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Evaluating Sustainable Land Revitalization Programs and Policies in the United States

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Abstract
Since the mid- to late-20th century, the implementation of land revitalization programs has become much more complex, expensive, and difficult to complete. In the United States, there are four major types of land revitalization programs, which overlap in some areas and clash in others. Over the last few decades, these programs have become increasingly ineffective as their budgets are decreased and the number of sites to focus on increase as well. The Environmental Protection Agency (EPA) oversees the Superfund program, a fund used for environmental cleanup efforts that was established in 1980 with the passage of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The EPA also oversees the National Brownfields Program, which is devoted to revitalizing lands whose redevelopment may be impeded by potential pollution or contamination. The Centers for Disease Control (CDC) oversees the Agency for Toxic Substances Disease Registry (ATSDR), also created under CERCLA. The ATSDR provides risk assessment analysis of Superfund sites and also has its own goals related to brownfield development under its Land/Reuse Action Model. Individual states have enacted their own land revitalization programs, called Voluntary State Programs. Finally, the 2002 revision of the Superfund program sought to devote more resources to brownfield redevelopment, drawing from Voluntary State Programs for private sector incentives. This paper draws upon academic sources and government reports to provide an analysis of these programs and the unintended consequences on local communities which can include displacement from gentrification.

Key Words: brownfields programs, bureaucratic behavior, public policy, organizational dynamics, environmental approaches

1. Introduction

The implementation of sustainable land revitalization programs has grown in size, complexity and cost, particularly since the latter half of the 20th century, for the United States and many other industrialized countries. During the post-industrial revolution period, polluting industries and urban planning have created land areas that require redevelopment and, often times, significant remediation. In the United States, land revitalization programs have been disjointed in their creation as public programs and policies which reflect different legal frameworks, organizational dynamics and environmental approaches. While the goal of each of the land revitalization programs, whether stated implicitly or explicitly, is sustainability, they are implemented in a diverse manner with overlapping policy actors that sometimes compete. The underlying approaches of these programs in their initial creation have different purposes, and the fragmented policies can create a series of site projects without any real comprehensive approach to land revitalization for metropolitan areas or regions. The outcome of the lack of integration across these programs can cause confusion for the private sector and

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a "hop-scotch" approach to redevelopment with unintended consequences for communities, such as gentrification, that can result in economically-forced relocation of existing residents. Furthermore, many of these sites that are in need of revitalization are located in low-income and minority populations within the United States, which have become known as environmental justice communities, that are overly burden with disproportionately high adverse impacts compared to surrounding communities.

This research examines four major land revitalization programs and policies in the United States: the Superfund Program, National Brownfields Program, ATSDR Brownfields Land/Reuse Model Action Program, and the State Voluntary Programs. Additional programs such as Smart Growth cities exist and have decades of implementation that can be compared. The birth of these programs reflect what policy scholars call different understandings of land revitalization through issue definitions and policy solutions (Anderson, 2014; Baumgartner and Jones, 2010). As a result, different legal frameworks, organizational dynamics, and environmental approaches result in complex implementation that hinders redevelopment in a comprehensive manner. The result of these programs often times are site-specific projects with no overall plan for sustainability. To evaluate how land revitalization takes place in the United States, we begin with the review of the four major programs with more detail being available on the controversial Superfund Program. The National Brownfields and the Land/Reuse Action Model are evaluated together because of their similarity in approach. Then, finally, a description of the state voluntary brownfield programs is provided which includes a significant diversity in land revitalization. This research uses a comparative case study approach of these major programs for land revitalization in the United States to examine implementation with the understanding for future practice.

2. Superfund Program, National Brownfields Program, Land/Reuse Model Action Program, and State Voluntary Programs

Before comparing the four major land revitalization programs in the United States, each program is described for understanding how the programs are being implemented today and how these programs were originally created. All four of these programs focus on improving the use of the land whether it is for protection of human health, the environment, or economic development. However, these programs take very different approaches to accomplish their goals while sharing some overlap.

