the privatization of the Department of Motor Vehicles in New Jersey. The satisfaction of the program ranged from satisfied to very satisfied, and there were no significant concerns raised. However, in both cases it was noted that the DEP's Administration support was inadequate and didn't have to sufficient staffing. If both DEP's staffing was adequate in the first place, the push for privatizations may not have occurred.

In case for the licensing board development, there could have been a broader group of stakeholders. However, it was pointed out that if there were to have a broader stakeholder's group, it would have need to take additional time to bring him up to speed they got constructive input and comments on the system. The key factor that kept the implementation on time where the desire for the private sector to develop sites in addition to regulatory timelines that need to be kept.

Table 2-3: Coded Responses

Program Influences	New Jersey Respondents Means	Massachusetts Respondents Means
The States' previous experiences with privatization in other sectors of government prior to the remedial privatization	5	1
The pressures from Non-Governmental Organizations	5	1
The pressures from Business and Industry Groups	4	5
The pressures from local communities	2	1

The pressures from the Departments' Administration	3	5
Satisfaction of process and development	New Jersey Respondents Means	Massachusetts Respondents Means
The department's administrative support available for the implementation	4	4
The development of the Licensing Board	4	4
The development of the Licensure Process	4	5
The remedial privatization addressing all the desired expectations	3	5
The implementation of the remedial privatization	3	4
The duration for the remedial privatization implementation	5	5

2.4.3 Complexity of Cases

In terms of the effect of the SRRA on the complexity of case, there has been an increase in the amounts of simple cases (category B and C1), complex cases (category C2, C3 and D), and other cases being closed. Comparing the 6 years prior to the SRRA to 6 years post SRRA in case of the others cases there has been a 233% increase, there has been a 129% increase in complex cases, and a 76% increase in simple cases as shown in Figure 2-8.

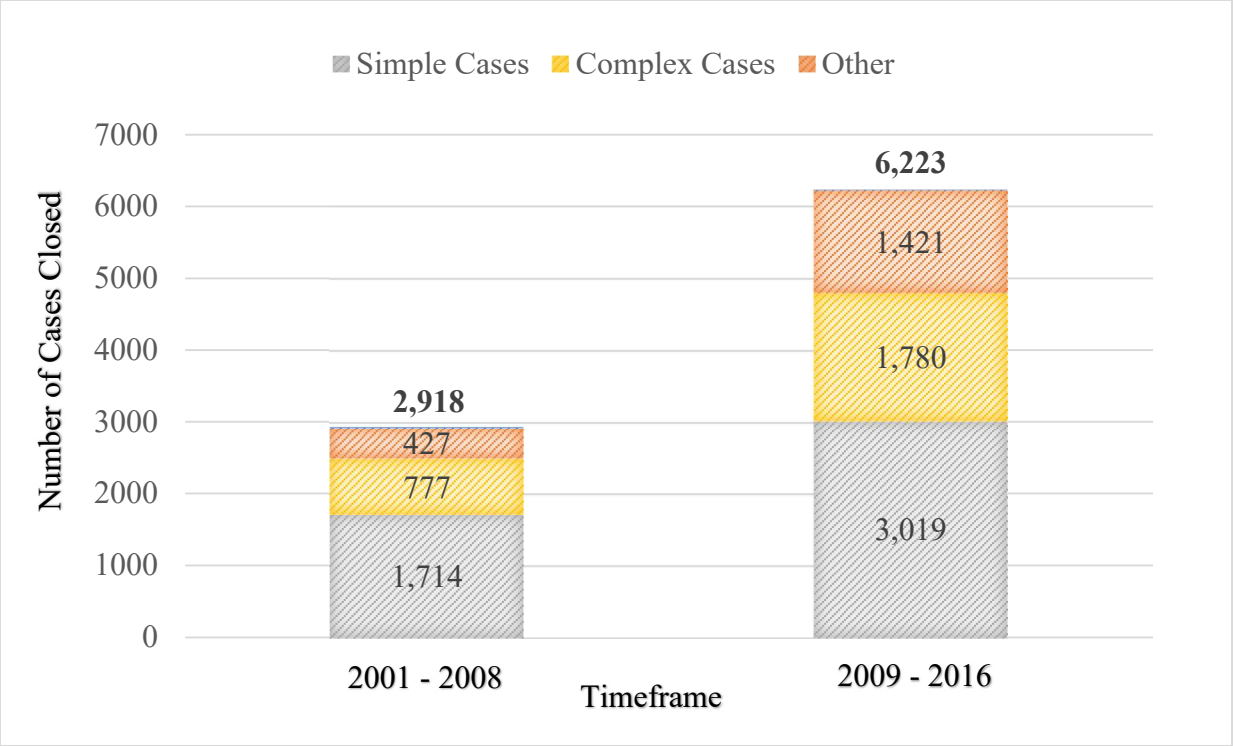

Figure 2-8: Cases Closed Before and After SRRA (2001-2016). Source: Boyle & Ferguson Jr (2018)

In regards to the number of cases close by year 2014 to 2018 there has been a slight drop in the amount of UHOT cases closed and the amount of LSRP cases have been increasing. The amount has been holding steady at approximately 5,000 cases per year for the past two years as shown if Figure 2-9.

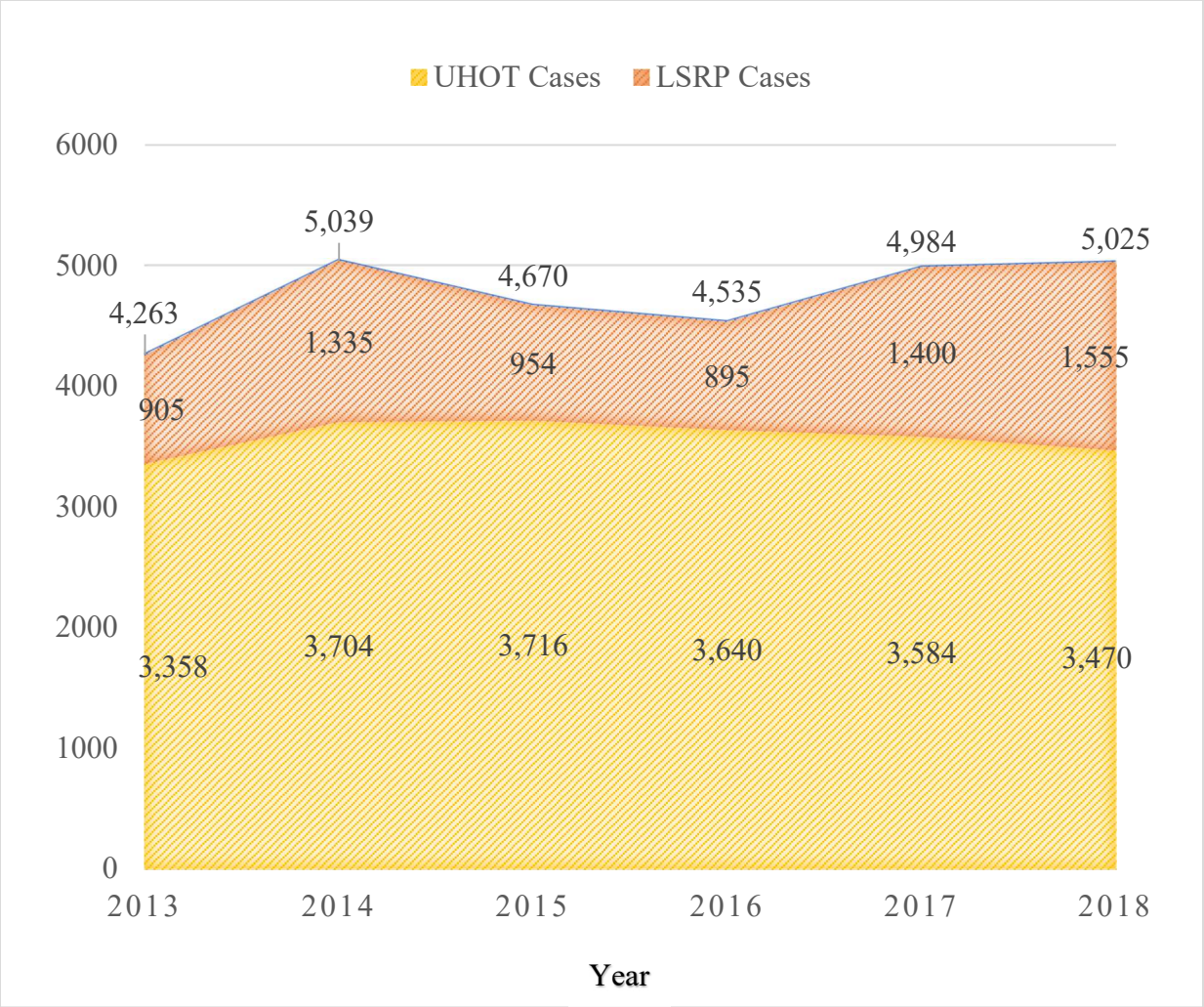

Figure 2-9: Number of Cases Closed by Year (2013-2018) Source: Cooperative Venture Project and Site Remediation Advisory Group (CVP/SRAG) "Site Remediation Program Comprehensive Report Traditional and LSRP Cases"

There has been a steady decrease in active "UHOT" cases, and active "LSRP" cases (Figure 2-10). The amount of active cases in the SRP have holding steady about 13,500 cases in the system. However, the total number of "Other" cases in the site remediation program there has been a steady. These "Other" cases include amount of active "Publicly Funded" cases such as Superfund sites, active "Unknown Source" cases involving contaminations unrelated to the activities of the property, such as an offsite source affecting the property, active "Traditional Oversight" cases.

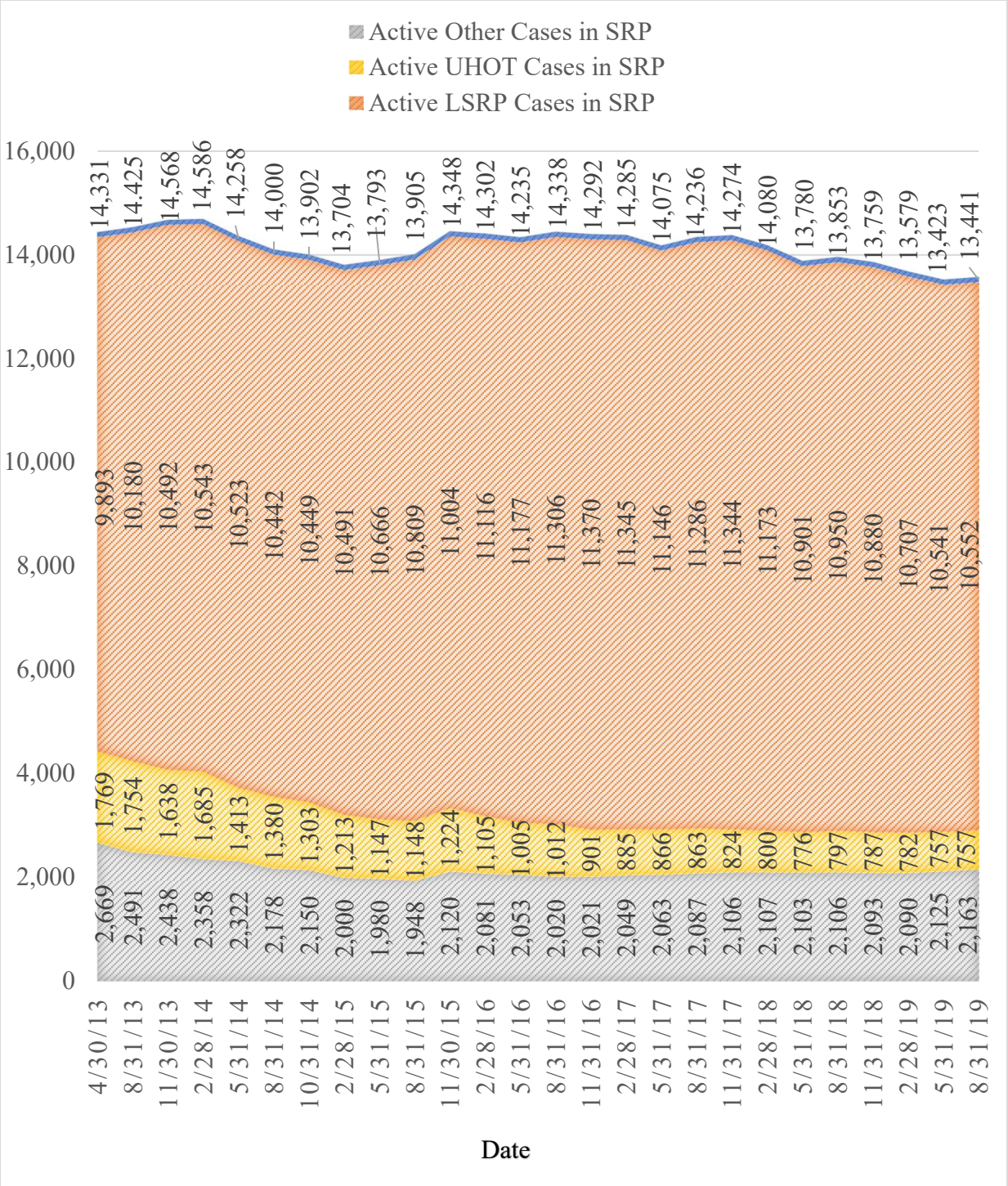

Figure 2-10: Total Number of Active Cases in the SRP (2013-2019) Source: Cooperative Venture Project and Site Remediation Advisory Group (CVP/SRAG) "Site Remediation Program Comprehensive Report Traditional and LSRP Cases"

The closure rates of LSRP case and UHOT in SRP have seen a significant change (Figure 2-11). The rates for UHOT cases have demonstrated that there has been a slowing down, but

still holding a rate of one, meaning that for every new case placed into the system, one case is being closed. There has been a steady overall increase in the amount of LSRP cases closed versus new LSRP cases since 2013. While there has been a noteworthy increase in the LSRP closer rates; the past three years have shown that there are sessional fluctuations.

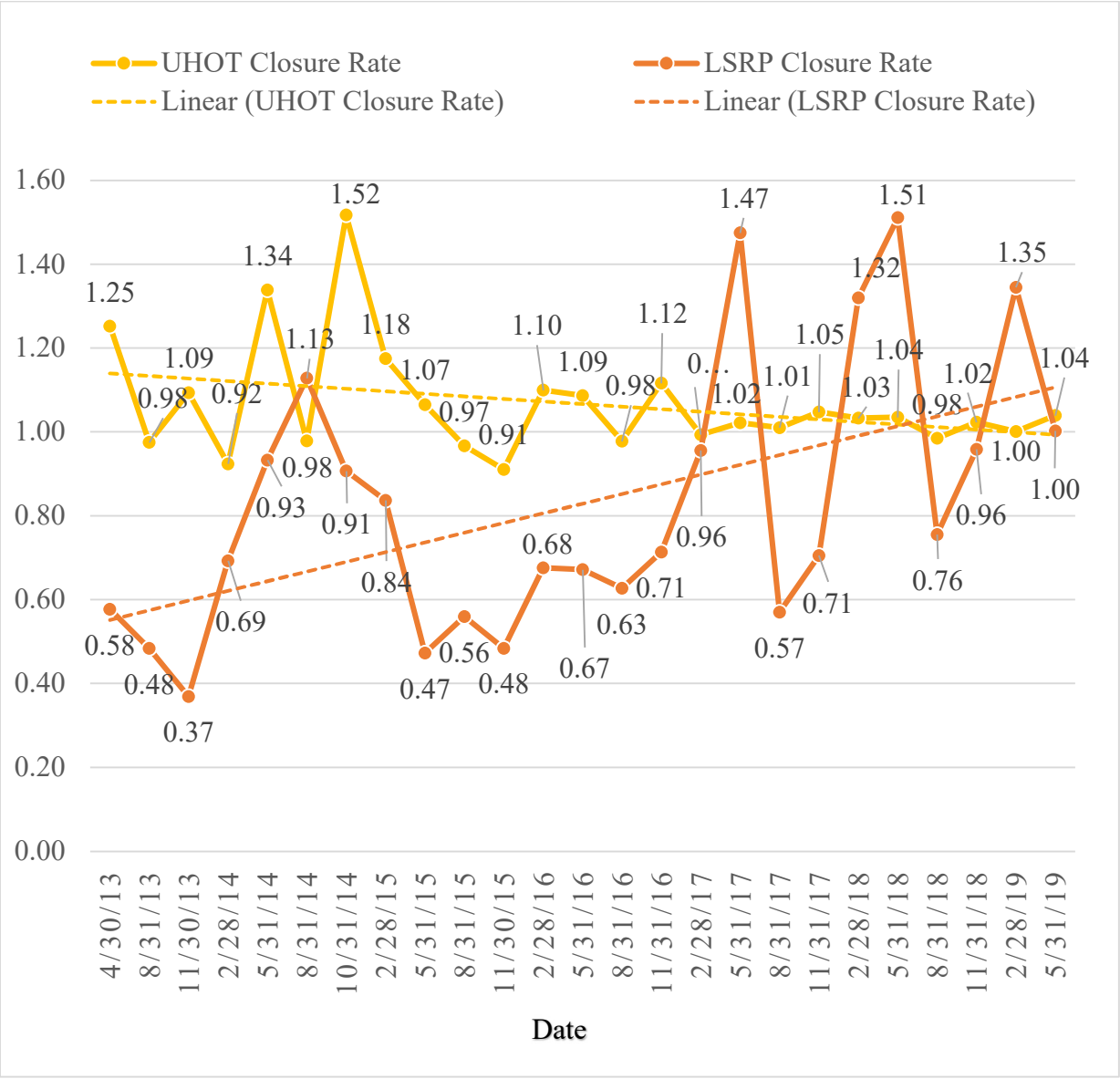

Figure 2-11: Closure Rates of the LSRP and UHOT Cases in the SRP (2013-2019) Source: Cooperative Venture Project and Site Remediation Advisory Group (CVP/SRAG) "Site Remediation Program Comprehensive Report Traditional and LSRP Cases"

2.4.4 Impacts to Large Metropolitan Cities

The LSRP program has been in use for ten years. As of May 2019, the SRP has identified direct effects including 13,423 active cases within the SPR, 10,541 of which were under the lead of the LSRPs, 9,122 LSRP cases closed, and a total of 50,373 LSRP Remedial Action Outcomes (RAO) that have been reviewed and closed within the SRP (CVP/SRAG, 2019). A RAO is a determination made by an LSRP that the area of concern (AOC) of a contaminated site is protective of public health and safety and the environment. A RAO can be given for individual AOCs or for the entire contaminated site, if the site has more than one AOC. Coinciding with the direct effects, there are also indirect positive effects of the program. Since SRRA's inception, a total of 56,834 UHOT cases have been closed within the SRP.