2.1 Superfund Program

The Superfund Program, which it is commonly called in the United States, was created by The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 (Pub. L. No. 96-510). The goal of this program is to protect human health and the environment from the impact of dangerous hazardous substances. This piece of federal legislation gave the quasi-independent agency, the US Environmental Protection Agency (EPA) the legal authority and responsibility to implement the program to remediate sites (includes land, water, and air pollution) that can pose either imminent or long-term risk of exposure and harm to both humans, and the environment. EPA has significant centralized legal enforcement authority with

centralized responsibilities within federal government for this program. The sites with the highest levels of risk to human health are placed on the National Priorities List (NPL) using a hazardous ranking system to prioritize their remediation. The Superfund process has a regimented structure for site revitalization. CERCLA was a necessary piece of legislation because it dealt with problems not addressed by the modern environmental movement and its subsequent legislation in the 1970s such as the Clean Air Act (1970), Clean Water Act (1972), Toxic Substances Control Act (1973), and the Resource Conservation and Recovery Act (1976). Each one of these pieces of legislation addressed specific media or contaminants but they did not holistically address human health particularly from historical hazardous sites except in a narrow focus. In addition, EPA was established with 10 regional offices containing bureaucratic divisions with experts that focus on the individual legislation rather than an interdisciplinary approach to environmental pollution. These bureaucratic divisions within the agency continues today. Thus, CERCLA assisted with plugging a policy hole for many abandoned sites that threatened human health which had multiple sources of contamination and no operator onsite. The Superfund program is one of the most studied environmental policies for cost and outcomes in the United States. Many of these studies are requested from Congress through their investigative research organization the General Accounting Office (GAO).

Issue definitions in public policy analysis are important to understanding how programs are born and impact implementation years later. News media attention to a national disaster known as Love Canal, along with its portrayal that the newly created EPA should address these types of projects, led to getting CERCLA passed as legislation even with significant conflict occurring in the Congress around the details of who pays for this program. This program cemented the role of the federal government in land revitalization and remediation. A political window was opened for this new sweeping legislation and program to be administered by EPA without delegation to the states partially in response to the disaster at Love Canal. Kingdon (2011) defines this as a critical step for getting the attention of the public as well as getting onto the national agenda for public policy formation. Love Canal is a small, working class community, in the eastern edge of Niagara Falls, New York. Originally the canal was built to connect the upper and lower Niagara Falls by then Mayor William Love. By 1910 the canal was no longer needed even though it was partially completed. In 1920, the canal was turned into a municipal and industrial chemical disposal site, and then in 1953 Hooker Chemical Company gave the site to the school district for $1 after using the disposal site. This transaction occurs long before the major pieces of legislation regarding chemical disposal and creation of EPA in 1970. This former chemical waste site becomes a place where a school and community were developed. The community was evacuated in 1978 with a total of 221 families being relocated with the assistance of President Carter under an emergency action. According to Beck (1979), the EPA regional administrator for this site in 1978, this was one of the most appalling environmental tragedies in American history to date. A primary community organizer named Lois Gibbs would later be labelled by the media and the environmental activists as the "Mother of Superfund." This event in 1978 helped get the issue defined and onto the agenda particularly with the major

coverage by national news media which is common for many public policies (Baumgartner and Jones, 2010).

Superfund sites are abandoned areas which require the federal government under EPA to take action for remediation and, where possible, return the area to a viable land use. As of 2014, there are approximately 1,315 sites on the NPL with about 157 of those sites being federal government facilities (GAO, 2015, 1). The federal funding of the revitalization of these sites over a 15-year period from 1999 to 2013 was approximately $23 billion. Most of the contaminants at these sites are polychlorinated biphenyls, lead and arsenic. Most of the contaminants found at NPL sites are linked to cancer, neurological disorders, infertility and birth defects (GAO, 2015, 2). Of the three land revitalization programs, Superfund has the highest costs associated with remediation and some of the longest times for completion on average depending on the complexity of the site. Every one of the fifty states has a Superfund site as well as Guam, Puerto Rico and the Virgin Islands. The majority of the costs are in seven states concentrated in the northeast regions in the United States where the impacts from the post-industrial land uses have the greatest exposure to humans due to population density. The demographics are also illustrative of problems with human risk exposure of these sites. According to GAO (2015,9), an estimated 39 million people live within 3 miles of a Superfund Site with 14 million of those people being under the age of 18 or older than 65. New York was the state with the largest number of people living within 3 miles of a Superfund site (6 million or 29% of the state's population). New Jersey had the largest percentage of population living within 3 miles of a Superfund site (50% of the population).

National politics and bureaucratic behavior have had a significant impact on the Superfund program. The enforcement of cleanup of these abandoned sites has been steeped in political controversy with impacts from various presidential administrations. One of the major political controversies occurred in the early 1980s around the issue of executive privilege, a legal concept separating the legislative and executive branches which was unsuccessfully used by former President Nixon. Under the Reagan Administration, many of the Superfund enforcement actions were curtailed and centralized decision-making was implemented taking away authority from the 10 regional offices of EPA for Superfund enforcement (Mintz, 2012, 647). This prompted a dramatic decline of remediation actions which led to congressional oversight hearings in 1982 that highlighted the shortcomings of the Superfund program. In 1982, EPA head, Ann Gorsuch, refused to turn over Superfund documents to Congress under a subpoena using the legal concept of executive privilege which resulted ultimately in her resignation and complete turnover of the EPA leadership.

The outcomes of land revitalization under Superfund have been not only controversial in political terms, but there is significant critical impacts from insecure funding, and agency delays in terms completion of site remediation. For instance, from 1983 to 2007, the number of sites added to the NPL declined on average each year from 37 sites to 12 sites (GAO, 2015, 26). One explanation is the referral of these sites to states and private sector funding with a growing focus on human health threats for the NPL. Also, the types of federal sites added to the NPL has changed during this period with a greater number of mining sites being included. Mining sites are some of the most

expensive and complex sites to remediate. The cost for remediating a single mining site from 1999 to 2013 was more than $700,000 average median per site (GAO, 2015, 24). By 2010, the GAO (2015, 3) reported that federal funding of the Superfund program was declining, and with limited congressional funding there was a direct impact to completion of site remediation projects. The GAO (2015, 26) reported to Congress that from 1999 to 2013, the trends showed a decline of overall funding from $2 billion to $1.1 billion for the Superfund program. In addition, construction actions decreased 84% during this period. There has been a recent surge from 2008 to 2012 of new Superfund sites added to the NPL with the economic recession of 2007 causing more state funding to decline for remediation, in conjunction with the bankruptcy of many private sector companies causing more dependence on national funding through EPA, (GAO, 2015, 26). As a result, the number of sites removed from the NPL has decreased because of these schedule delays. The average time to clean up a Superfund site in 1999 was 13 years, and it increased to 25 years in 2013. 185 sites were deleted from 1999 to 2013, with 2001 having the highest deletion of 30 sites and 2013 with only 6 sites deleted (GAO, 2015, 29).

Of all three land revitalization programs, clearly Superfund is the most expensive and vulnerable to issues such as national presidential politics, budget cuts, public dissatisfaction with the federal government in the United States, and pressures from the economy. Keeping in mind, these are also some of the most dangerous sites to human health in the United States. EPA struggles with management of special accounts in terms of Superfund (GAO 2006, 2009, 2012) and according to GAO (2015, 8) relies heavily on appropriations from Congress (80%) rather than the cost sharing options with the states or responsible private companies (20%).