The indirect effects can be observed when comparing the pre- and post- SRRA in terms of "No Further Action (NFA) or Completed Case". The NFA and Completed Case, of which a majority are UHOTs, are documented in the same fashion within this category and are indifferent of the SRRA. The potentially more complex sites have been the focus of the LSRPs, which allows the SRP to focus on smaller sites for quicker turnaround times in turn increasing the amounts of properties available for redevelopment. More urban properties available to consumers will increase the cost of urban lands prices, and assist in curbing "Urban Sprawl" (Habibi & Asadi 2012). Consequently, since the introduction of the SRRA in 2009, there has been a 46% increase in the amounts of NFA and Completed Cases within New Jersey's top three most populated cities. When comparing the ten years pre- and post- SRRA amounts, and there has been a steady increase in the past six years as outlined in Figure 2-12.

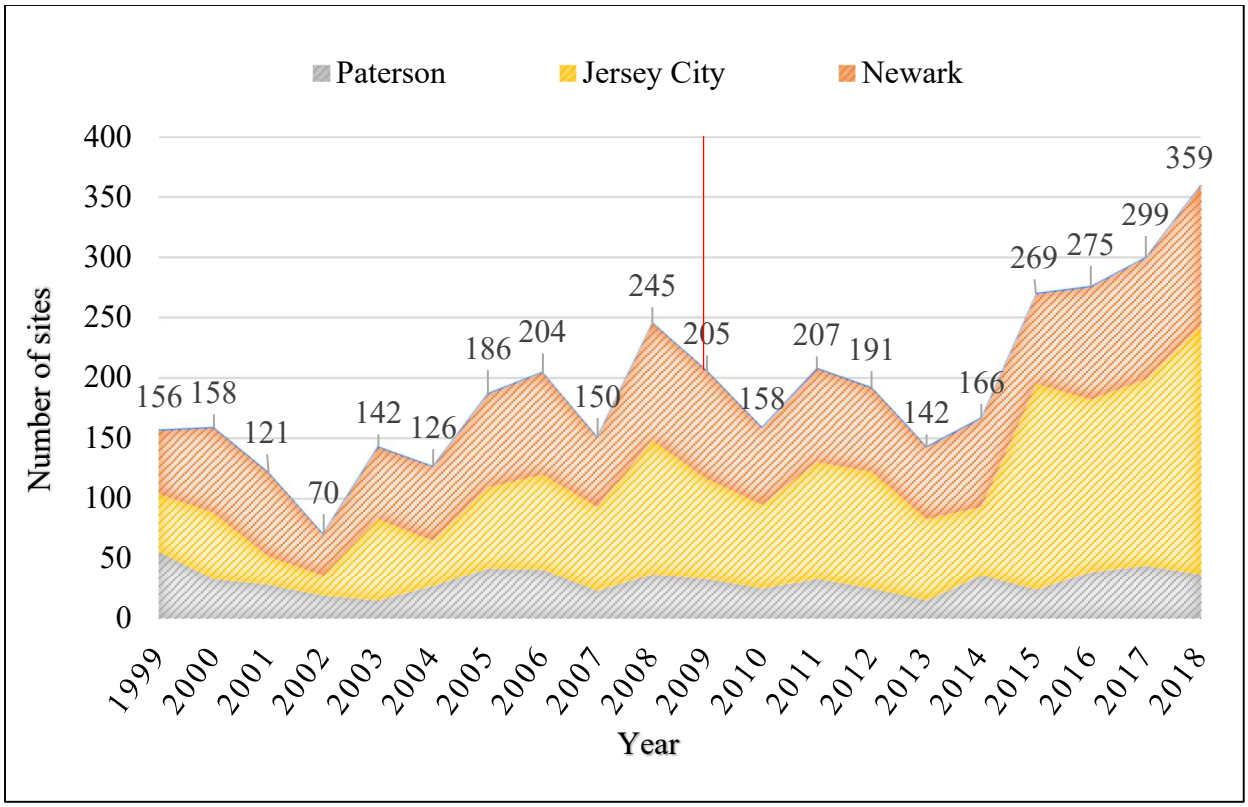

Figure 2-12: Amounts of NFA or Completed Cases within New Jersey's Top 3 Populated Cities (1999-2018) Source: Data from New Jersey's DataMiner subcategory "No Further Action or Completed Case Report by Municipality"

2.4.5 Impacts to Well Heads

The SRRA has shown improvements to the amounts of NFA and Completed Cases in regards to the total amounts of sites for all three WHP Areas when comparing the ten years pre- and post-SRRA as outlined in Figure 2-13. There has been an 88% increase when considering all three sites. However, there are variances between the three. The Montclair-Glen Ridge site has increased by 195%, while the Orange-East Orange site increased by 28%, and the Paterson-Hawthorne site has decreased by 9%. This decrease can be attributed to only a small number of sites being NFA or Completed, 11 in the pre- as compared to 10 in the post-SRRA. As in the impacts to Large Metropolitan Cities, there has been a steady increase in the last 10 years in the SRP.

There are still sites in need of remediation in all three WHP areas, 18 in Orange-East Orange, 16 in Paterson-Hawthorne, and 12 in Montclair-Glen Ridge. Orange-East Orange has 2 simple and 12 complex sites, 12 of which are under LSRP oversight, and 4 under a Remedial Action Permit (RAP). A Remedial Action Permit is granted to a site where the contamination, whether in soil or water is in excess of the DEP cleanup standards at the end of the remediation. Paterson-Hawthorne has 1 simple and 15 complex sites, 12 of which are under LSRP oversight, and only 1 RAP. Montclair-Glen Ridge being the forerunner in remediations still has 4 simple and 6 complex sites, 8 of which are under LSRP oversight, and 2 RAPs.

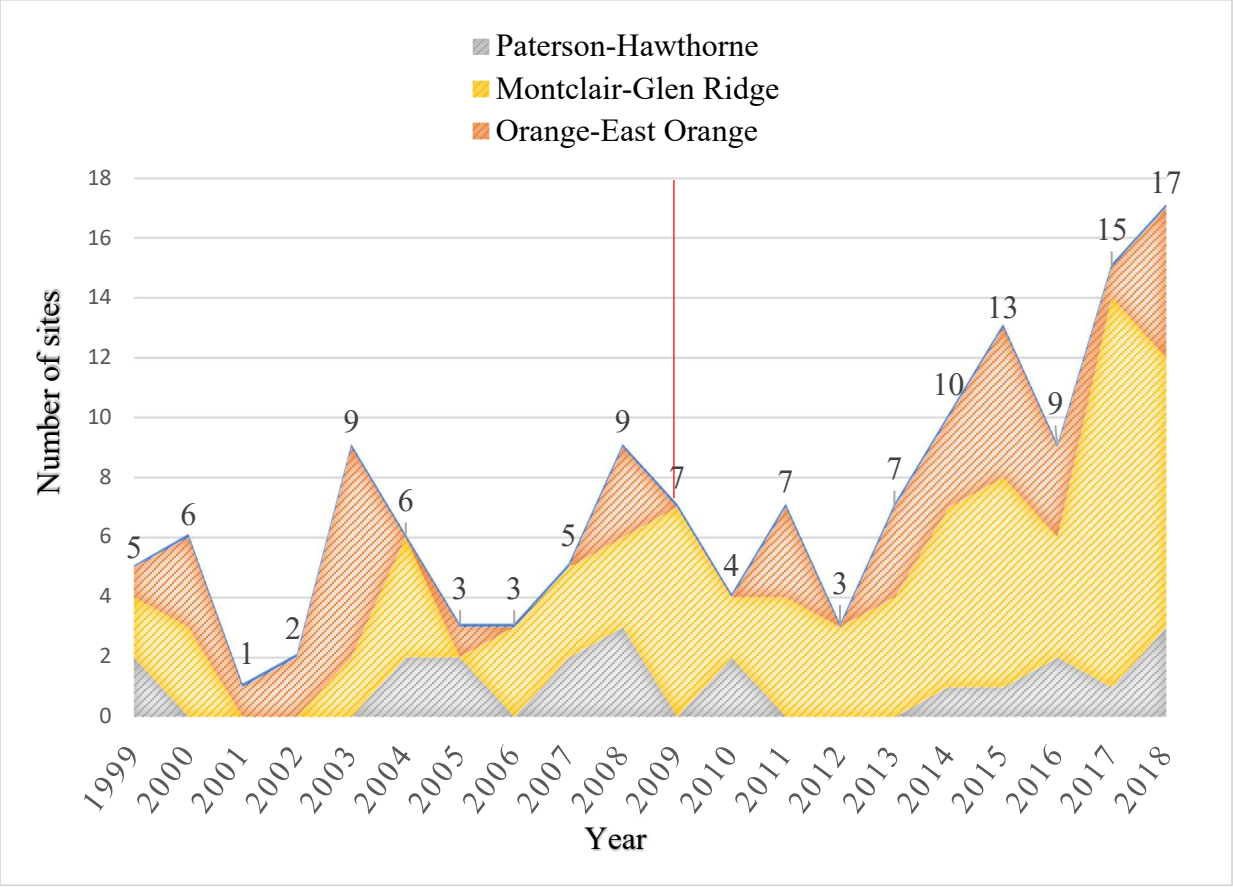

Figure 2-13: Amounts of NFA or Completed Cases within New Jersey's Well Head Type 1 Area (1999-2018) Source: Data from New Jersey's DataMiner subcategory "No Further Action or Completed Case Report by Municipality"

2.3.6 Impacts to Environmental Sensitive Areas

Unlike in the impacts to Large Metropolitan Cities and WHP Areas has not completely demonstrated a continuous improvement due to the SRRA in the amounts of NFA and Completed Cases in regards comparing the ten years pre- and post-SRRA as outlined in Figure 2-14. There has been a total of a 46% increase in NFA and Completed Cases. However, the majority has occurred in 2009. A total of 100% increase of cases has occurred in ID 2994/2995, while ID 2988 there has been an 88% increase, and in ID 2529 there has only been an 8% increase. As mentioned, there has a been a significant increase when comparing the ten years pre- and post-SRRA, nevertheless there has been a significant decrease in amount of sight being remediated in the past 6 years, and no sites were listed in 2016 and 2017.

As in the WHP areas, there are still sites still in need of remediation in all three Vernal pool habitat areas including 10 in ID 2929, 6 in ID 2988, and 3 in ID 2994/2995. ID 2929 has 3 simple and 7 complex sites, 3 of which are under LSRP oversight, no RAP, but has 1 Post Remediation (Post-rem). A Post-rem site is one that may have institutional or engineering controls placed upon the site, and includes variations of periodic monitoring depending in the type and concentration of the contaminant(s). ID 2988, has 2 simple and 3 complex sites, 2 of which are under LSRP oversight, and 1 RAP. While, ID 2994/2995 has no simple and 2 complex sites, only 1 of which are under LSRP oversight, and 1 Post-rem.

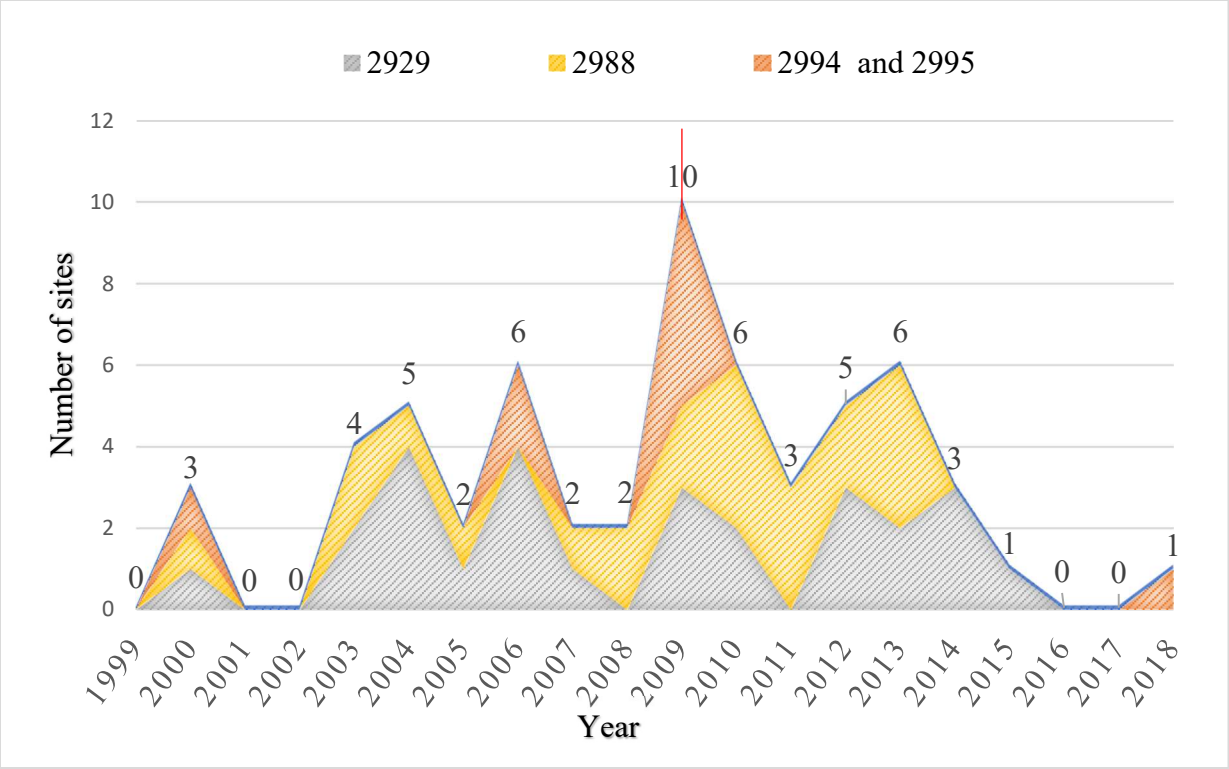

Figure 2-14: Amounts of NFA or Completed Cases within New Jersey's Vernal Pool Habitats (1999-2018) Source: Data from New Jersey's DataMiner subcategory "No Further Action or Completed Case Report by Municipality"

2.5 Conclusions

From the respondents willing to participate in the study, the coded portion of study has exposed that there were some similarities and differences in the implementation of the privatization of state-run remediation programs between Massachusetts and New Jersey. First, the similarity was both groups had a good understanding that the system was broken and something needed to be done, urgently. Second, the differences occurred in the influences for the change in management style. In Massachusetts, the change was pushed from Business and Industry Groups, and the DEP Administration. While, in New Jersey the greatest influences came from the NGOs and some from the Business and Industry Groups, but there not as much push from the DEP Administration as compared to Massachusetts. However, the New Jersey DEP Administration had significant influence with the author of the enabling legislation. To

achieve this a robust stakeholder process involving multiple public types, regulatory officials and elected officials resulted in a law that accomplished its primary goal of more efficient, protective remediations being accomplished faster and in many cases, less expensive than the previous program.

The similarities and differences were not as drastic within satisfaction of the process and development of the respective programs. In this case, both Massachusetts and New Jersey responses ranged from somewhat to completely satisfied. The largest discrepancy occurred in the remedial privatization addressing all the desired expectations, perhaps due to not having all parties fully engaged in the process development.

In the non-coded portion, the changes to the SRP have increased the overall rates of amounts and complexity of remediation cases in New Jersey. The program has also demonstrated some disparages between the locations and types of remediation that were being conducted in regards to anthropocentric locations, and very little impact in non- anthropocentric locations. First, in large metropolitan cities, such as Jersey City and Newark there have been great strides in having sites being put back into beneficial use, especially since 2013. However, this was not the case for Paterson. Second, the same disparages were confirmed in cases within Tier-1, WHP community areas. In which case, Montclair-Glen Ridge and Orange-East Orange sites have increased, but the Paterson-Hawthorne was not as dramatic. Third, the SRRA has shown little effect on the non-anthropocentric environment, such as the vernal pool habitat areas. Since 2013, these areas have shown a downward trend.

Contributing factors causing these variations may in part due to economic and social factors impacting property value (Matos-Perez 2015). However, some researchers have identified other factors that can also contribute to these variations such as access to water bodies

(Braden, Feng, & Won 2011), number and acreage of brownfields redevelopment areas (Joyce 2016), or even perhaps increased access to greenways (Noh 2019). Therefore, the drive for the remediations should not be derived only from one aspect.

3. Determine the hierarchy of the Strengths, Weaknesses, Opportunities, and Threats of the New Jersey privatization remediation program

3.1 Introduction

Codified in 2009, New Jersey's Site Remediation Reform Act (SRRA) set forth major modifications in the Site Remediation Program (SRP), within New Jersey's Department of Environmental Protection (NJDEP) administration in the remediation activities of over 20,000 contaminated environmental properties. The main goal of the SRRA was to establish the Site Remediation Professional Licensing Board (SRPLB) in order to create a licensures process for the Licensed Site Remediation Professional (LSRP) (SRRA 2009). The program shifted the responsibilities of NJDEP's Site Remediation Case Managers to the LSRPs. The LSRPs are licensed private individuals which are able to provide remediation services without any delayed approval from the NJDEP. This allows for timelier remediations of contaminated properties that are protective of "public health, safety, and the environment" (SRRA 2009). In essence, the state privatized a major portion of the NJDEP's Site Remediation Program (SRP). In order to identify the programs perceived successes and potential risks, a critical assessment of the program stakeholders was needed. To achieve this assessment, a combined Strength, Weakness, Opportunities and Threats - Analytical Hierarch Process (SWOT-AHP) technique was used to obtain the perceptions of various stakeholder groups (Ramirez, S., Ramirez, P., Dwivedi, Bailis, Ghilardi 2012). SWOT alone is a strategic management tool which assists in determining the internal strengths and weakness factors, and external opportunities and threats (Houben, Lenie, Vanhoof 1999, Dyson 2004). By incorporating the SWOT technique with AHP, the process enables the stakeholders to rank, thought pairwise comparisons, each SWOT factors (Saaty and Vargas 2001)

3.2 Literature Gaps / Research Objectives

As indicated in Chapter 1, there were no studies conducted that used both qualitative and quantitative data in identifying the capabilities and limitations of privatizing state environmental remediation programs. The following studies were used to create the framework for this portion of the study. Researchers have identified the use of SWOT analysis as a strategic management tool to enhance business strategies and management development by allowing the key stakeholders to interact and discuss business development (Pickton & Wright 1998). SWOT is a good tool for starting this dialog amongst key stakeholders, but SWOT alone does not take into consideration the weight of each of the SWOTs to determine their priorities. Incorporating an AHP pair-wise comparisons of the SWOT analysis allows a researcher to rank the weights of each SWOT, in turn creating a hierarchical structure (Saaty 1977). Researchers have also used the SWOT-AHP framework not only to conduct the pair-wise comparisons within each SWOT, but also conducted pair-wise comparisons of the highest-ranking SWOTs to determine the hierarchical structure within the entire SWOT and create an overall priority matrix (Dwivedi & Alavalapati 2009). While similar researchers have built upon the SWOT-AHP technique to determine the overall factor priorities for each stakeholder group within each SWOT (Ramirez et. al. 2012).

3.3 Study Methodology, Study Area, Survey Design and Administration

3.3.1 Study Methodology

Incorporating AHP to a SWOT analysis required a three-step process. The first step involved stakeholder interviews to identify the key SWOT category factors. The second step involved creating a factor priority SWOT-AHP survey for the stakeholder groups. The survey

consisted pairwise comparisons of each of the factor within the SWOT categories. The scaling was from 1 to 7 (1, 3, 5, and 7) on each side of the median. The respondents were asked to compare two factors to determine which factor was more important relative to each other on the ranking scale as show below:

Factor A	7	5	3	1	3	5	7 Factor B

This scale was used for the relative weight determination; if Factor B was more important than Factor A, then the number to the right side of "1" is picked since the assumption is that the comparison is between Factor A and Factor B. For the survey, the numbers were replaced with a known scale: 1, 3, 5 and 7 were replaced by "Equal", "Moderate", "Strong", and "Very Strong", respectfully. In each question, the respondent was able to weight their choice between the two comparing factors.

This operates under the assumption that if Factor A is being compared to Factor B, then the reciprocal value is determined when Factor B is being compared to Factor A. Therefore, a relative weight on the one side of the diagonal is aij, while its reciprocal relative weight on the other side of the diagonal is 1/ aij. This means that the numbers to the one side of 1 are whole numbers (3, 5, and 7), while the other side they are fractions (1/3, 1/5, and 1/7). The eigenvector or geometric mean of weights from each individual pairwise comparisons are them calculated by taking the n^{th} root of the corresponding product. The eigenvector values are used to yield a square comparison matrix.

$$\mathbf{A} = (\mathrm{aij}) = \begin{pmatrix} w_1/w_1 & w_1/w_2 & \dots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \dots & w_2/w_n \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ w_n/w_1 & w_n/w_2 & \dots & w_n/w_n \end{pmatrix}$$

A square comparison matrix was then developed for each SWOT category. Each comparison matrix was then normalized to summate the columns and then divide each cell in that column with its associated summation. This normalized matrix was used to generate the local priority factors. These factors were calculated by averaging each row and dividing the value by the number of factors within each category.

The next step was to identify the quality of the data (Ramezanpour, Pronker, Kreijtz, Osterhaus, & Claassen 2015). This was accomplished by multiplying the transpose of the vector of weights w by matrix A to get a vector represented by λ_{max}w, where:

$$\mathrm{Aw} = \lambda_{max}\mathrm{w}$$

while w = (w1, w2,….wn)^{T} , λ_{max} was the largest eigenvalue of matrix A and w was the transpose of the vector of weights (Iranah 2018). If there was any consistency within the pairwise comparisons, then λmax will be equal or greater than n (Saaty 1977). The next objective was to verify the consistency ratio (CR) is less the <0.1 or 10%. The CR of the matrix was calculated by using

$$\mathrm{CR} = \mathrm{CI}/\mathrm{RI}$$

$$\mathrm{CI} = (\lambda_{max} - n) / (n\text{-}1)$$

whereas CI was the consistency index and RI is the random index. (Dwivedi et. al. 2009). This was conducted on all the SWOT factor and stakeholder groups to determine the factor priorities and determine the highest factors in each category to be used in the final survey.

The final step of the process included a global SWOT-AHP survey consisting pairwise comparisons of the highest-ranking SWOT factors to each other. Each stakeholder group had their own pairwise comparison depending on the group's preferences. The results were tabulated in the same fashion as the factor priory survey. The last step in this process also included multiplying the factor priorities by the scaling values determined in the global survey to calculate the global priority for each factor within each stakeholder group (Ramirez et. al. 2012).

3.3.2 Study Area Survey Design and Administration

The first stage of the process was identifying the SWOT factors by interviewing a representative selection of experts and stakeholders that were conducive in the implementation of the New Jersey Site Remediation Program's Legislative Reform as listed in Table 3-1.

Table 3-1: Stakeholders conducive in the Legislative Reform

American Petroleum Council - NJ Chapter	NJ Builders Association
Assembly Democratic Office	NJ Business & Industry Assn.
Assembly Republican Office	NJ Chamber of Commerce
Camden County NAACP	NJ Chemistry Council
Camden Regional Legal Services, Inc.	NJ Environmental Federation (NJEF)
City of Elizabeth	NJ Office of Legislative Services
City of Trenton	NJ Work Environment Council
Coalition for Affordable Housing and Environment	North Jersey Environmental Justice Alliance (EJA)
Communication Workers of America	Riker, Danzig
DuPont Corporation	Senate Democratic Office
Environmental Research Foundation	Senate Republican Office
Fuel Merchants Association of NJ	Sierra Club - NJ Chapter
Hamilton Township	Smith Pizzutillo LLC

Interfaith Community Organization (Jersey City)	Sokol, Behot and Fiorenzo
Ironbound Community Corporation	Trenton BEST Committee
Langan Engineering	

A total of 17 responses from the 57 potential respondents were obtained, several groups had multiple stakeholders. A tabulation of the highest results was developed (see Table 3-2). A total of 5 strengths, 4 weakness, 4 opportunities and 6 threats were used. These factors were used for the pairwise-comparisons.

Table 3-2: SWOT factors

Weaknesses	Strengths
W1: The amount of Internal New Jersey Department of Environmental Protection's resources to handle workloads	S1: Licensed Site Remediation Professional's ability to use "Professional Judgment"
W2: Holding the Licensed Site Remediation Professional liable for the site	S2: Requiring the Licensed Site Remediation Professional to comply with a strict "Code of Conduct"
W3: Conflicts between multiple Licensed Site Remediation Professionals in rendering mutual agreeable judgments	S3: Ability for Licensed Site Remediation Professionals to network ideas through organizations such as the Licensed Site Remediation Professional Association
W4: Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money	S4: Ability for the Licensed Site Remediation Professionals to quickly adapt to changes in guidance
	S5: Having the Licensed Site Remediation Professional's "Code of Conduct" as part of a law

Opportunities	Threats
O1: The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities	T1: Misperception of the general public of a Licensed Site Remediation Professional exercising "Professional Judgment" leading to a site being "Protective of human health and safety and of the environment"
O2: The ability to reuse remediated materials for beneficial use	T2: Ability for the New Jersey Department of Environmental Protection to overturn a rendered Licensed Site Remediation "Professional Judgment", due to political pressures
O3: Escalated remediation schedules	T3: Owners unable to clean up their sites due to financial burdens beyond their ability to remediate, turning properties into orphan sites
O4: Flexibility of Licensed Site Remediation Professional to adapt	T4: Changes to the markets' focusing away from the redevelopment of contaminated properties
	T5: Retroactive effects due to standard changes
	T6: Ability to improve the analytical detection limits used to quantify target compounds

The second stage involved administering a survey of the pairwise-comparisons between factors within the same strength, weakness, opportunities and threats grouping to determine the ranking within the grouping. A sample of the strength pairwise-comparisons is located as Figure 2. The survey was initiated via email to Governmental/Legal Entities (GLE), Business and Trade Organizations (BTO), and Non-Governmental Organizations (NGO) that have interest in site

remediation and to all current LSRPs. The email contained a link to an online survey located on SurveyMonkey®, an online survey service. A total of 191 respondents were obtained, of which 150 came from the LSRPs. The highest factors from each stakeholder group's groupings were developed into their own specific stakeholder SWOT-AHP Global survey.

	Strength Category							
	Comparison More ⟷ More							
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
LSRPs ability to use "Professional Judgment"								Requiring the LSRP to comply with a strict "Code of Conduct"
LSRPs ability to use "Professional Judgment"								Ability for NJDEP to provide coherent guidelines for LSRP
LSRPs ability to use "Professional Judgment"								Ability for LSRPs to network ideas through organizations such as the LSRPA
LSRPs ability to use "Professional Judgment"								Ability for the LSRPs to quickly adapt to changes in guidance

LSRPs ability to use "Professional Judgment"								Having the LSRPs "Code of Conduct" as part of a law
Requiring the LSRP to comply with a strict "Code of Conduct"								Ability for NJDEP to provide coherent guidelines for LSRP

Figure 3-1: Pairwise comparison of factors under the strength category.
In terms of factors contributing to the strength of the Licensed Site Remediation Professional (LSRP) Program; please compare the two factors below and select the best value.

The third stage involved administering a survey of pairwise comparisons between highest ranked SWOT factors: SWOT-AHP Global survey. The survey was initiated via email to the same respondents in the previous survey and linked to an online survey on SurveyMonkey®. A total of 101 respondents were obtained, of which 74 came from the LSRPs.

3.4 Results and Discussion

A summary of the factors and their overall priority scores is shown in Table 3-3. Factors with the highest priority score for each SWOT category in a particular stakeholder group are highlighted in bold, and the highest overall priority score is also highlighted in bold italic. For all comparisons, the CR was always less than 0.1. The scores of strength and opportunity factors can be interpreted as positives while the scores of weakness and threat factors as negatives of using a privatized remediation program such as the LSRP (Masozera, Alavalapati, Jacobson, & Shrestha 2006). For instance, the overall priority scores for the GLE stakeholders were 0.2748 and 0.3333 for the strengths and opportunities, and the sum was 0.6081, which implies that the total GLE in favor for the LSRP program was 61%. Using the same methodology, the overall priority scores can be calculated for the other stakeholder groups as well. The relative importance for each

individual SWOT category can provide valuable insight to assist in the decision-making process. In the case of the GLE, the priority value for the highest strength (S1) is 0.3610, which implies that the *LSRP ability to use "Professional Judgment"* accounts for 36% of the overall strengths of the program.

Table 3-3: Summary of the priority scores of all SWOT factors and categories

SWOT Categories	**Factors priority**				**Overall priority**			
	GLE	BTO	NGO	LSRP	GLE	BTO	NGO	LSRP
Strengths					**0.2748**	**0.1670**	**0.1125**	**0.166**
S1	**0.3610**	**0.2471**	0.2050	0.1597	0.0992	0.0413	0.0231	0.0265
S2	0.1195	0.2090	**0.3121**	0.1702	0.0328	0.0349	0.0351	0.0283
S3	0.2300	0.2224	0.1712	**0.2491**	0.0632	0.0371	0.0193	0.0414
S4	0.2091	0.1639	0.1270	0.2019	0.0575	0.0274	0.0143	0.0335
S5	0.0805	0.1576	0.1847	0.2191	0.0221	0.0263	0.0208	0.0364
Weaknesses					**0.1439**	**0.2319**	**0.1747**	**0.2651**
W1	**0.2852**	0.2076	0.2799	**0.3027**	0.0410	0.0481	0.0489	0.0803
W2	0.2186	0.2146	0.2510	0.1785	0.0315	0.0498	0.0439	0.0473
W3	0.2247	0.2285	**0.2855**	0.2683	0.0323	0.0530	0.0499	0.0711
W4	0.2716	**0.3493**	0.1836	0.2505	0.0391	0.0810	0.0321	0.0664
Opportunities					**0.3333**	**0.2597**	**0.1500**	**0.2373**
O1	**0.3122**	**0.4242**	**0.3684**	0.1349	0.1041	0.1102	0.0553	0.0320
O2	0.2291	0.2144	0.1810	**0.3095**	0.0764	0.0557	0.0272	0.0735
O3	0.2266	0.2472	0.2592	0.2894	0.0755	0.0642	0.0389	0.0687
O4	0.2320	0.1142	0.1914	0.2663	0.0773	0.0297	0.0287	0.0632
Threats					**0.2480**	**0.3414**	**0.5628**	**0.3315**
T1	0.1495	0.1573	**0.2915**	0.1921	0.0371	0.0537	0.1641	0.0637
T2	**0.2448**	0.1413	0.1288	0.0821	0.0607	0.0482	0.0725	0.0272
T3	0.0881	0.1316	0.1383	0.1149	0.0218	0.0449	0.0778	0.0381
T4	0.1594	0.1523	0.2113	0.1778	0.0395	0.0520	0.1189	0.0589
T5	0.1442	0.1602	0.1243	0.1399	0.0358	0.0547	0.0699	0.0464
T6	0.2140	**0.2573**	0.1058	**0.2932**	0.0531	0.0879	0.0596	0.0972

3.4.1 GLE Group Perceptions

The overall Governmental-Legal Entities positive perceptions for the program was 0.6081 or 61%. The strength (S1) *LSRP ability to use "Professional Judgment"* accounted for 33% of the total, while highest opportunity (O1) *The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities* provided 31% in the opportunities' highest influence. The second most significant determinant for this stakeholder group was the program's strength, which accounted for 27%. The highest strength (S1) *LSRP ability to use "Professional Judgment"* accounted for 36% of the perception. Threats were the third highest overall priority in determining the programs' perception at 25%, with the leading threat, (T2) Ability for the NJDEP to overturn a rendered LSRP judgment due to political pressures, led to 25% of this determination. Weakness showed the lowest level of importance to the stakeholder group and explained only 14% of the group's perceptions. The stakeholder gave each weakness in the category equal weights. However, weaknesses (W1) *The amount of Internal NJDEP resources to handle workloads* and (W4) *Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money* accounted for 56% of this stakeholders' groups perceptions, as shown in in Figure 3-2.

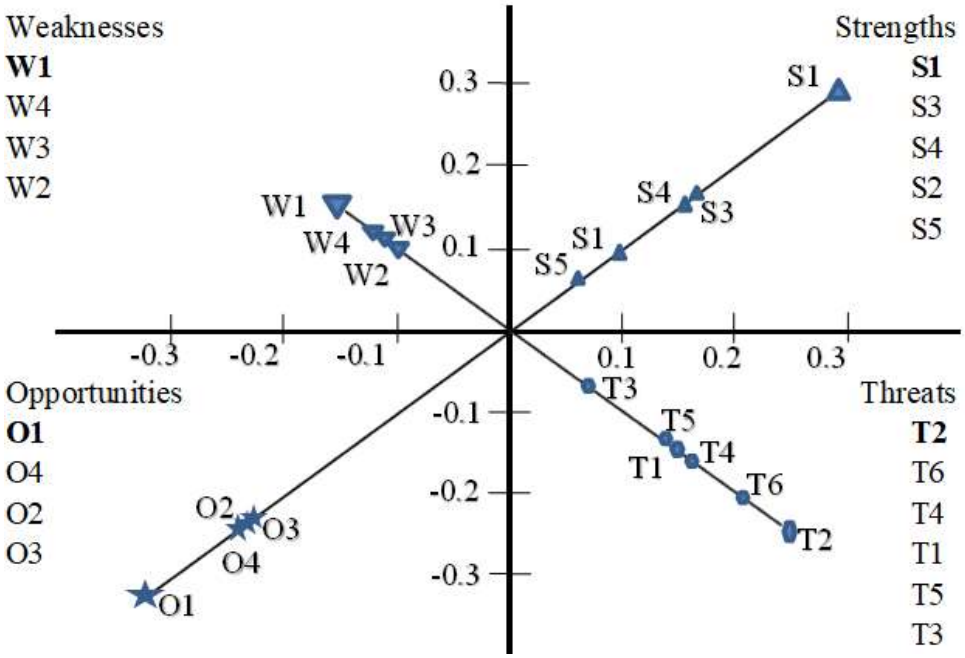

Figure 3-2: Perceptions map of the Government-Legal Entities

3.4.2 BTO Group Perceptions

The overall Business and Trade Organizations positive perceptions for the program was 0.4267 or 43%. While the threats dominated the group's overall perceptions of 34%. The highest threat priority was (T6) *Ability to improve the analytical detection limits used to quantify target compounds* at 26%. The group's second highest overall priority was the opportunities, which accounted for 26% of group's perceptions. Opportunity (O1) *The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities* dominated the perceptions at 42%. The third overall priority was weaknesses at 23%. Weakness (W4) *Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money* accounted for 34%. While the strengths held the fourth overall priority for group at 17%, strength's (S1) *LSRPs ability to use "Professional Judgment"*, (S2) *Requiring the LSRP to comply with a strict "Code of Conduct"*, and (S3) *Ability for LSRPs to network*

ideas through organizations such as the LSRPA accounted for 68% of the groups strength's perceptions, as shown in in Figure 3-3.

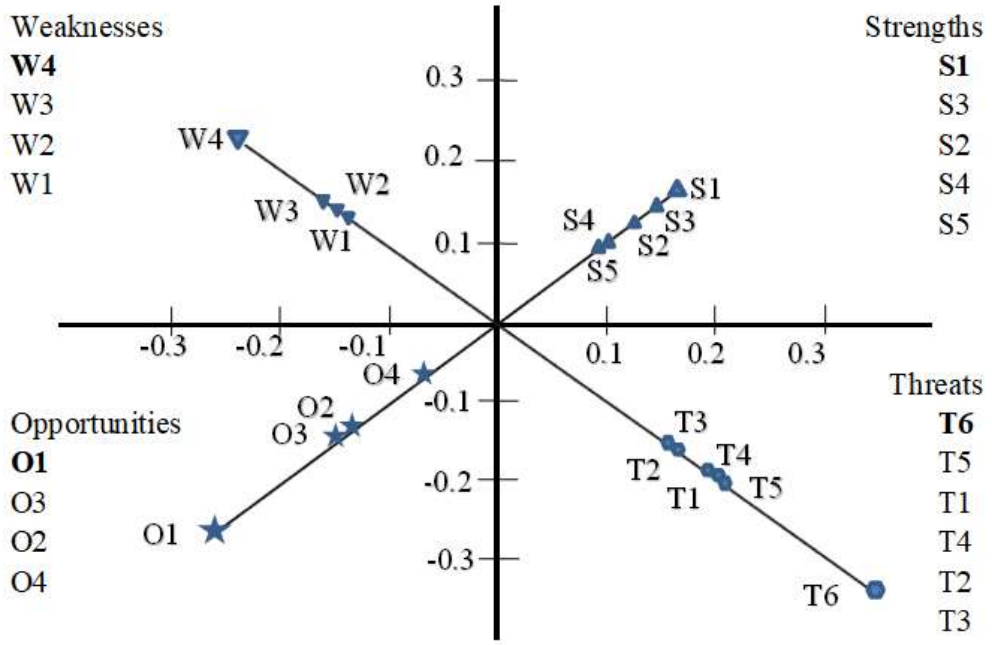

Figure 3-3: Perceptions map of the Business and Trade Organizations

3.4.3 NGO Group Perceptions

The overall Non-Governmental Organizations positive perceptions for the program was 0.2625 or 26%. Threats were the highest overall priority at 56%, and (T1) *Misperception of the general public of an LSRP exercising "Professional Judgment" leading to a site being "Protective of human health and safety and of the environment"* accounted for 30% of the group's perception. The group's second highest overall priority was the weakness, which accounted for 17% of group's perceptions. Weaknesses (W1) *The amount of Internal NJDEP resources to handle workloads*, (W2) *Holding the LSRP liable for the site*, and (W3) *Conflicts between multiple LSRPs in rendering mutual agreeable judgments* accounted for 82% of the group's perceptions. Opportunities held the third highest overall priority at 17%, as opportunity (O1) *The ability to incorporate inputs from groups such as Non-Governmental Organizations,*

Business and Industry Groups, and Local Communities held the ranking of 37%, the highest ranking of all the group's perceptions. Strengths held the fourth ranked overall priority at 11%. Strengths (S1) *LSRPs ability to use "Professional Judgment"* and (S2) Requiring the Licensed Site Remediation Professional to comply with a strict "Code of Conduct" accounted for 51% of the groups strength's perceptions, as shown in in Figure 3-4.