2.2 EPA National Brownfields Program and ATSDR Brownfields/Land Reuse Action Model Program

A brownfield is a property that can be redeveloped, or reused, yet is complicated by the presence or potential presence of a hazardous contaminant (Small Business Liability Relief and Brownfield Revitalization Act, 2002). EPA (2016) estimates that more than 450,000 brownfields sites in the United States (EPA, 2016). Brownfield sites are a diverse range of sources for contaminants. Common pollutants include volatile organic compounds from former dry cleaners and print shops, or lead and asbestos from industrial factories. Businesses usually are operating for some time in the local community then fail leaving problems of vacant land and buildings with the potential of containing contamination. This can impact local property values, the ability for communities to redevelop the area, and could lead to economic distress of a community. The goal of the national brownfield programs is to provide incentives and remove or lower some of the financial barriers to revitalizing these properties, as well as to spur productivity and economic vibrancy to the local community. Thus, there is a potential overlap with the goals of the Superfund sites in terms of protecting human health and the environment, but these parcels of land are not considered as dangerous as Superfund sites. In fact, these brownfield sites can sit idle for decades never being redeveloped.

The National Brownfields Program and the ATSDR Brownfield/Land Reuse Action Model Program are federally-administered revitalization programs in the United States. The National Brownfields Program is implemented by EPA, and the Brownfield/Land Reuse Action Model Program is implemented by the Centers for Disease Control, which is an agency under the cabinet organization, Department of Health and Human Services. The agency that is created as part of the CERCLA legislation called the Agency for Toxic Substances Disease Registry (ATSDR) is the subunit of the Centers for Disease Control. ATSDR provides risk assessment information to both Superfund sites and has its own mission for brownfield revitalization which is called the Brownfield/Land Reuse Action Model. Both the EPA and ATSDR programs address land revitalization which is commonly referred to as brownfield sites.

Beginning in the mid-1990s, EPA provided small amounts of seed money to local governments that launched hundreds of two-year brownfield "pilot" projects and developed guidance in the cleanup and redevelopment of brownfield sites. In 2002, the Small Business Liability Relief and Brownfields Revitalization Act codified many of EPA's practices, policies and guidance. Today, EPA issues grants to developers and local governments involved in brownfields activities such as assessments, loans for remediation, environmental training for residents of these communities, and area-wide planning grants to provide for local community research and development of implementation strategies to revitalize a specific brownfield site or area.

From 1999 to 2016, EPA has issued over 3,033 these brownfield grants to local communities for land revitalization. These grants are distributed across the United States with the states of California (7.1%), Massachusetts, and Michigan (each 6.6%) receiving the largest amount of the funding. Contrary to the Superfund distribution of funding, New Jersey and New York received only a small portion of the funding. The EPA Brownfields Program seeks to leverage funding by having matching contributions from private and local/State governments with federal monies. Through 2013, on average $17.79 was leveraged for each EPA brownfield dollar spent. EPA estimates that 7.3 jobs were leveraged per $100,000 of grant dollars spent (EPA, 2016). Like Superfund sites, brownfield sites exist in every state, and across Guam, Puerto Rico and the Virgin Islands. The funding for these grants from 1993 to 2005 ranged from $1 million to $161 million (GAO, 2005, 4). From 1993 to 2010, EPA has awarded over $800 million in grants and loans through this program (Dull 2010).

Brownfield sites have a unique policy linkage to CERCLA. One of the components of the CERCLA legislation is the concept of strict, joint and several liability. This means that if a buyer selects a prior contaminated site, they are required to remediate it. This becomes a significant economic liability if the contamination rises to the level of being listed the NPL. In addition, this provision allows liability for the cleanup regardless of the role or level of contribution of the contaminants. This means transporters, disposal companies, and those with minimal contributions to the contamination may be required to remediate the site. There has been large debates in the literature and legal circles on this provision in the 1980 CERCLA legislation which has made banks who mortgage the loans for sites to owners vulnerable. The result is that while Superfund was trying to close loopholes for polluters of abandoned sites, it created

an unintended policy consequence for brownfield developers trying to revitalize land sites. Superfund policy was attempting to increase the likelihood of cost recovery versus a single payer focus which is futile on abandoned sites (Chang and Sigman, 2004). The result was the private sector redevelopers as well as the banks sought to lower liability risk by finding "greenfield" sites that were not plagued with the potential for Superfund listing on the NPL. One outcome of this risk aversion was sprawl created by new development outside of the city centers avoiding the redevelopment of urban industrial brownfields. The problems with seeking land for development outside of the metropolitan areas has left many population centers with economic performance problems (Fallah, 2010).