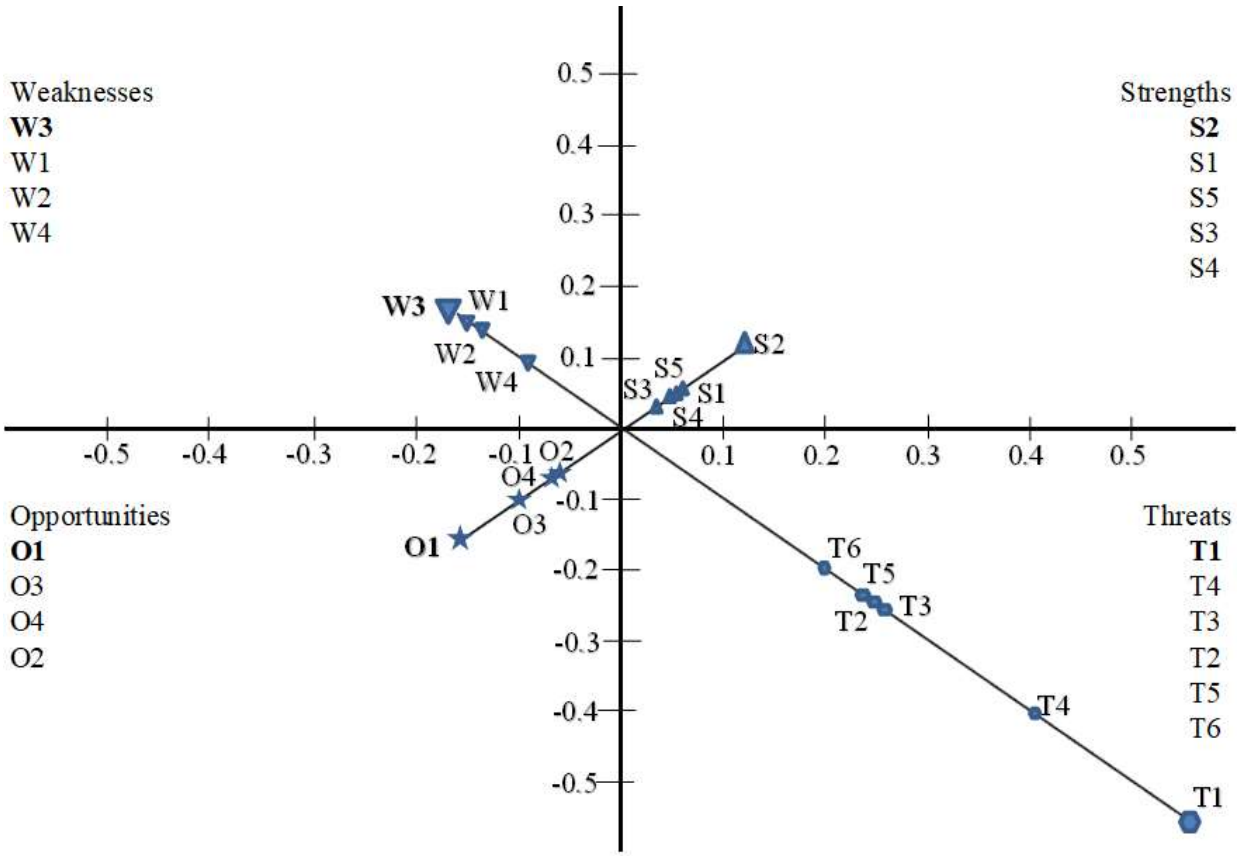

Figure 3-4: Perceptions map of the Non-Governmental Organizations

3.4.4 LSRP Group Perceptions

The overall Licensed Site Remediation Professionals positive perceptions for the program was 0.4043 or 40%. Threats were the highest overall priority at 33%, wherein (T6) *Ability to improve the analytical detection limits used to quantify target compounds* accounted for 29% of the group's perception. The group's second highest overall priority was weakness, which

accounted for 27% of group's perceptions. Weakness (W1) *The amount of Internal NJDEP resources to handle workloads* accounted for 30% of the group's perceptions. Opportunities held the third highest overall priority at 24%, with opportunity (O2) *The ability to reuse remediated materials for beneficial use* holding the ranking of 31%, the highest ranking of all the group's perceptions. Strengths held the fourth ranked overall priority at 24%. Strength (S2) *Ability for Licensed Site Remediation Professionals to network ideas through organizations such as the Licensed Site Remediation Professional Association* accounted for 25% of the group's strength perceptions, as shown in in Figure 3-5.

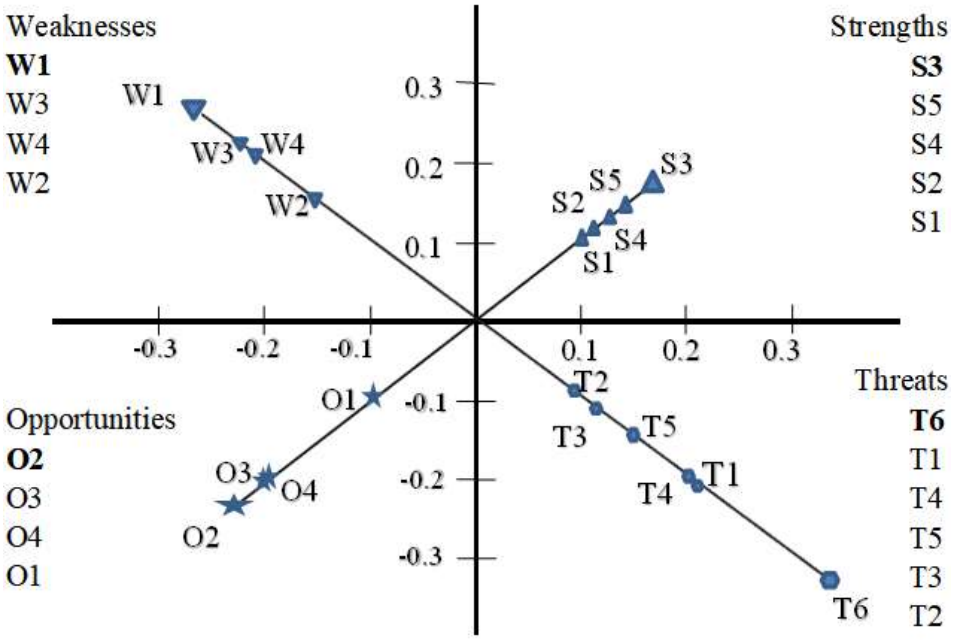

Figure 3-5: Perceptions map of the Licensed Site Remediation Professionals

3.4.5 Overall Priority Perception Distributions

On an average, the overall perception for all stakeholder groups was determined by strengths (18%) and opportunities (20%) followed by weaknesses (25%) and threats (37%). In terms of strengths, Governmental-Legal Entities and Business and Trade Organizations stakeholder groups determined that (S1) *Licensed Site Remediation Professional's ability to use*

"Professional Judgment" was the most prevalent. Non-Governmental Organizations favored (S2) *Requiring the Licensed Site Remediation Professional to comply with a strict "Code of Conduct",* and Licensed Site Remediation Professionals favored (S3) *Ability for Licensed Site Remediation Professionals to network ideas through organizations such as the Licensed Site Remediation Professional Association,* as shown in Figures 3-6. In terms of weaknesses as shown in Figures 3-7, Governmental-Legal Entities and the Licensed Site Remediation Professionals were most concerned about (W1) *The amount of Internal New Jersey Department of Environmental Protection's resources to handle workloads*. Business and Trade Organizations saw (W4) *Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money* as the greatest weakness of all the groups, and Non-Governmental Organizations were most concerned with (W3) *Conflicts between multiple Licensed Site Remediation Professionals in rendering mutual agreeable judgments.* In figure 3-8, the highest-ranking opportunities are identified. Governmental-Legal Entities, Business and Trade Organizations, and Non-Governmental Organizations were most optimistic about (O1) *The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities.* This particular opportunity factor was not a shared value for the Licensed Site Remediation Professionals as they perceived that factor as the least impactful, they identified (O2) *The ability to reuse remediated materials for beneficial use* the most prevalent. Finally, in Figure 3-9, the threats were identified. In this case, Business and Trade Organizations and the Licensed Site Remediation Professionals identified (T6) *Ability to improve the analytical detection limits used to quantify target compounds* as the most significant. Governmental-Legal Entities and Non-Governmental Organizations determined that (T2) *Ability for the New Jersey*

Department of Environmental Protection to overturn a rendered Licensed Site Remediation Professional judgment, due to political pressures and (T1) *Misperception of the general public of a Licensed Site Remediation Professional exercising "Professional Judgment" leading to a site being "Protective of human health and safety and of the environment"* were the greatest concerns, respectfully.

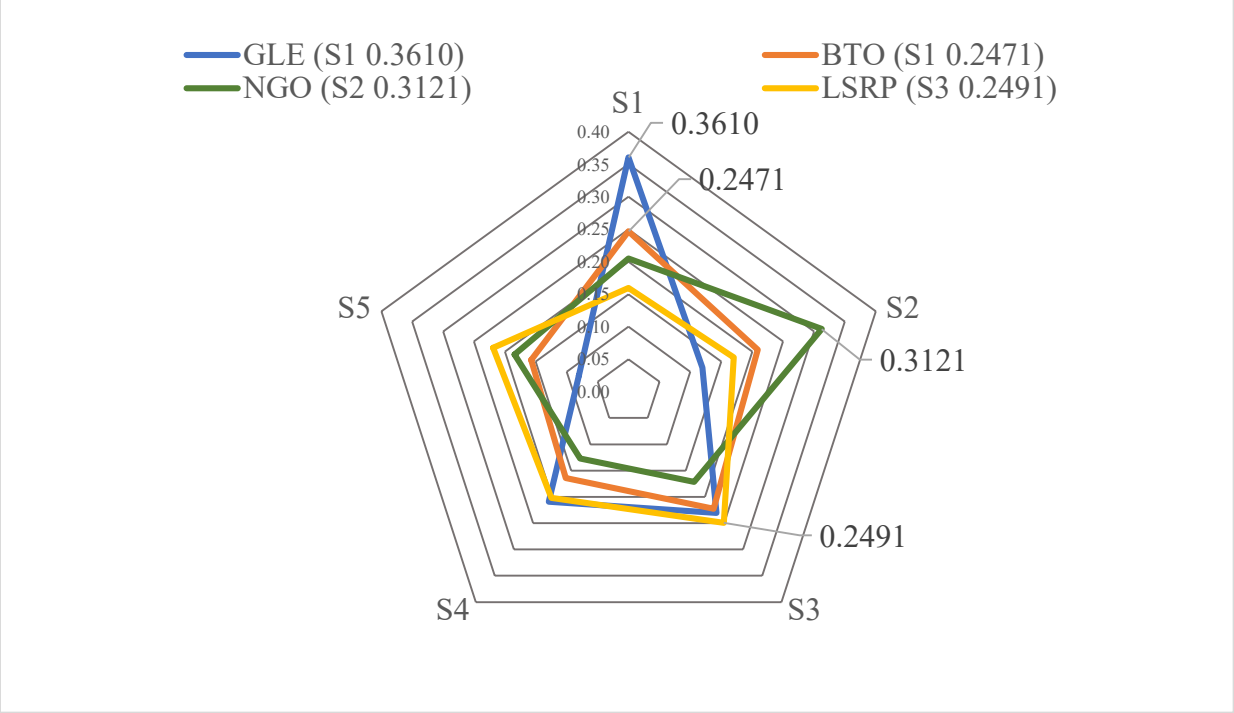

Figure 3-6: Distributions of overall factor priorities for each stockholder group of the Strengths category

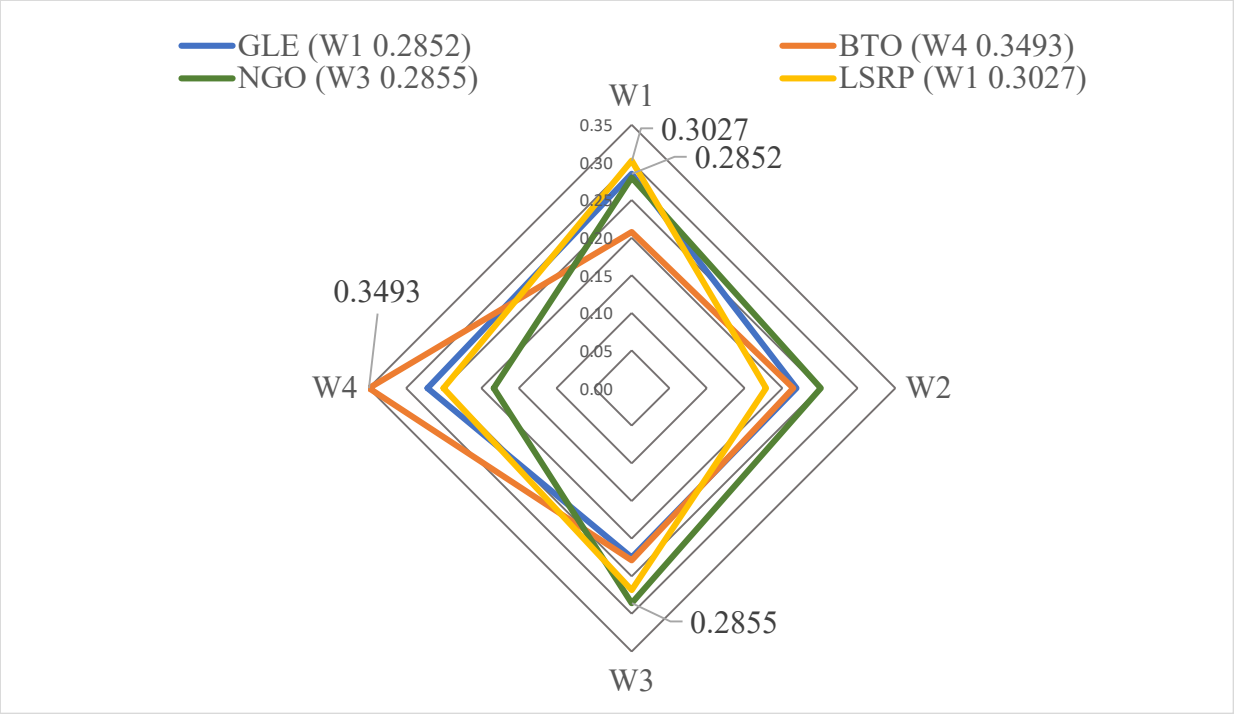

Figure 3-7: Distributions of overall factor priorities for each stockholder group of the Weakness category

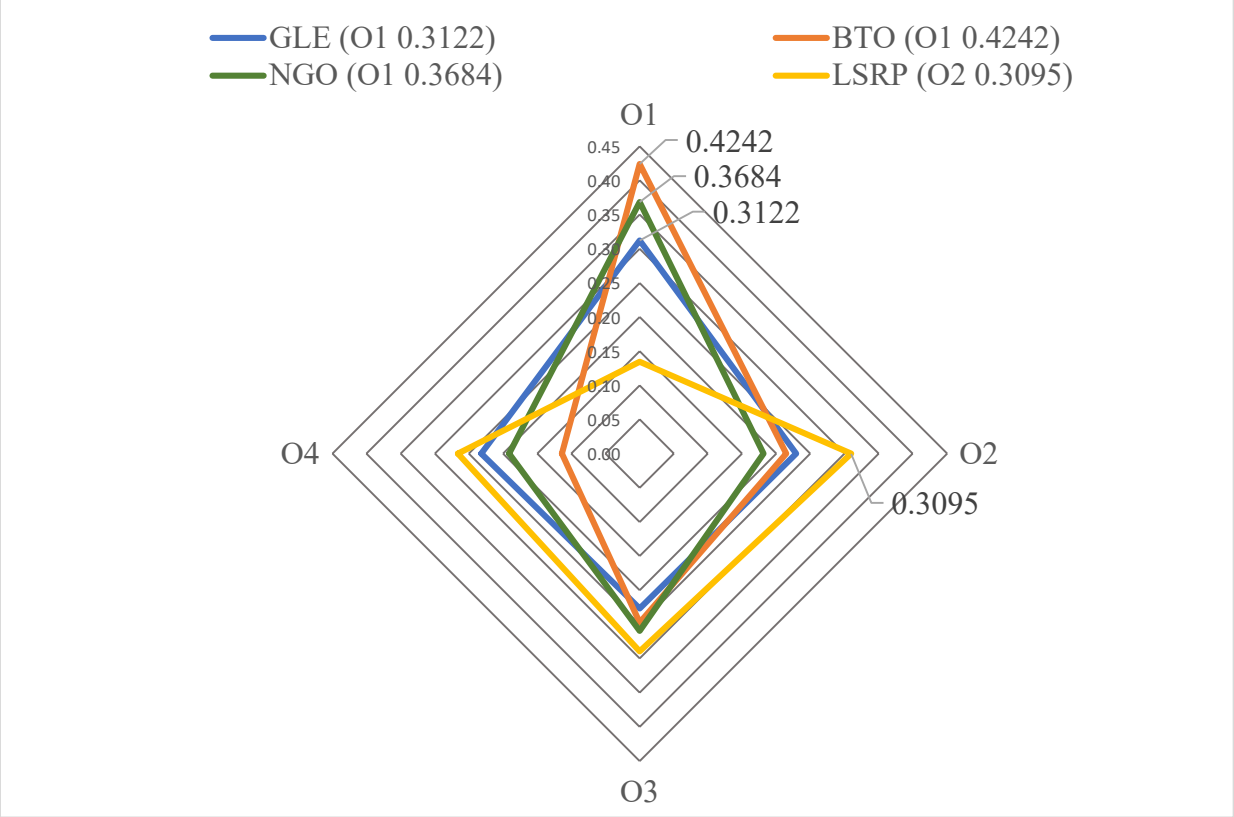

Figure 3-8: Distributions of overall factor priorities for each stockholder group of the Opportunity category

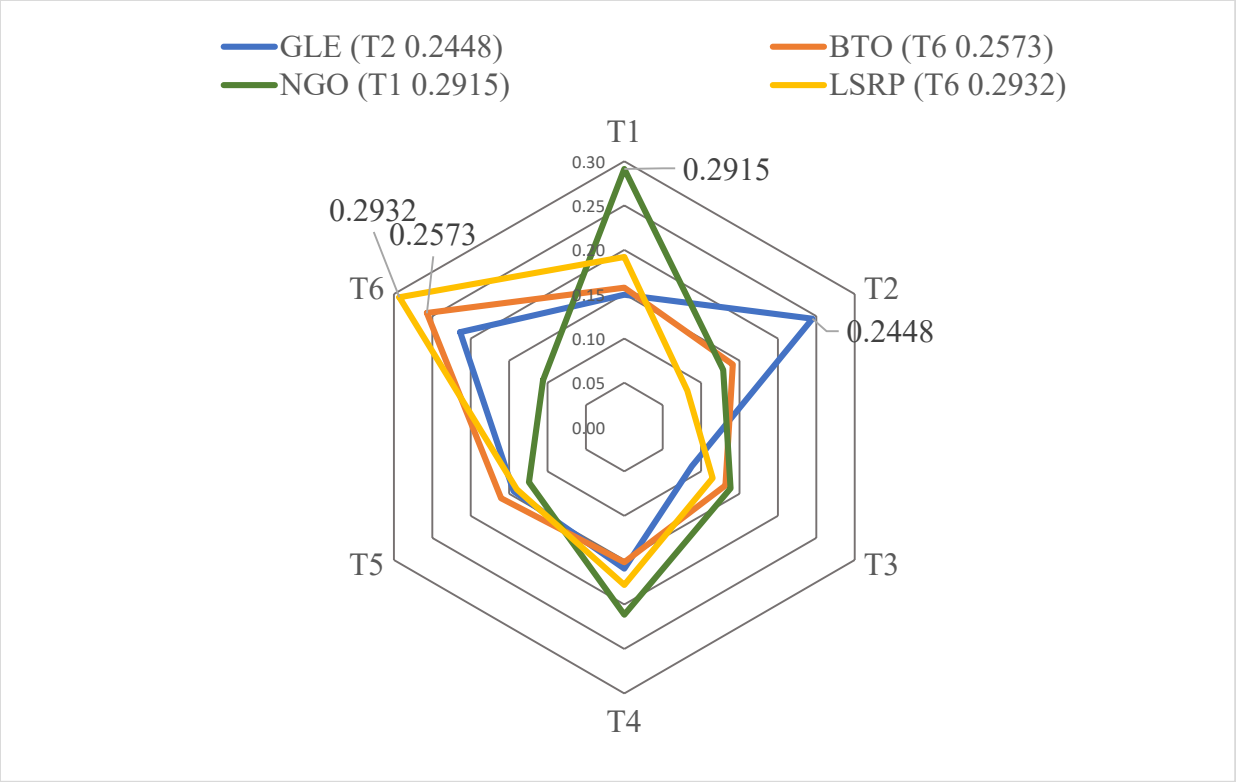

Figure 3-9: Distributions of overall factor priorities for each stockholder group of the Threats category

3.5 Conclusions

In this assessment, a combined SWOT-AHP was used to determine the perceptions of four key stakeholder groups pertaining to New Jersey's LSRP Program. The analysis indicated that there are many shared perceptions between the groups. First, a key significant opportunity factor was (O1) *The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities;* this may indicate that the program has an open line of communication for these entities to input new ideas, new experiences, new perspectives to continuously improve the program. Second, a key agreed strength factor was (S1) *Licensed Site Remediation Professional's ability to use "Professional Judgment",* which may specify the program highlight is that it allows the LSRP to apply their traits, such as specialized knowledge, skill, education, training, and experience, to issues of the

contaminated property in order to make knowledgeable remediation decisions that are within all the rules and regulations set forth by the NJDEP and SRPLB to make remediation decisions that comply with all applicable statutes, regulations, and requirements of the NJDEP and the SRPLB." (SRPLB 2017). Third, a key agreement threat factor within two groups was (T6) *Ability to improve the analytical detection limits used to quantify target compounds*. In the advances of an instrument's method detection limit capabilities, compounds may no longer be colluded or masked by interferences as may have been previously. This change could allow the analyst to quantify target compounds more accurately and potentially at lower concentrations, thus illuminating issues of contaminants impacting human health where no such knowledge previously existed. This action could force a site to require additional remediation at a later date even though it was thought to be adequately remediated previously. In fact, this is now a present issue due to "emerging contaminants" being regulated in parts per trillion ranges, three orders of magnitude lower than previous remedial levels. However, the threat that received the highest overall priority at 56% was (T1) *Misperception of the general public of a Licensed Site Remediation Professional exercising "Professional Judgment" leading to a site being "Protective of human health and safety and of the environment".* A value of the program requires that the general public is comfortable with the premise that the LSPR is working on their behalf, and that they are aware that changes to the remediation program would allow the contaminates to stay onsite, as long as the site is protective of public health, safety, and the environment. As more sites are remediated, particularly in urban areas, there is an increased reliance on institutional or engineering controls. However, previous stringent practices may have been required in being stricter as to where and how contamination could remain. Fourth, an agreed upon weakness factor was (W1) *The amount of Internal New Jersey Department of*

Environmental Protection's resources to handle workloads. This is highly significant it has been noted that the main contributing cause for the need for privatization was the lack of NJDEP resources.

4. **Determining Conformance with Professional Judgment and a Code of Conduct.**

4.1 Introduction

Under the premise that the licensed professionals take on the role of Remediation Case Managers, it is imperative that the professionals be considered the leaders of all remediation activities. It is expected that the professionals maintain ethical standards (dimensions) as a leader. The general dimensions of a leader include being fair and transparent by engaging in open communications, being concerned for the well-being of others, being able to clearly express the "Code of Conduct", being aware of concerns of the stakeholder and society, and committing to their word (Kalshoven et. al. 2011). In order to build these general dimensions, the LSRP are required to stay explicitly knowledgeable (Ropo & Parviainen 2001) on any changes to the program that may impact their decision-making process known as "Professional Judgment". "Professional Judgment" allows the LSRP to apply their traits, such as specialized knowledge, skill, education, training, and experience, to issues of the contaminated property in order to make knowledgeable remediation decisions that are within all the rules and regulations set forth by the NJDEP and SRPLB to make remediation decisions that comply with all applicable statutes, regulations, and the "Code of Conduct", which are the guidance for an LSRP to conduct services in an ethical manner.

To identify how a LSRP adapts to significations changes in the law, a modified Environmental Management System (EMS) audit program was used to identify specific changes. Under the premise that the updating of laws is part of a continuous improvement process, it mimics a Plan-Do-Check-Act (PDCA) cycle, wherein "Plan" is the formulation of a mission, "Do" is communicating the strategy, "Check" is controlling the implementation, and "Act" is the

adopting to the controls (Pietrzak & Paliszkiewicz 2015). The PDCA cycle is at the heart of the ISO-14001, continuous improvement process (Brouwer & van Koppen 2008).

In 2019, signification changes were introduced into the SRRA, commonly known as SRRA 2.0 (P.L. 2019, c.263). The changes were high level, and would potentially influence all practicing LSRPs. A questionnaire focused on the key changes within the SRRA was administered online to a group of twenty percent randomly selected LSRPs (Pinero n.d.). It is imperative that the LSRPs are knowledgeable on the changes, since once the law has been signed, it takes effect immediately. The questionnaire was used to score the LSRPs based on their knowledge of changes to the SRRA. The results of the questionnaire were to determine how quickly an LSRP can adopt to changes to the law, and whether being in an association such as the Licensed Site Remediation Professional Association (LSRPA) had impact as an educational resource.

4.2 Literature Gaps / Research Objectives

As indicated in Chapter 1, there were no studies conducted that used both qualitative and quantitative data in identifying the capabilities and limitations of privatizing state environmental remediation programs. The following studies were used to create the framework for this portion of the study.

An Environmental Management System such as ISO-14001 is an all-inclusive method for a company to validate its efforts to achieve excellence in the field of environmental compliance, and moving away from the dreaded “command and control” regulations (Begley 1996). On one hand, environmental groups are concerned that this approach can lead detrimental effects due to companies exploiting countries with less rigorous standards, nonetheless some researchers have

found that ISO-14001 is a great vehicle to propagate environmental compliance without the need for regulatory oversight (Prakash & Potoski 2006). Researchers have identified that the key to a program's success is a good auditing system is fundamentally an evaluation of audit evidence as compared to the audit criteria (Pinero n.d.), and so an audit questionnaire was developed on the criteria on the minimally revamped SRRA. The Delphi technique is a tool that can assist practitioners in identify and comprehending challenging issues in order to better evaluate structures in an ever-changing environment. (Adler & Ziglio 1996). Researchers have used this technique to identify changes over time in phases, specifically targeting knowledge, skills, and professional behaviors (Swank & Houseknecht 2019). In which case, the researcher was not concerned with a small the small amounts of respondents, for a large number of respondents is not required when using the Delphi technique (Swank 2019).

4.3 Study Area, Questionnaire Design and Administration

4.3.1 Study Area

The target participants were limited to three groups of twenty percent randomly selected active New Jersey's LSRPs.

4.3.2 Questionnaire Design and Administration

The questionnaires were designed to identify the participants' potential educational resources and their understanding of the amendment changes in the SRRA 2.0. The participating LSRPs were asked to identify if they were a member of any association such as the Licensed Site Remediation Professional Association (LSRPA) and if given statements reflected the actual changes in the SRRA. The participant was asked to use any and all available resources that the

participant needed to feel comfortable in determining their response. The resources may include but not limited to relying "upon the technical assistance of another professional whom the LSRP has reasonably determined to be qualified by education, training, and experience" (NJ Rev Stat § 58:10C-16 (2018). The questionnaires were administered three times to separate respondent groups in order to determine if there were notable changes over time. The first round occurred after the legislature passed the proposed changes, and the second occurred after the proposed changes were signed into law, and the third occurred two months after the signing. The statements that the participants responded to are listed in SRRA 2.0 Questionnaire, as shown in Table 4-1.

Table 4-1: SRRA 2.0 Questionnaire

As an LSRP, are you a member of any association such as the Licensed Site Remediation Professional Association (LSRPA)?
Statement #1
Under no circumstances can a non-LSRP person conduct sampling or investigation to confirm or evaluate a remediation performed or supervised by a retained LSRP.
Statement #2
A person responsible for conduction a remediation is required to respond to any inquiries from the public regarding the status of the remediation that the person receives or that the DEP receives and forwards to that person, that person response must include information or documents that are responsive to the public inquiry and is required to submit a written summery status report for the remediation in a form and manner as determined by the DEP.
Statement #3
If an immediate environmental concern (IEC) had migrated and identify in a structure that is unoccupied, then as long as the structure is (1) not occupied, (2) will not be occupied, and (3) will be demolished, then no further remediation relative to that IEC affecting the unoccupied structure would be required. As long as, the person responsible for conducing the remediation provides a written certification of the stated 3 conditions to the DEP.

Statement #4
If an LSRP identifies a condition that, in the LSRP's independent professional judgment, is an immediate environmental concern, then the LSRP must, among other things, immediately verbally advise the person responsible for conducting the remediation of that person's duty to notify the DEP.
Statement #5
If a retained LSRP performing remediation at a site or any portion of the site obtains specific knowledge that a discharge has occurred at any location on the site, that LSRP is required notify the person conducting the remediation and the DEP.
Statement #6
A person cannot become an LSRP if they have been involved in crimes and offenses involving moral turpitude.
Statement #7
A non-LSRP person can perform a remediation as long as the remediation is managed, supervised, or periodically reviewed and evaluated by an LSRP.
Statement #8
The DEP would not undertake direct oversight of a contaminated site if the person responsible for conducting the remediation was unable to meet the applicable timeframe, because the person was unable to enter the contaminated site, because the person does not own the property, and the person took all appropriate and timely action to gain access to the site.
Statement #9
An applicant seeking to become an LSRP, requires to have work at least three years of full-time professional experience in the state within the five years immediately prior to the applicant's submission.
Statement #10
The DEP is able to modify the requirements of direct oversight if there is a public emergency that results in the delay in meeting the mandatory or expedited site-specific timeframe or other conditions that triggered direct oversight.

4.4 Results and Discussion

The first questionnaires generated 12 participants with 3 non-LSRPA members; the second generated 22 participants, with no non-LSRPA members; and the third generated 11 participants with 2 non-LSRPA members. On an average, the overall scoring for the first LSRP participating group was 72%, with the LSRPA grouping scoring 73% and the non-LSPRA group scoring 70%. The second LSRP participating group scoring was 68%, which also represented the LSRPA grouping, since none of the non-LSRPA groups responded. The third LSRP participating group was 78%, with the LSRPA grouping scoring 76% and the non-LSPRA group scoring slightly higher at 85%.

It is not until the actual individual question responses are analyzed, that a root-cause behind the scoring can be determined.

For the first group, questions #1, #5, #6, #7, #8, #9, and #10 generally received correct responses, ranging from 90% to 92%, as shown in Figure 4-1. Questions #2, #3, and #4, in contrast, revealed more confusion from respondents.

In Question 2, the correct response was “no”, since the modification in the SRRA specifies that “A person responsible for conducting a remediation shall respond to any written or email inquiries from the public regarding the status of the remediation that the person receives, or that the department receives and forwards to the person responsible for conducting the remediation, by providing either: (1) specific information or documents that are responsive to the public inquiry; or (2) a written summary status report for the remediation, which shall be made in a form and manner as prescribed by the department pursuant to rules and regulations.” (P.L. 2019, c.263.) This specifies that the respondent needs to supply either specific information or documents, or written summary status report. The question written in such a way that asks if the

respondent is required to do both, and thus the participants' response would be that this does not reflect the changes to the SRRA. However, if the LSRP was to go beyond compliance, then the participant could respond "yes" (Orsato 2009).

In Question 3, the participants' responses fluctuated. In the 2019 version of the SRRA, there are many minor modifications throughout the law. However, there are a few new sections, of which this is one. This question focuses on contaminations that are within unoccupied structures, and the actions that the LSRP must take if the structure will be taken, the question reflects the actual changes. Nonetheless, the conditions of the type of occurrence are atypical.

In Question 4, the statement refers to proper notifications and how they are to be communicated when the LSRP needs to inform the person responsible for conducting the remediation when an immediate environmental concern (IEC) has been identified. The change on the law now requires all notifications of this type be in writing.

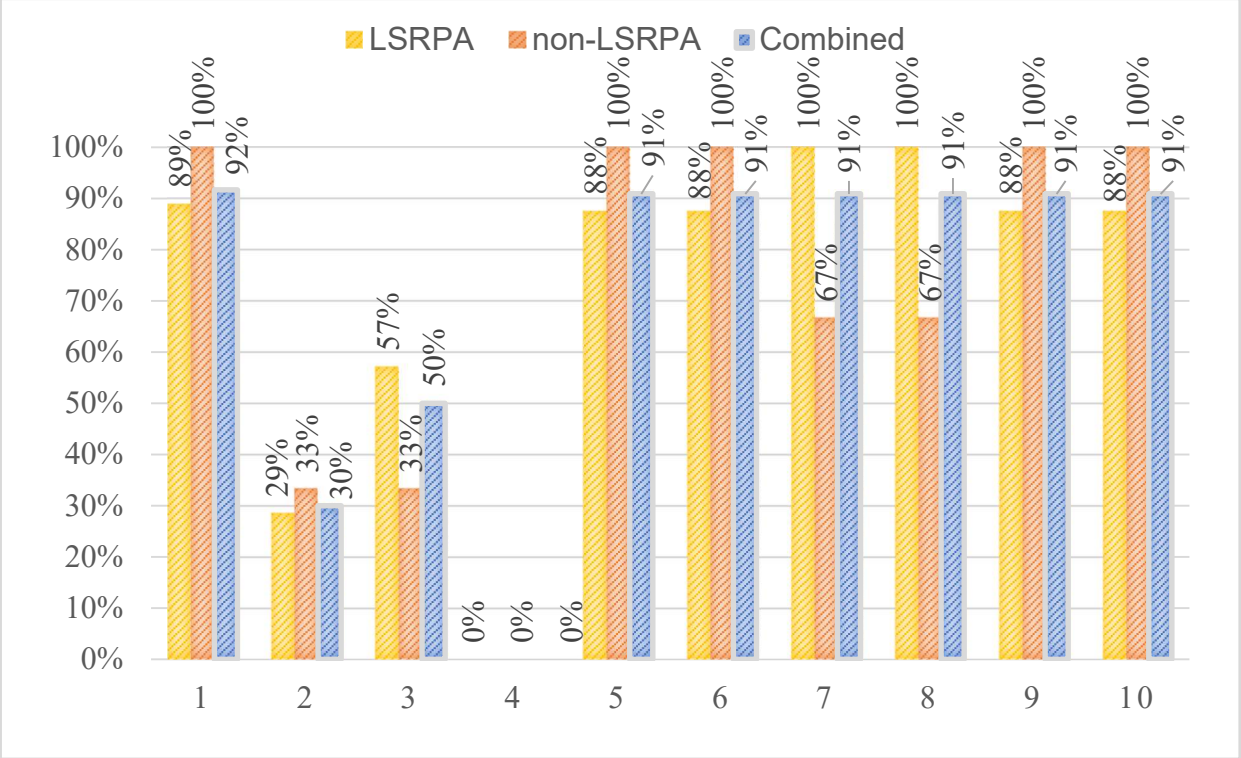

Figure 4-1: First SRRA 2.0 Questionnaire Results

For the second group of participants, the overall scoring did not show much change as shown in Figure 4-2. However, for questions #2, #3, and #4, the percent scoring increased by a numerical value of #12, #11, and #5, respectively.