It is harder to estimate the costs of brownfield revitalization efforts in both of these national programs. Schadler et al (2010) point out that estimated costs can range for large sites from $100 billion to over $650 billion and for the sites in the European Union to almost 100 billion Euros. As a result, decision-making systems that assist with how to evaluate social, economic, and ecological sustainably of land use alternatives as well as the remediation goals and site use options has become a strategic part of the decision-making for redevelopers (Shadler, et al, 2010). Several international studies on how to prioritize brownfield revitalization reflect the role of developers to limit liability, but in some countries these options of undeveloped lands are less available. This makes site selection for revitalization even more critical (Pizzol, et al, 2015).

The ATSDR Brownfield/Land Reuse Action Model Program (Perlman et al, 2012; Berman and Forrester, 2012) is focused on community health in land revitalization. The pillars of its action model include health (physical and mental health), community (education, economic, safety and security), land and environment (remediation), and buildings and infrastructure (public works). Like EPA, ATSDR funds community health projects related to their action model, which a specific focus on public health. ATSDR tends to works on building tools in assessing and revitalizing for communities to implement. The funding from 1993 to 2005 for brownfield work performed by ATSDR ranged from $73 million to a high of $84 million in 1999 returning to $75 million in 2005. Thus, ATSDR program has been impacted by erratic funding and criticism of delayed health assessment to support decision-making by EPA and local communities as well as some concern expressed over the review process of their work (GAO, 2001, 206; 2009; 2010). Both EPA and ATSDR list many cases of success stories which are often consisting of small projects that are site specific without a link to a regional planning effort in sustainability or revitalization.

The goal of both the EPA Brownfield Program and the ATSDR Brownfield/Land Reuse Action Model Program is to provide a redevelopment of the land for human use. This reuse of the land may include environmental remediation in the process, but the goal is focused on providing safe communities that lead to healthy communities. Like the unintended policy consequence of Superfund liability on brownfield revitalization, there is an unintended consequence of brownfield redevelopment on both low-income and minority populations. When a community becomes redeveloped, economic revitalization occurs. This means a more affluent community begins to develop. Often it results in low-income residents who may live in the area becoming displaced or in need of affordable housing. Shaw and Hagmans

(2015) outlines the issues of gentrification that is not unique to the United States that often occurs to revitalized land areas and the consequence of the loss of place for residents who may no longer be able to remain in the community. This issue of displacement as a result of these national programs has not been one that is widely addressed by either EPA or ATSDR.

2.3 Voluntary State Brownfield Programs

State voluntary brownfield programs reflect a diversity of revitalization needs and approaches across the fifty states (EPA 2014). Most states have their own legislation and developed state brownfield programs to promote land revitalization. There is an increasing number of brownfield properties entering the state programs placing states in the critical role of land revitalization at a time when the states are having scarce resources. Many of these properties remain on the list for redevelopment for decades due either to lack of funding by state agencies or lack of interest by private developers. These programs usually require funding from the state, and some federal monies from the National Brownfield Programs as incentives for redevelopment. Financial instruments include funding from other federal government agencies, in addition to tax credits, that comprise an overall general portfolio of funding instruments available to state revitalization programs. The state brownfield programs represented a more cooperative approach to encourage voluntary land revitalization as an alternative to the Superfund approach.

In 2002, CERCLA (42 U.S.C. §§ 9601–9675) was revised to provide limited liability relief which lessens the barriers to remediation of previously contaminated lands. The revision was modeled on state programs that emerged to encourage brownfield remediation through regulatory and liability relief, tax-related incentives, expedited permitting opportunities, supportive public infrastructure investments, and relief from the discovery of previous contamination or from future changes in regulatory standards. However, Eckerd (2015) found that private investment in brownfield redevelopment is more likely in communities with higher home ownership, a large supply of vacant houses, and comparatively lower poverty. Thus, the liability relief to owners for brownfield sites may have had the impact to stimulate private sector investment in redevelopment. The only issue is that these were sites that would be anticipated for revitalization because of the potential profit. The result then of liability reform was that it did little to benefit underdeveloped communities.