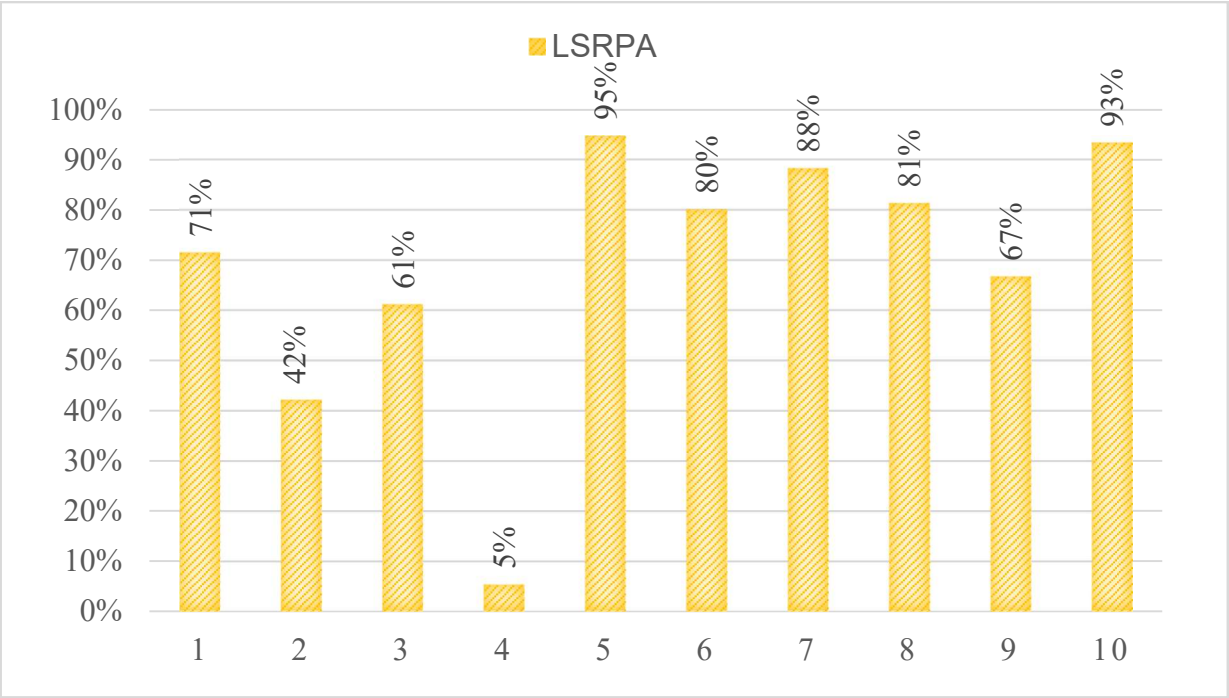

Figure 4-2: Second SRRA 2.0 Questionnaire Results

The most overall increase occurred in the third group of participants, the overall scoring did show much change as shown in Figure 4-3. The respondents from both LSRPA and non-LSRPA scored 100% on questions #3, #5, #7, #8, #9, and #10, and question #4 increased by a numerical value of 13, as compared to the first testing round.

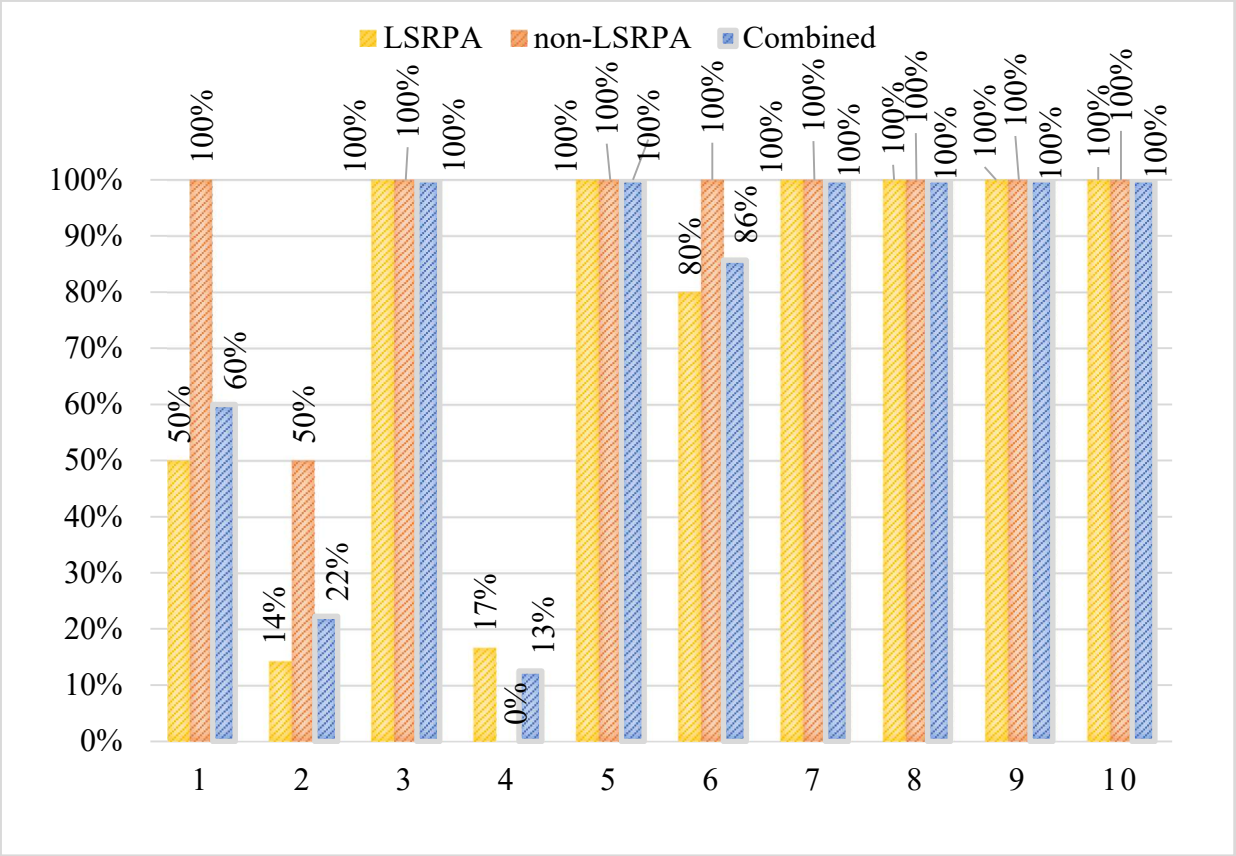

Figure 4-3: Third SRRA 2.0 Questionnaire Results

4.5 Conclusion

The results of the survey have determined that the LSRP's are committed to upholding the LSRPs "Professional Judgment" and "Code of Conduct". The study has also shown that there have been improvements to the understanding of changes to the SRRA over a short period of time. The study also implies that the attitude of going above the regulations is in use. If this action was applied to Question #2, then the scoring would have increased to 79%, 80%, and 77% for the first-round total participating LSRPs, LSRPA, non-LSRPA, respectfully, and 74% for the second-round results, and 86%, 85%, and 90% for the third-round total participating LSRPs, LSRPA, non-LSRPA, respectfully.

5. Conclusion, limitations, and future work

5.1 Conclusion

Privatization of environmental remediation programs is a long process that requires an intensive commitment in order to properly protect public health, safety, and the environment from known contaminants. This process should not be taken lightly. In the cases of Massachusetts and New Jersey remediation programs, both were broken. Massachusetts and New Jersey staffing and regulations were creating a bottleneck of contaminated sites and in turn preventing timely remediations of properties.

In New Jersey, there were more than 20,000 active sites within the Site Remediation Program. As of August 31. 2019, there are less than 13,500 active sites in the SRP. Privatization in New Jersey has shown a significant decrease the number of sites within SRP by improving the rates of closures on simple and complex sites. Overall, the privatization has demonstrated a large effect on environmental remediations. However, not all areas have felt the same impact of the program, and there is still work to be done. Unfortunately, there may be little additional impact regarding environmental issues in view of other economic and social factors as to which sites get remediated and by whom. In regards to large metropolitan cities, Jersey City, Newark, and Paterson still have 509, 624, and 193 active sites with confirmed contamination, respectively. In regards to Well Head Protection Areas (Community) areas, Orange-East Orange, Paterson-Hawthorne, and Montclair-Glen Ridge have 18, 16, and 12 active sites with confirmed contamination. In regards to Vernal pool habitat areas, areas ID 2929, ID 2988, and the combined ID 2994 and 2994 have a total of 19 active sites over a combined area of 11,332 acres. Since 2013, Jersey City and Newark, and all the three Well Head Protection Areas have shown increase in the amounts of NFA or Cases Closed, while Paterson overall and the Vernal pool

habitat areas have not seen these increase. Contributing factors causing the differences may be to access to water bodies, or perhaps due to factors like the number and acreage of brownfields redevelopment areas, none-natural recreation areas such as sports complexes, or even perhaps to access to greenways, of which the latter three have may be in the need for study.

The results of the Strength Weakness Opportunities Threats - Analytical Hierarchy Process assessment of the New Jersey's LSRP Program provided valuable insight from the perceptions of the four stakeholder groups, (Government/Legal Entities, Business and Industry Groups Non-Governmental Organizations, and the LSRPs). There were many perception similarities amongst the stakeholder groups. The GLE perceptions were 61% in favor of the program, followed by BTO at 43%, LSRP at 40%, and NGO at 26%. Key strengths and opportunities focused on communications. The "Code of Conduct'" allows the LSRP to use of "Professional Judgement". The judgment allows the LSRP to apply their skills, specialized knowledge, education, training, and experience. The knowledge can be adopted from networking ideas from the LSRPA, as well as other entities such as NGOs. BTO, and local communities. While, the NGOs greatest perceived concern of the program was the misperception of the general public of a site being protective of public health, safety, and the environment. Communication might be key facture to the success of the program, but additional outreach might be required.

The results of the SRRA 2.0 Questionnaire gave valuable insight into the adaptations of the LSRP to high-level changes within the program. The high scoring demonstrated the LSRP are leaders and are committed to adhering to the LSRP's strict "Code of Conduct", and exercising "Professional Judgment". The scoring ranged 75% to 80%, which is good, but compliance always requires 100%.

In the beginning of the study, four types of privatizations were identified. Out of all the types, the LSRP program most closely fits with the Divestiture / assist transfer. Each one of the types had an end date attached, the LSRP currently does not and the control is through a public-private partnership, such as the New Jersey Site Remediation Professional Licensing Board. If all goes well and the program is viable, it can go over indefinitely similar to the Massachusetts LSP Program. However, the main impetus for the SRRA was to prevent mishaps such as the one that occurred at Kiddie Kollege. The changes that the SRRA made the rates of case in need of environmental remediations is outstanding. The SRRA created an iterative system that incorporates a continuous improvement process, such as requiring LSRPs to earn 36 continuous education credits to maintain a three-year license, and allows the use of audits and complaints to detect potential issues of inappropriate performance of LSRPs. The findings from the LSRP's failings uncovered in the audits and complaints can be used to create notices to communicate issues in order to notify the public of the policing of the LSRPs and to allow other LSRPs to be aware of actions which are not acceptable, and used as references when updating regulations. A question that may arise is, would the SRRA actually prevent such a catastrophic failure that led to Kiddie Kollege? The program that SRRA created has shown that it can identify areas of improvement, correct those areas and adopt to change. Unfortunately, there is always a chance for a failure to occur, but as long as the program has built in safeguards that continually monitor the performance of LSRPs and can adopt to changes, it will minimize the likelihood and severity of a failure occurrence.

In essence, privatization is an approach that is used to in theory to reduce the cost of running public services and goods. However, there are many externalities of the privatizations that are not taken into consideration. These include but no limited to the additional cost of

maintaining the license in regards to the LSRP, or the time that the members of the licensure board need to volunteer in order to maintain the success of the program.

5.2 Limitations and Future Work

All three studies had some problematic issues that could have affected the data. In the first study, the coded portion, the respondents were limited to the individuals that attended and perhaps participated in the stakeholder session for the program development in New Jersey, and the individuals involved in the determination for a program change in Massachusetts. However, if key players that are crucial role in change where not able to attend or participate, then they were not included in the sample population. In the non-coded portion, the secondary data relied on the information that was obtained from NJDEP's DataMiner. The information for identifying NFA and Closed cases were readily available, but this was not the same for cases involving LSRPs. Each LSRP case in DataMiner would have needed to evaluate individually, which include navigating several levels of links to in order to develop a reasonable database. Since, there are currently 10,552 active LSRP case and 9,561 LSRP cases closed, this would be a tremendous undertaking. This issue is not only problematic, but can appear as a transparency issue.

The second and third study required the use of SurveyMonkey® a web-based survey system. In order for the respondents to access the survey, they were required to receive an email which included instructions on how to access the survey system. A respondent's individual or companies email spam filter can potentially move the email to a spam folder or even delete the email without the respondent knowing. This could have potentially lowered the response rates in both studies.

All three studies provide evidence that there are still research gaps that need to be filled. The first study focused on large-scale environmental remediation program privatizations. These types of privatizations are a massive undertaking, and are costly to implement and maintain. The privatization process is not stagnant. Once a large-scale program is put in place, a continuous improvement process needs to be maintained. This opens up to dilemma, is the program sustainable, and do the externalities maintain over the course of the program or do they fluctuate?

In the second study, during the survey process, the New Jersey Legislature was conducting changes to the SRRA, known as SRRA 2.0. The process involved extensive stakeholder sessions and included a myriad of inputs from all four stakeholder groups. As of August 23, 2019, these changes were signed into law by Governor Murphy (P.L. 2019, c.263). An additional SWOT-AHP analysis would be essential to determine what type on impacts that the changes to the SRRA have to the stakeholder perceptions. In addition, since only the perceptions of each stakeholder grouping were identified, an additional neutrosophic AHP-SWOT analysis could be conducted to asset in developing potential strategies to improve the outcomes or minimize any negative impacts,

The final study focused on the time it took for LSRPs to be educated on the changes that occurred within the Site Remediation Reform Act. The questionnaires were sent out to two groups of participants, the first a month after the legislature pass the amendments, and the second after the amendments were codified. The LSRPs showed to the best of their knowledge and practices have proven their commitment to the LSRP's strict "Code of Conduct". Both rounds of questionnaires were administered prior to any formal, and informal training. The questionnaire as

it stands, would need to be re-administered to determine if a minimization of educational gaps have occurred and to what extent after formal trainings have been conducted.

Both Massachusetts and New Jersey have extensive privatizations of their Site Remediation Programs, which is due to the population density, past and present industrial activities, and needs for environmental remediations. Several other states have implemented similar smaller programs in their management of site remediations. A comparable study could be adapted to identify if their determination for environmental remediations is adequate for their state's needs. Such as Connecticut's' LEP program, perhaps not all three drivers were engaged or a determination was made These proposed future works would help assist policymakers, practitioners, researchers, and businesses alike in determining the practicality of smaller state-run remedial privatization.

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Appendix I - Telephone Script for Key Influential Individuals

Telephone Script for Key Influential Individuals

Hello Dr. /Mr. /Mrs. _____(fill in name) my name is Robert Oleksy, and I am a PhD student at Montclair State University working on my dissertation in Environmental Management. My dissertation called "Perceptions of Privatizing State Remediation Programs" is focused on identifying the drivers and barriers of privatizing a state-run remediation system. The findings of this study will be able to act as an assessment tool for states which may be struggling with the amounts of open sites requiring remediations and the efficiency of remediating these contaminated sites. Finally, this study may help gauge the benefits and pitfalls of conducting a large-scale privatization of state-run remediation programs. Through a series of questions, this survey is designed to assess your opinions of the privatizing a state-run remediation system process and identify potential improvements through your personal input. These questions may include ranking questions, open-ended questions, and agree/disagree type questions. This survey will take about 15 to 30 minutes. If you are interested, do you have available time now for you to participate in this survey? (Yes _____/ No _____) If not, what date (_____) and time (_____) would work best for you?

I have some additional information about the survey process itself. I am about to start audio-recording the consent process, do I have your permission to begin audio recording (Yes _____/ No _____). Also, any tapings of this conversation will be destroyed after the study has been accomplished. You should experience no greater risk than everyday life in participating in this survey. However, if at any time you feel uncomfortable answering a question, please let me know and we will skip to the next question, and you may withdraw from the study at any time, if desired. Though we are taking precautions to protect your privacy, you should be aware that

information sent through email could be read by a third party. Although we will keep your identity confidential as it relates to this study, if we learn of any suspected child abuse we are required by state law to report that to the proper authorities immediately. Unfortunately, there are no direct benefits to you being in this study. However, others may benefit from this study because the results can assist other states in developing potential strategies for either implementing a privatized program or modifying an existing remediation program. Your personal information will not be linked to any presentations or reports. We will keep your identity confidential. As a reminder, you do not have to be in this study. You are a volunteer! It is okay if you want to stop at any time and not be in the study. You do not have to answer any questions you do not want to answer. Nothing will happen to you.

If you have any question pertaining to the study please phone or email the Principal Investigator, Robert Oleksy at 46 Woodland Road, Franklin, New Jersey 07416, phone (862) 754-3425 or email at oleksyr1@montclair.edu; or the Faculty Sponsor, Dr, Pankaj Lal at Montclair State University, 1 Normal Ave., Montclair, New Jersey 07043, phone 973-655-3137 or email at lalp@montclair.edu. If you have any question pertaining to your rights as a research participant please phone or email the Montclair State University, IRB Chair, Dr. Dana Levitt, at 973-655-2097 or reviewboard@mail.montclair.edu.

There are still a few more questions before continuing to the actual survey question. Will it be acceptable to use the data in other studies? (Yes _____/ No _____). As part of this survey, is it acceptable with you to audiotape the pertinent information from the study conversations for transcription purposes? Remember as previously mentioned, all tapings of this conversation will be destroyed after the study has been accomplished (Yes _____/ No _____). As part of this survey a copy of this verbal consent form will be sent to you, may I have your email address?

( ) Finally, having listened to this script; I would like to verify that you have decided to participate in the project described. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to your satisfaction, and that you understand that you can withdraw at any time. Your verbal agreement also indicates that you are 18 years of age or older and will receive a copy of this consent form. Please state yes (_____) to continue to the survey questions, or no (_____)

Appendix II - In-state Questionnaire

The following questions are segregated into three categories; aspects that influenced the decision-making process for the privatization of the remedial program; the implementation of the privatization program; and the outcomes of the privatization program. The questions are divided into four parts; the first part are in forms of scaling questions focusing on your opinion on the drivers for the privatization; the second part are also in forms of scaling questions focusing on your opinion on the implementation and outcomes of the privatization; the third will determine your justification for your scaling answer in open-ended questions, and the fourth will focus on a short set of statements which you will be able to ether agree or disagree with the statement. If at any point the question does not relate to you, please state non-applicable.

In this portion, the questions are ranked in terms of not influenced (1), minimally influenced (2), somewhat influenced (3), mostly influenced (4), or completely influenced (5) the development of the privatized remediation program. If at any point you would like me to repeat the question, please feel to ask me to do so.