To alleviate concerns about liability, often states offer a covenant not to sue. Many of the states have a state Superfund program that mirrors the federal government process for remediation. While each state works closely with the local governments and private redevelopers, the state programs have come under increasing economic constraints with recent economic recession in 2007-8 in the United States. Over the last 15 years, the federal government in cooperation with the states have worked on reforming liability issues and reduced regulatory barriers for brownfield redevelopment (Eckerd, 2015). Approximately 63% of the states were providing remediation grants and 73% issued loans under the voluntary brownfield programs. Environmental insurance was offered in approximately six states along with financial incentives such as tax credits in over half of the states (Eckerd, 2015).

Unlike the national land revitalization programs, state programs have an additional pressure to select brownfield sites that would best grow and develop their local economies. Wang et al (2014) point out that brownfields represent an unsustainable development pattern because existing infrastructure is wasted and greenfields are irreversibly developed for business or residential purposes. In addition, brownfields usually pose a threat to public health from previous contamination. Hence, leaving brownfields intact reduces the sustainability of cities. Unlike the national programs on land revitalization, brownfields are challenges to local governments for reasons of economic growth, public health and the environment. To Wang et al (2014), this creates a problem of complex subsystems which are difficult for developers to decide on which sites to take risk for redevelopment. For states and local governments, this is a critical process for economic redevelopment. Likewise, one of the more interesting studies on local brownfield revitalization is by Rizzo et al (2015) whose findings highlight the importance of stakeholder involvement in terms of perceptions, concerns, and attitudes in brownfield redevelopment in Europe. As far as information needs are concerned, similarities between some groups of stakeholders have been noticed: site owners and problem holders are primarily interested in information on planning and financing, while authorities and services providers are interested in more technical aspects like investigation, planning and risk assessment.

3. Comparing the Land Revitalization Programs

To summarize the four different programs in the United States on land revitalization, the elements of the role of government and legal framework, costs and liabilities, political and economic vulnerabilities, and the issue definition are included in Table 1.0.

Table 1.0 Comparing the Land Revitalization Programs in the United States

	Role of Government and Legal Framework	**Costs and Liabilities**	**Political and Economic Vulnerabilities**	**Issue Definitions**
Land Revitalization Programs				
1. Superfund Program	EPA quasi-independent regulatory agency with centralized authority for Superfund within the federal government. Created in 1980 by federal legislation with strict processes for site	High costs for revitalizing complex sites with majority of funding from federal government and perceived liabilities by private sector developers. Started in mid-1990s as seed	Extremely vulnerable to both political and economic pressures from Congress and the President as well as the overall economy.	Focus on protection of human health and the environment from hazardous sites. Issue definition from national disaster.

	remediation.	money for pilot projects.		
2. EPA National Brownfield Program	EPA is primarily a funder of grants to assist state and local governments in assessments.	EPA is only partial contributor to revitalization effort. Low liabilities as funder.	Economic vulnerabilities from states and localities not being able to fully participate in funding projects.	Focus on land revitalization of idle properties with perceived or actual contamination.
3. ATSDR Land/ Reuse Action Model Program	ATSDR is primarily a funder of grants to assist state and local governments. Develops and generates tools and health risk assessments for communities in their revitalization efforts.	ATSDR has erratic funding for brownfield revitalization and limited grants to communities.	Congressional oversight focused on delays of health assessments and problems of review process for their reports.	Focus on public health issues for community members.
4. State Voluntary Brownfield Programs	Individual states develop their own programs through state legislation and agencies.	States have funding that has been linked to the economy. The result is many idle sites in inventory that need to be revitalized.	Not politically vulnerable but completely economically vulnerable to federal funding as well as state support.	Focus on economic development as well as remediation.