- In regards to the States' pervious experiences with privatization in other sectors of government prior to the remedial privatization? (1, 2, 3, 4, 5)
- In regards to the pressures from Non-Governmental Organizations? (1, 2, 3, 4, 5)
- In regards to the pressures from Business and Industry Groups? (1, 2, 3, 4, 5)
- In regards to the pressures from local communities? (1, 2, 3, 4, 5)
- In regards to the pressures from the Departments' Administration? (1, 2, 3, 4, 5)

The next portion of the perception questions is focused on your aspect of the process and development of the state-run remediation system. If at any point you would like me to repeat the question, please feel to ask me to do so. Also, if at any point the question does not relate to you,

please state non-applicable. In this portion, the questions are ranked in terms of your satisfaction with the development of the privatization process; please rate the following in terms of not satisfied (1), minimally satisfied (2), somewhat satisfied (3), mostly satisfied (4), or completely satisfied (5). If at any point you would like me to repeat the question, please feel to ask me and I will do so.

- In regards to the department's administrative support available for the implementation? (1, 2, 3, 4, 5)
- In regards to the development of the Licensing Board? (1, 2, 3, 4, 5)
- In regards to development of the Licensure Process? (1, 2, 3, 4, 5)
- In regards to the remedial privatization addressing all the desired expectations? (1, 2, 3, 4, 5)
- In regards to the implementation of the remedial privatization? (1, 2, 3, 4, 5)
- In regards to the duration for the remedial privatization implementation? (1, 2, 3, 4, 5)

The next set of questions is open-ended to gather your knowledge and experiences to identify potential improvements in the implementation of remedial privatization. If at any point you would like me to repeat the question, please feel to ask me to do so. Also, if at any point the question does not relate to you, please state non-applicable. If at any point you would like me to repeat the question, please feel to ask me to do so.

- In regards to the implementation, how did the experiences with the states' pervious experiences with privatization affect the outcome?
- In regards to the implementation, how were the Non-Governmental Organizations concerns addressed?

- In regards to the implementation, how were the Business and Industry Groups' concerns addressed?
- In regards to the implementation, how were the local communities' concerns addressed?
- In regards to the implementation, how were the concerns from Departments' Administrative addressed?
- In regards to the availability of the Departments' Administrative support, was it adequate for the implementation and what areas could be had been improved?
- In regards to the development of the Licensing Board, were there areas which could have be improved and how?
- In regards to development of the Licensure Process, were there alternatives available?
- In regards to the duration for implementation, what were the key factors that kept the implantation on time?
- In regards to the remedial privatization addressing all the desired expectations, were there areas could be improved and how?

The final set of questions is for developing a strengths, weaknesses, opportunities and threats analysis of the New Jersey privatized remediation program. Your answers will be used to develop a combined SWOT-AHP (Strengths, Weaknesses, Opportunities and Threats – Analytical Hierarchical Process) questionnaire, which will be used for strategic planning. Please rate the following in terms of agree or disagree. If at any point you would like me to repeat the question, please feel to ask me to do so.

Please indicate whether you agree (1) or disagree (2) with the following statement in terms of a strength of the program.

- The LSRPs ability to use "Professional Judgment" (1, 2)

- Requiring the LSRP to comply with a strict "Code of Conduct" (1, 2)
- Requiring the Local Municipalities to handle a sites violation tickets (1, 2)
- Ability for NJDEP to use Direct Oversight on higher risk sites (1, 2)
- Ability for NJDEP to provide coherent guidelines for LSRPs (1, 2)
- Ability of the LSRP program to provide timelier remediations of properties (1, 2)
- Requiring education and standardized work practices for LSRPs (1, 2)
- Ability for LSRPs to network ideas through organizations such as the LSRPA (1, 2)
- Ability for NJDEP to use LSRPs for direct oversight cases (1, 2)
- Ability for the LSRPs to quickly adapt to changes in guidance (1, 2)
- Having the LSRPs "Code of Conduct" as part of a law (1, 2)
- The states previous experiences with a privatization assisted in the implementation (1, 2)

Please indicate whether you agree (1) or disagree (2) with the following statement in terms of a weakness of the program.

- Having the NJDEP Program Managers minimize their technical knowledge and expertise by turning managers into program administrators. (1, 2)
- The amount of Internal NJDEP resources to handle workloads (1, 2)
- Holding the LSRP liable for the site (1, 2)
- Conflicts between multiple LSRP in rendering mutual agreeable judgments (1, 2)
- Burden of having the LSRP serve as an expert for all issues affecting the site (1, 2)
- Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money. (1, 2)

Please indicate whether you agree (1) or disagree (2) with the following statement in terms of an opportunity of the program.

- Long term monitoring programs (1, 2)
- The ability to incorporate inputs from NGO's (1, 2)
- The ability to incorporate inputs from Business and Industry Groups' (1, 2)
- The ability to incorporate inputs from local communities (1, 2)
- The ability to reuse remediated materials for beneficial use (1, 2)
- Support of local communities for the program (1, 2)
- Escalated remediation schedules (1, 2)
- Flexibility of LSRP to adapt (1, 2)

Please indicate whether you agree (1) or disagree (2) with the following statement in terms of a threat of the program.

- Misperception of the general public of a site being, "Protective of human health and safety and of the environment" (1, 2)
- Misperception of the general public of an LSRP exercising "Professional Judgment" (1, 2)
- The potential of stricter regulations and/or guidelines during a site remediation (1, 2)
- Changes to the markets' focusing away from the redevelopment of contaminated properties (1, 2)
- Cost of securing and maintaining an LSRP (1, 2)
- Cost of maintaining a long-term monitoring program (1, 2)
- Ability for the NJDEP to overturn a rendered LSRP judgment, due to political pressures (1, 2)

- Owners unable to clean up their sites due to financial burdens beyond their ability to remediate, turning properties into orphan sites. (1, 2)
- Changes of site status, due to zoning changes (1, 2)
- Retroactive effects due to standard changes. (1, 2)
- Ability to improve the analytical detection limits used to quantify target compounds (1, 2)

That was the last question which concludes this survey. Thank you for your cooperation and time in this survey. Dr. /Mr. /Mrs. _____(fill in name), your answers are valuable in my dissertation and may eventually be used to influence policy makers' decisions when looking for alterations in their own state's remediation management system. Also, would you like to be willing participant in future surveys?

Appendix III - Out-of-State Questionnaire

The following questions are segregated into three categories; aspects that influenced the decision-making process for the privatization of the remedial program; the implementation of the privatization program; and the outcomes of the privatization program. The questions are divided into three parts; the first part are in forms of scaling questions focusing on your opinion on the drivers for the privatization; the second part are also in forms of scaling questions focusing on your opinion on the implementation and outcomes of the privatization; and the third will determine your justification for your scaling answer in open-ended questions. If at any point the question does not relate to you, please state non-applicable.

In this portion, the questions are ranked in terms of not influenced (1), minimally influenced (2), somewhat influenced (3), mostly influenced (4), or completely influenced (5) the development of the privatized remediation program. If at any point you would like me to repeat the question, please feel to ask me to do so.

- In regards to the States' pervious experiences with privatization in other sectors of government prior to the remedial privatization? (1, 2, 3, 4, 5)
- In regards to the pressures from Non-Governmental Organizations? (1, 2, 3, 4, 5)
- In regards to the pressures from Business and Industry Groups? (1, 2, 3, 4, 5)
- In regards to the pressures from local communities? (1, 2, 3, 4, 5)
- In regards to the pressures from the Departments' Administration? (1, 2, 3, 4, 5)

The next portion of the perception questions is focused on your aspect of the process and development of the state-run remediation system. If at any point you would like me to repeat the

question, please feel to ask me to do so. Also, if at any point the question does not relate to you, please state non-applicable. In this portion, the questions are ranked in terms of your satisfaction with the development of the privatization process; please rate the following in terms of not satisfied (1), minimally satisfied (2), somewhat satisfied (3), mostly satisfied (4), or completely satisfied (5). If at any point you would like me to repeat the question, please feel to ask me to do so.

- In regards to the department's administrative support available for the implementation? (1, 2, 3, 4, 5)
- In regards to the development of the Licensing Board? (1, 2, 3, 4, 5)
- In regards to development of the Licensure Process? (1, 2, 3, 4, 5)
- In regards to the remedial privatization addressing all the desired expectations? (1, 2, 3, 4, 5)
- In regards to the implementation of the remedial privatization? (1, 2, 3, 4, 5)
- In regards to the duration for the remedial privatization implementation? (1, 2, 3, 4, 5)

The final set of questions is open-ended to gather your knowledge and experience to identify potential improvements in the implementation of remedial privatization. If at any point you would like me to repeat the question, please feel to ask me to do so. Also, if at any point the question does not relate to you, please state non-applicable.

- In regards to the implementation, how did the experiences with the states' pervious experiences with privatization affect the outcome?

- In regards to the implementation, how were the Non-Governmental Organizations concerns addressed?
- In regards to the implementation, how were the Business and Industry Groups' concerns addressed?
- In regards to the implementation, how were the local communities' concerns addressed?
- In regards to the implementation, how were the concerns from Departments' Administrative addressed?
- In regards to the availability of the Departments' Administrative support, was it adequate for the implementation and what areas could be had been improved?
- In regards to the development of the Licensing Board, were there areas which could have be improved and how?
- In regards to development of the Licensure Process, were there alternatives available?
- In regards to the duration for implementation, what were the key factors that kept the implantation on time?
- In regards to the remedial privatization addressing all the desired expectations, were there areas could be improved and how?

That was the last question which concludes this survey. Thank you for your cooperation and time in this survey. Dr. /Mr. /Mrs. _____(fill in name), your answers are valuable in my dissertation and may eventually be used to influence policy makers' decisions

when looking for alterations in their own state's remediation management system. Also, would you like to be willing participant in future surveys?

Appendix IV - SWOT-AHP Primary Factors Survey Packet

Subject Line: LSRP - SWOT-AHP Survey

Greetings Participant,

I am a PhD candidate at Montclair State University in Environmental Management. As part of my work, I have created a survey focusing on personal perceptions associated with the Licensed Site Remediation Professional (LSRP) Program. This survey is designed to compare the Strengths, Weaknesses, Opportunities, and Threats (SWOT) factors of the LSRP program by using an Analytic Hierarchy Process (AHP), a technique used to delineate factors strength through your individual preferences and input. In this survey, your valuable opinion will be used to rank a variety of SWOT factors in terms of importance relative to each other.

The short-term outcomes of this survey can help create improvements to the current LSRP program. However, the long-term outcomes will contribute to a larger study aimed at developing an assessment tool for states struggling with their own site remediation programs and help them develop planning strategies in increasing their efficiency of site remediations, and also help determine needed updates to their programs. Finally, this study may help gauge the benefits and pitfalls of conducting a large-scale privatization of state-run site remediation programs; such as the LSRP program.

The survey is in the form of an online survey. Your participation is anonymous and voluntary. The survey questions have no right or wrong answer; we are interested in your opinions only. The survey should take you no more than 10 – 15 min. Your time and input to this study is valuable and may contribute to fine tuning the LSRP program. This study has been approved by Montclair State University's Institutional Review Board, study #L-001785. We thank you for your participation.

By clicking on the link below you will be able to access the survey. For best results please use either a desktop, laptop, or tablet. Smartphones are not recommended.

SWOT-AHP Survey

Best Regards,

Robert Oleksy

Dept. Earth & Environmental Studies

College of Science and Mathematics

Montclair State University

1 Normal Avenue, Montclair, NJ 07043

For more information on the students in the program, please visit the Current Student tab in the Environmental Science and Management PhD People's page:

https://www.montclair.edu/environmental-management-phd/people/

Thank you for participating in our survey. Your feedback is important. During this survey, you will be partaking in an Analytical Hierarchy Process (AHP) technique, a systematic approach in determining which factors are the most influential in a decision-making process. You may have already used this technique in the past. For instance, prior to purchasing a new vehicle, there may be several vehicle features that influenced your choice in choosing the right vehicle. These influences may have included gas mileage, horsepower, onboard navigation, cargo space, the number of passengers the vehicle can accommodate, and so on. However, which of these features were the most influential in your purchasing decision?

You most likely compared numerous features to each other to determine only several top features. For instance, if your travel included making many deliveries and were concerned on number of packages the vehicle could hold, but you were still slightly concerned with mileage due to short trips, then your response might have leaned towards the "Cargo Space" side of the spectrum and the result may have looked similar to the following.

Mileage						**Cargo Space**
Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong
0	0	0	0	0	X	0

If both factors weighed in the same, then you would choose "Equal". However, if mileage significantly outweighed capacity, then your choice would have been either "Strong" or "Very Strong" on the "Mileage" side of the spectrum. However, if nether of two factors would influence your decision at all, then you can still choose the "Equal" since nether factors would receive a point.

For this survey instead of focusing on car features, the AHP technique will be used to determine the Strengths, Weaknesses, Threats and Opportunities (SWOT) of the New Jersey Licensed Site Remediation Professional program. For best results please use either a desktop, laptop, or tablet. Smartphones are not recommended; the survey will appear confusing and distorted.

Before advancing to the survey please review the legalese below.

Dear Potential Participant,

You have been invited to participate in a study of The New Jersey's Licensed Site Remediation Professional Program entitled "Perceptions of Privatizing State Remediation Programs" is focused on identifying the Strength, Weaknesses, Opportunities, and Threats of the LSRP Program. The findings of this is part of larger study that will be able to act as an assessment tool for states which may be struggling with the amounts of open sites in need of remediation and the efficiency of those remediation, and states that may need to update their own programs. Finally, this study may help gauge the benefits and pitfalls of conducting a large-scale privatization of state-run remediation programs; such as the Licensed Site Remediation Professional (LSRP) program.

The Strength, Weaknesses, Opportunities, and Threats – Analytical Hierarchy Process is a technique that is used to identify variables of a implementing and maintaining a program. Based on your preferences, these variables will be ranked and a hierarchical structure developed to delineate the perception and strengths of stakeholder preferences which can be used for creating improvements the current program or strategic planning for states pondering on how to implement such a program. You were selected to participate in this study because of your participation as a stakeholder and understanding of the LSRP program.

If you decide to participate, please complete the following set of questions. The survey is designed to assess your personal preferences through your input. It will take about 15 to 20 minutes to complete survey. You will be asked to answer questions by choosing between two factors affecting the potential strengths, weaknesses, opportunities and threats of the LSRP program. You may not directly benefit from this research. However, we hope this research will result in assisting other states in developing potential strategies for either implementing a similar remediation program or modifying the existing LSRP program.

Any discomfort or inconvenience to you may include no greater risk than everyday life in participating in this survey. Data will be collected using the Internet. There are no guarantees on the security of data sent on the Internet. Confidentiality will be kept to the degree permitted by the technology used. We strongly advise that you do not use an employer issued electronic device, laptop, phone or WIFI to respond to this survey, as many employers monitor use of all devices.

Your decision whether or not to participate will not affect your relationships with the any associations or organizations which you may belong. If you decide to participate, you are free to stop at any time. You may skip questions you do not want to answer.

Please feel free to ask questions regarding this study. You may contact me or my Faculty Advisor Dr, Pankaj Lal if you have additional questions. Robert Oleksy at (862) 754-3425 or email at oleksyr1@montclair.edu; or Dr, Pankaj Lal at (973) 655-3137 or email at lalp@montclair.edu. Any questions about your rights may be directed to Dr. Dana Levitt, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-2097.

Thank you for your time.

Sincerely,

Robert Oleksy,

College of Science and Mathematics

Department of Earth & Environmental Studies

By clicking the link below, I confirm that I have read this form and will participate in the project described. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can discontinue participation at any time. My consent also indicates that I am 18 years of age. This study has been approved by the Montclair State University IRB.

I agree to participate

I decline

From the list below, please choose the best group which you closely represent:

Government/Legal Entity

Business/Trade Organization

Non-Governmental Organization

Licensed Site Remediation Professional

Strength Category:

In terms of factors contributing to the strength of the Licensed Site Remediation Professional (LSRP) Program; please compare the two factors below and select the best value.

	Comparison More ◄——► More							
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
Licensed Site Remediation Professionals (LSRP) ability to use "Professional Judgment"								Requiring the Licensed Site Remediation Professionals (LSRP) to comply with a strict “Code of Conduct”
LSRPs ability to use "Professional Judgment"								Ability for LSRPs to network ideas through organizations such as the Licensed Site Remediation Professional Association (LSRPA)
LSRPs ability to use "Professional Judgment"								Ability for the LSRPs to quickly adapt to changes in guidance

LSRPs ability to use "Professional Judgment"								Having the LSRPs “Code of Conduct” as part of law
Requiring the LSRP to comply with a strict “Code of Conduct”								Ability for LSRPs to network ideas through organizations such as the LSRPA
Requiring the LSRP to comply with a strict “Code of Conduct”								Ability for the LSRPs to quickly adapt to changes in guidance
Requiring the LSRP to comply with a strict “Code of Conduct”								Having the LSRPs “Code of Conduct” as part of a law
Ability for LSRPs to network ideas through organizations such as the LSRPA								Ability for the LSRPs to quickly adapt to changes in guidance
Ability for LSRPs to network ideas through organizations such as the LSRPA								Having the LSRPs “Code of Conduct” as part of a law

Ability for the LSRPs to quickly adapt to changes in guidance								Having the LSRPs "Code of Conduct" as part of a law

Weakness Category:

In terms of factors contributing to the <u>weakness</u> of the LSRP Program; please compare the two factors below and select the best value.

	Comparison							
	More ← → More							
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
The amount of internal NJDEP resources to handle workloads								Holding the LSRP liable for the site
The amount of internal NJDEP resources to handle workloads								Conflicts between multiple LSRPs in rendering mutual agreeable judgments
The amount of internal NJDEP resources to handle workloads								Requiring the setting aside of monies used

								for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money
Holding the LSRP liable for the site								Conflicts between multiple LSRPs in rendering mutual agreeable judgments
Holding the LSRP liable for the site								Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money
Conflicts between multiple								Requiring the setting aside of monies

LSRPs in rendering mutual agreeable judgments								used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money

Opportunity Category:

In terms of factors contributing to the opportunities of the LSRP Program; please compare the two factors below and select the best value.

	Comparison							
	More ◄——► More							
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and								The ability to reuse remediated materials for beneficial use

Industry Groups, and Local Communities								
The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities								Escalated remediation schedules
The ability to incorporate inputs from groups such as Non Governmental Organizations, Business and Industry Groups, and Local Communities								Flexibility of LSRPs to adapt
The ability to reuse remediated materials for beneficial use								Escalated remediation schedules
The ability to reuse remediated materials for								Flexibility of LSRPs to adapt

beneficial use								
Escalated remediation schedules								Flexibility of LSRPs to adapt

Threat Category:

In terms of factors contributing to the threats to the LSRP Program; please compare the two factors below and select the best value.