Based on the focus of the issue definition for land revitalization, it becomes obvious that the programs have different goals. There is a range in legal frameworks and organization dynamics for the role of government participation in each program. For instance, the Superfund program is highly centralized and structured in its legal framework and organizational dynamics. This is very different than the state brownfield programs which are diverse in approach and legal frameworks. Overall, a contained network of policymakers are involved in the field of land revitalization across the states and federal government. These programs also have differing political and economic vulnerabilities and some that relate to Congress, the President, and each other when joint funding for state and local programs occurs in the programs. Some of the highest costs and liabilities are associated with the Superfund program while other projects site idle in state brownfield inventories waiting for economic upturns or interest by the private sector for redevelopment. The Superfund program not surprisingly with its very large costs has had the most political controversy and scrutiny by Congress of all the programs.

Clearly, each of the programs play an important role for land revitalization efforts in the United States. Collectively these programs are not well integrated with each other and have overlap in missions and focus. More recent programs have been created that focus on smart growth which address land revitalization in a more

interdisciplinary approach across EPA, state and local economic agencies, as well as the US Department of Housing Urban Development and US Department of Transportation. The focus of these newer programs are on greening communities and creating economic resilience approach to climate change. In this role, EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire local and state leaders to expand this work elsewhere. Future policymakers in the United States would benefit by looking at these land revitalization programs before generating new programs that overlap and do not integrate into the system already in place.

References

Anderson, J. E. (2014). *Public Policymaking*. Independence, KY: Cengage Learning.

Baumgartner, F., Jones, B. D. (2010). *Agendas and Instability in American Politics* (2nd ed.). Chicago, IL: University of Chicago Press.

Berman, L., Forrester, T. (2013). An Indicator Framework to Measure Effects of Brownfields Redevelopment on Public Health. *Journal of Environmental Health, 76* (1), 50-55.

Chang, H. F., Sigman, H. (2014) An Empirical Analysis of Cost Recovery in Superfund Cases: Implications for Brownfields and Joint and Several Liability. *Journal of Empirical Legal Studies, 11* (3), 477-504.

Dull, M., Wernstedt, K. (2010). Land Recycling, Community Revitalization, and Distributive Politics: An Analysis of EPA Brownfields Program Support. *Policy Studies Journal, 38*, (1), 119-141.

Eckerd, A., Heidelberg, R. L., (2015). Public Incentives, Market Motivations, and Contaminated Properties: New Public Management and Brownfield Liability Reform. *Public Administration Review, 75* (2), 252–261.

Fallah, B. N., Partridge, M. D., Olfert, M. R. (2011). Urban Sprawl and Productivity: Evidence from US Metropolitan Areas. Papers in Regional Science, 90, 451-473.

Kingdon, J. W. (2011). *Agendas, Alternatives, and Public Policies* (2nd ed.). New York, NY: Longman Pub Group.

Mintz, Joel A., (2012). EPA Enforcement of CERCLA: Historical Overview and Recent Trends. *Southwestern Law Review, 41*, 645-659.

Perlman, G. D., Berman, L., Bing, K. L. L. (2012). Agency for Toxic Substances and Disease Registry Brownfields/Land-Reuse Site Tool. *Journal of Environmental Health, 75* (5), 30-34.

Pizzol, L., Zabeo, A., Klusáček, P., Giubliato, E., Critto, A., Frantal, B., Martinát, S., Kunc, J., Osman, R., Bratke, S. (2015). Timbre Brownfield Prioritization Tool to Support Effective Brownfield Regeneration. *Journal of Environmental Management, 166*, 178-192

Rizzo, E., Pesce, M., Pizzol, L., Alexandrescu, F. M., Giubilato, E., Critto, A., Marcomini, A., Bartke, S. (2015). Brownfield Regeneration in Europe: Identifying Stakeholder Perceptions, Concerns, Attitudes and Information Needs. *Land Use Policy, 48*, 437–453.