	Comparison More ⟷ More							
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
Misperception of the of the general public of an LSRP exercising “Professional Judgment” leading to a site being “Protective of human health and safety and of the environment"								Ability for the NJDEP to overturn a rendered LSRP's judgment, due to political

								pressures
Misperception of the general public of an LSRP exercising “Professional Judgment” leading to a site being “Protective of human health and safety and of the environment"								Owners unable to clean-up their sites due to financial burdens beyond their ability to remediate, turning properties into orphan sites
Misperception of the of the general public of an LSRP exercising “Professional Judgment” leading to a site being “Protective of human health and safety and of the environment"								Changes to the markets focusing away from the redevelopment of contaminated properties

Misperception of the of the general public of an LSRP exercising “Professional Judgment” leading to a site being “Protective of human health and safety and of the environment"								Retroactive effects due to standard changes
Misperception of the of the general public of an LSRP exercising “Professional Judgment” leading to a site being “Protective of human health and safety and of the environment"								Ability to improve the analytical detection limits used to quantify target compounds
Ability for the NJDEP to overturn a								Owners unable to cleanup their sites due to financial

rendered LSRP's judgment, due to political pressures								burdens beyond their ability to remediate, turning properties into orphan sites
Ability for the NJDEP to overturn a rendered LSRP's judgment, due to political pressures								Changes to the markets focusing away from the redevelopment of contaminated properties
Ability for the NJDEP to overturn a rendered LSRP's judgment, due to political pressures								Retroactive effects due to standard changes
Ability for the NJDEP to overturn a rendered LSRP's judgment, due to political pressures								Ability to improve the analytical detection limits used to quantify target compounds
Owners unable to clean-up their sites due to								Changes to the markets focusing away

financial burdens beyond their ability to remediate, turning properties into orphan sites								from the redevelopment of contaminated properties
Owners unable to clean-up their sites due to financial burdens beyond their ability to remediate, turning properties into orphan sites								Retroactive effects due to standard changes
Owners unable to clean-up their sites due to financial burdens beyond their ability to remediate, turning properties into orphan sites								Ability to improve the analytical detection limits used to quantify target compounds
Changes to the markets focusing away from the								Retroactive effects due

redevelopment of contaminated properties								to standard changes
Changes to the markets focusing away from the redevelopment of contaminated properties								Ability to improve the analytical detection limits used to quantify target compounds
Retroactive effects due to standard changes								Ability to improve the analytical detection limits used to quantify target compounds

You have made it to the end of my Survey, thank you for participating!!!

Appendix V - SWOT-AHP Global Survey Packet

Subject Line: LSRP – Global SWOT-AHP Survey

Greetings Participant,

I am a PhD candidate at Montclair State University in Environmental Management. As part of my work, I have created a survey focusing on personal perceptions associated with the Licensed Site Remediation Professional (LSRP) Program. This survey is designed to compare the Strengths, Weaknesses, Opportunities, and Threats (SWOT) factors of the LSRP program by using an Analytic Hierarchy Process (AHP), a technique used to delineate factors strength through your individual preferences and input. In this survey, your valuable opinion will be used to rank high level SWOT factors in terms of importance relative to each other.

The short-term outcomes of this survey can help create improvements to the current LSRP program. However, the long-term outcomes will contribute to a larger study aimed at developing an assessment tool for states struggling with their own site remediation programs and help them develop planning strategies in increasing their efficiency of site remediations, and also help determine needed updates to their programs. Finally, this study may help gauge the benefits and pitfalls of conducting a large-scale privatization of state-run site remediation programs; such as the LSRP program.

The survey is in the form of an online survey. Your participation is anonymous and voluntary. The survey questions have no right or wrong answer; we are interested in your opinions only. The survey should take you no more than 5 min. Your time and input to this study is valuable and may contribute to fine tuning the LSRP program. This study has been approved by Montclair State University's Institutional Review Board, study #L-001785. We thank you for your participation.

By clicking on the link below you will be able to access the survey. For best results please use either a desktop, laptop, or tablet. Smartphones are not recommended.

SWOT-AHP Global Survey

Best Regards,

Robert Oleksy

Dept. Earth & Environmental Studies

College of Science and Mathematics

Montclair State University

1 Normal Avenue, Montclair, NJ 07043

For more information on the students in the program, please visit the Current Student tab in the Environmental Science and Management PhD People's page:

Thank you for participating in our survey. Your feedback is important. During this survey, you will be partaking in the final steps of an Analytical Hierarchy Process (AHP) technique, you will be determining which “global factors” are the most influential in a decision-making process. You may have already used this technique in the past. For instance, prior to purchasing a new vehicle, there may be several vehicle features that influenced your choice in choosing the right vehicle. Depending on your justification for the vehicle, some of those features may have a positive impact or a negative impact on your decision.

The positive influences may have included high gas mileage, horsepower, onboard navigation, while the negative included limited cargo space, or poor handling. However, which of these features were the most influential in your purchasing decision?

You most likely compared numerous features to each other to determine only several top features. Afterwards you may have narrowed it to down to the top ranked positive and negative features that will help you in your final determination. For instance, if your travel included making many deliveries and were concerned on number of packages the vehicle could hold, but you were still slightly concerned with gas mileage due to short trips, then your response might have leaned towards the "Cargo Space" side of the spectrum and the result may have looked similar to the following.

Mileage						**Cargo Space**
Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong
0	0	0	0	0	X	0

If both factors weighed in the same, then you would choose "Equal". However, if mileage significantly outweighed capacity, then your choice would have been either "Strong" or "Very Strong" on the "Mileage" side of the spectrum. However, if nether of two factors would influence your decision at all, then you can still choose the "Equal" since nether factors would receive a point.

For this survey instead of focusing on car features, the AHP technique will be used to determine the Strengths, Weaknesses, Threats and Opportunities (SWOT) of the New Jersey Licensed Site Remediation Professional program. Using the findings from a previous survey that you and your colleagues may have participated, you will be asked to choose between the highest ranked SWOT factors in a pair-wise comparison to determine which of these factors have the highest program impact. For best results please use either a desktop, laptop, or tablet. Smartphones are not recommended; the survey will appear confusing and distorted.

Before advancing to the survey please review the legalese below.

Dear Potential Participant,

You have been invited to participate in a study of The New Jersey's Licensed Site Remediation Professional Program entitled "Perceptions of Privatizing State Remediation Programs" is focused on identifying the Strength, Weaknesses, Opportunities, and Threats of the LSRP Program. The findings of this is part of larger study that will be able to act as an assessment tool for states which may be struggling with the amounts of open sites in need of remediation and the efficiency of those remediation, and states that may need to update their own programs. Finally, this study may help gauge the benefits and pitfalls of conducting a large scale privatization of state run remediation programs; such as the Licensed Site Remediation Professional (LSRP)

program.

The Strength, Weaknesses, Opportunities, and Threats – Analytical Hierarchy Process is a technique that is used to identify variables of a implementing and maintaining a program. Based on your preferences, these variables will be ranked and a hierarchical structure developed to delineate the perception and strengths of stakeholder preferences which can be used for creating improvements the current program or strategic planning for states pondering on how to implement such a program. You were selected to participate in this study because of your participation as a stakeholder and understanding of the LSRP program.

If you decide to participate, please complete the following set of questions. The survey is designed to assess your personal preferences through your input. It will take about 5 minutes to complete survey. You will be asked to answer questions by choosing between two factors affecting the potential strengths, weaknesses, opportunities and threats of the LSRP program. You may not directly benefit from this research. However, we hope this research will result in assisting other states in developing potential strategies for either implementing a similar remediation program or modifying the existing LSRP program.

Any discomfort or inconvenience to you may include no greater risk than everyday life in participating in this survey. Data will be collected using the Internet. There are no guarantees on the security of data sent on the Internet. Confidentiality will be kept to the degree permitted by the technology used. We strongly advise that you do not use an employer issued electronic device, laptop, phone or WIFI to respond to this survey, as many employers monitor use of all devices.

Your decision whether or not to participate will not affect your relationships with the any associations or organizations which you may belong. If you decide to participate, you are free to

stop at any time. You may skip questions you do not want to answer.

Please feel free to ask questions regarding this study. You may contact me or my Faculty Advisor Dr, Pankaj Lal if you have additional questions. Robert Oleksy at (862) 754-3425 or email at oleksyr1@montclair.edu; or Dr, Pankaj Lal at (973) 655-3137 or email at lalp@montclair.edu. Any questions about your rights may be directed to Dr. Dana Levitt, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-2097.

I agree to participate

I decline

From the list below, please choose the best group which you closely represent:

Government/Legal Entity

Business/Trade Organization

Non-Governmental Organization

Licensed Site Remediation Professional

Government/Legal Entity 1:

In terms of factors affecting the Licensed Site Remediation Professional (LSRP) Program; please compare the two factors below and select the best value.

	Comparison							
	More ←						→ More	
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor

Licensed Site Remediation Professionals (LSRPs) ability to use Professional Judgment"								The amount of Internal New Jersey Department of Environmental Protection (NJDEP) resources to handle workloads
LSRPs ability to use "Professional Judgment"								The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities
LSRPs ability to use "Professional Judgment"								Ability for the NJDEP to overturn a rendered LSRP judgment, due to political pressures
The amount of Internal NJDEP resources to								The ability to incorporate inputs from

handle workloads								groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities
The amount of Internal NJDEP resources to handle workloads								Ability for the NJDEP to overturn a rendered LSRP judgment, due to political pressures
The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities								Ability for the NJDEP to overturn a rendered LSRP judgment, due to political pressures

Business/Trade Organization:

In terms of factors affecting the LSRP Program; please compare the two factors below and select the best value.

	Comparison							
	More ←						→ More	
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
Licensed Site Remediation Professionals (LSRP) ability to use "Professional Judgment"								Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money
LSRPs ability to use "Professional Judgment"								The ability to incorporate inputs from groups

								such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities
LSRPs ability to use "Professional Judgment"								Ability to improve the analytical detection limits used to quantify target compounds
Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money								The ability to incorporate inputs from groups such as Non Governmental Organizations, Business and Industry Groups, and Local Communities

Requiring the setting aside of monies used for institutional and engineering controls in escrow in perpetuity, instead of having the ability to invest and potentially earning money								Ability to improve the analytical detection limits used to quantify target compounds
The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities								Ability to improve the analytical detection limits used to quantify target compounds

Non-Governmental Organization:

In terms of factors affecting the LSRP Program; please compare the two factors below and select the best value.

	Comparison							
	More ←						→ More	
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
Requiring the Licensed Site Remediation Professionals (LSRP) to comply with a strict "Code of Conduct"								Conflicts between multiple LSRPs in rendering mutual agreeable judgments
Requiring the LSRP to comply with a strict "Code of Conduct"								The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities
Requiring the LSRP to comply with a strict "Code of Conduct"								Misperception of the general public of an

								LSRP exercising "Professional Judgment" leading to a site being "Protective of human health and safety and of the environment
Conflicts between multiple LSRPs in rendering mutual agreeable judgments								The ability to incorporate inputs from groups such as Non Governmental Organizations, Business and Industry Groups, and Local Communities
Conflicts between multiple LSRPs in rendering mutual agreeable judgments								Misperception of the general public of an LSRP exercising "Professional Judgment" leading to a site being

								"Protective of human health and safety and of the environment
The ability to incorporate inputs from groups such as Non-Governmental Organizations, Business and Industry Groups, and Local Communities								Misperception of the general public of an LSRP exercising "Professional Judgment" leading to a site being "Protective of human health and safety and of the environment

Licensed Site Remediation Professional 1:

In terms of factors affecting the LSRP Program; please compare the two factors below and select the best value.

	Comparison							
	More ←						→ More	
Factor	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Factor
Ability for Licensed Site Remediation Professional								The amount of Internal

(LSRP) to network ideas through organizations such as the Licensed Site Remediation Professional Association (LSRPA)								New Jersey Department of Environmental Protection (NJDEP) resources to handle workloads
Ability for LSRPs to network ideas through organizations such as the LSRPA								The ability to reuse remediated materials for beneficial use
Ability for LSRPs to network ideas through organizations such as the LSRPA								Ability to improve the analytical detection limits used to quantify target compounds
The amount of Internal NJDEP resources to handle workloads								The ability to reuse remediated materials for beneficial use
The amount of Internal NJDEP								Ability to improve the analytical

resources to handle workloads								detection limits used to quantify target compounds
The ability to reuse remediated materials for beneficial use								Ability to improve the analytical detection limits used to quantify target compounds

You have made it to the end of my Survey, thank you for participating!!!

Appendix VI - SRRA 2.0 Questionnaire Packet

Subject Line: LSRP – SRRA 2.0 Questionnaire

Greetings Participant,

I am a PhD candidate at Montclair State University in Environmental Management. As part of my work, I have created a survey focusing on the adaptions of a Licensed Site Remediation Professional (LSRP) to changes in Site Remediation Reform Act (SRRA), also known as SRRA 2.0. This survey is designed to identify how quickly LSRPs adapt to the changes in the law.

The short-term outcomes of this survey can help understand if a LSPR has all the needed resources to adapt to change. However, the long-term outcomes will contribute to a larger study aimed at developing an assessment tool for states struggling with their own site remediation programs and help them develop planning strategies in increasing their efficiency of site remediations, and also help determine if there are any lag times. Finally, this study may help gauge the benefits and pitfalls of conducting a large-scale privatization of state-run site remediation programs; such as the LSRP program.

The survey is in the form of an online survey. Your participation is anonymous and voluntary. The survey should take you no more than 5 minutes. Your time and input to this study is valuable and may contribute to fine tuning the LSRP program. This study has been approved by Montclair State University's Institutional Review Board, study #L-001785. We thank you for your participation.

By clicking on the link below you will be able to access the survey. For best results please use either a desktop, laptop, or tablet. Smartphones are not recommended.

SRRA-2.0 Survey

Best Regards,

Robert Oleksy

Dept. Earth & Environmental Studies

College of Science and Mathematics

Montclair State University

1 Normal Avenue, Montclair, NJ 07043

For more information on the students in the program, please visit the Current Student tab in the Environmental Science and Management PhD People's page:

https://www.montclair.edu/environmental-management-phd/people/

Thank you for choosing to participate in the "LSRP Adaptations to Change – SRRA 2.0" Questionnaire, your feedback is very important.

For best results please use either a desktop, laptop, or tablet. Smartphones are not recommended; the survey will appear confusing and distorted. Before advancing to the survey please review the legalese below.

Dear Potential Participant,

You have been randomly selected to participate in a study of The New Jersey's Licensed Site Remediation Professional (LSRP) Program entitled "LSRP Adaptations to Change – SRRA 2.0". The study is focused on identifying how a LSRP adapts to significations changes in laws governing the site remediation program, also known as Site Remediation Reform Act (SRRA) 2.0. The initial findings of the survey will be used as an assessment tool to determine how quickly a New Jersey Licensed Site Remediation Professional (LSRP) can adapt to changes in the law. The latter findings of this study will be part of larger study that will be able to act as an assessment tool for states which may be struggling with the amounts of open sites in need of remediation and the efficiency of those remediation, and states that may need to update their own programs.

The survey is designed to assess your personal understanding of the changes to the SRRA through your input. During this survey, you will be asked several polar questions pertaining to a statement reflecting the changes in SRRA. The entire survey should take no longer the 5 minutes to complete. If you come across a statement that you are unsure of, please do use any and all available resources that you need to feel comfortable in choosing your answer.

Any discomfort or inconvenience to you may include no greater risk than everyday life in participating in this survey. Data will be collected using the Internet. There are no guarantees on the security of data sent on the Internet. Confidentiality will be kept to the degree permitted by the technology used. We strongly advise that you do not use an employer issued electronic device, laptop, phone or WIFI to respond to this survey, as many employers monitor use of all devices.

Your decision whether or not to participate will not affect your relationships with the any associations or organizations which you may belong. If you decide to participate, you are free to stop at any time. You may skip questions you do not want to answer.

Please feel free to ask questions regarding this study. You may contact me or my Faculty Advisor Dr, Pankaj Lal if you have additional questions. Robert Oleksy at (862) 754-3425 or email at oleksyr1@montclair.edu; or Dr, Pankaj Lal at (973) 655-3137 or email at lalp@montclair.edu. Any questions about your rights may be directed to Dr. Dana Levitt, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-2097.

Thank you for your time.

Sincerely,

Robert Oleksy,

College of Science and Mathematics

Department of Earth & Environmental Studies

If you decide to participate, please complete the following set of questions. By clicking the link below, I confirm that I have read this form and will participate in the project described. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can discontinue participation at any time. My consent also indicates that I am 18 years of age. This study has been approved by the Montclair State University IRB.

I agree to participate

I decline

As an LSRP, are you a member of any association such as the Licensed Site Remediation Professional Association (LSRPA)?

Yes

No

Does the following statement reflect the actual changes in the Site Remediation Reform Act (SRRA)?

Under no circumstances can a non-LSRP person conduct sampling or investigation to confirm or evaluate a remediation performed or supervised by a retained LSRP.

Yes

No

A person responsible for conduction a remediation is required to respond to any inquiries from the public regarding the status of the remediation that the person receives or that the DEP receives and forwards to that person, that person response must include information or

documents that are responsive to the public inquiry and is required to submit a written summery status report for the remediation in a form and manner as determined by the DEP.

Yes

No

If an immediate environmental concern (IEC) had migrated and identify in a structure that is unoccupied, then as long as the structure is (1) not occupied, (2) will not be occupied, and (3) will be demolished, then no further remediation relative to that IEC affecting the unoccupied structure would be required. As long as, the person responsible for conducing the remediation provides a written certification of the stated 3 conditions to the DEP.

Yes

No

If an LSRP identifies a condition that, in the LSRP's independent professional judgment, is an immediate environmental concern, then the LSRP must, among other things, immediately verbally advise the person responsible for conducting the remediation of that person's duty to notify the DEP.

Yes

No

If a retained LSRP performing remediation at a site or any portion of the site obtains specific knowledge that a discharge has occurred at any location on the site, that LSRP is required notify the person conducting the remediation and the DEP.

Yes

No

A person cannot become an LSRP if they have been involved in crimes and offenses involving moral turpitude.

Yes

No

A non-LSRP person can perform remediation as long as the remediation is managed, supervised, or periodically reviewed and evaluated by an LSRP.

Yes

No

The DEP would not undertake direct oversight of a contaminated site if the person responsible for conducting the remediation was unable to meet the applicable timeframe because the person was unable to enter the contaminated site, because the person does not own the property, and the person took all appropriate and timely action to gain access to the site.

Yes

No

An applicant seeking to become an LSRP, requires to have work at least three years of full-time professional experience in the state within the five years immediately prior to the applicant's submission.

Yes

No

The DEP are able to modify the requirements of direct oversight if there is a public emergency that results in the delay in meeting the mandatory or expedited site-specific timeframe or other conditions that triggered direct oversight.

You have made it to the end of my Survey, thank you for participating!!!

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