Schädler, S., Morio, M., Bartke, S., Rohr-Zänker, R., Finkel, M. (2011). Designing Sustainable and Economically Attractive Brownfield Revitalization Options Using an Integrated Assessment Model. *Journal of Environmental Management*, *92*, 827-837.

Shaw, K. S., Hagemans, I. W. (2015). 'Gentrification Without Displacement' and the Consequent Loss of Place: The Effects of Class Transition on Low-income Residents of Secure Housing in Gentrifying Areas. *International Journal of Urban and Regional Research*, 323-341. DOI:10.1111/1468-2427.12164

United States Environmental Protection Agency (2016), Brownfield Grant Fact Sheet Search Database. Retrieved from https://cfpub.epa.gov/bf_factsheets/

United States Environmental Protection Agency. (1979). The Love Canal Tragedy. Retrieved from https://www.epa.gov/aboutepa/love-canal-tragedy

United States Environmental Protection Agency. (2014). State Brownfields and Voluntary Response Programs 2014. Retrieved from www.epa.gov/brownfields

United States Environmental Protection Agency. (2016). Brownfield Overview and Definition. Retrieved from https://www.epa.gov/brownfields/brownfield-overview-and-definition

Comprehensive Environmental Response, Compensation, and Liability Act (1980). (Public Law No. 96-510).

Small Business Liability Relief and Brownfields Revitalization Act. (2002). (Public Law No. 107-118).

United States Government Accountability Office. (2001). Supporting Congressional Oversight, Framework for Considering Budgetary Implementation of Selected GAO Work. (GAO Publication No. GAO-01-447). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2004). Federal Revitalization Programs Are Being Implemented, but Data on the Use of Tax Benefits Are Limited (GAO Publication No. GAO-04-306). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2004). Stakeholders Report That EPA's Program Helps to Redevelop Sites, but Additional Measures Could Complement Agency Efforts (GAO Publication No. GAO-05-94). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2005). Hazardous Waste Programs: Information on Appropriations and Expenditures for Superfund, Brownfields, and Related Programs (GAO Publication No. GAO-05-746R). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2005). Stakeholders Cite Additional Measures That Could Complement EPA's Efforts to Clean Up and Redevelop Properties (GAO Publication No. GAO-05-450T). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2006). Remediation Activities Account for a Small Percentage of Total Brownfield Grant Funding (GAO Publication No. GAO-06-7). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2009). Litigation Has Decreased and EPA Needs Better Information on Site Cleanup and Cost Issues to Estimate Future Program Funding Requirements (GAO Publication No. GAO-09-656). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2010). EPA's Estimated Costs to Remediate Existing Sites Exceed Current Funding Levels, and More Sites Are Expected to Be Added to the National Priorities List (GAO Publication No. GAO-10-380). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2010). Interagency Agreements and Improved Project Management Needed to Achieve Cleanup Progress at Key Defense Installations (GAO Publication No. GAO-10-348). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2010). Policies and Procedures for Public Health Product Preparation Should Be Strengthened (GAO Publication No. GAO-10-449). Washington, DC: U.S. Government Printing Office.

United States Government Accountability Office. (2015). Trends in Federal Funding and Cleanup of EPA's Nonfederal National Priorities List Sites (GAO Publication No. GAO-15-812). Washington, DC: U.S. Government Printing Office.

United States House of Representatives, Subcommittee on Investigations and Oversight of the Committee on Science and Technology (2009). The Agency for Toxic Substances and Disease Registry (ATSDR): Problems in the Past, Potential for the Future? (House of Representatives Serial No. 111-10) Washington, DC: U.S. Government Printing Office

Wang, Q., Kilgour, D. M., Hipel, K. W. (2015). Numerical Methods to Calculate Fuzzy Boundaries for Brownfield Redevelopment Negotiations. *Group Decis Negot*, 24, 515–536.

Wernstedt, K., Blackman, A., Lyon, T. P., Novak, K. (2013). Revitalizing Underperforming and Contaminated Land Through Voluntary Action: Perspectives From U.S. Voluntary Cleanup Programs. *Land Use Policy*, *31*, 545-556.