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A STUDY OF LOCAL ELECTED OFFICIALS' ATTITUDES

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RECLAIMING LANDFILLS FOR RECREATION: A STUDY OF LOCAL ELECTED OFFICIALS' ATTITUDES

By

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ABSTRACT

RECLAIMING LANDFILLS FOR RECREATION:
A STUDY OF LOCAL ELECTED OFFICIALS' ATTITUDES

By

Chia-Jen Liu

This study aimed to explore the local elected officials' attitudes toward reclaiming closed type II and type III landfills for recreation uses and to identify the factors influencing the local elected officials' intentions to support landfill recreation reclamation (LR). Data were collected by means of self-administered questionnaires in southern lower Michigan. A conceptual framework based on the theory of planned behavior was applied in developing the survey instrument. The reliability and validity of the newly developed instrument were supported.

This study underlines the usefulness of using a social psychological theory for increasing our understanding of the local elected officials' behavioral intentions regarding their attitudes toward landfill recreation reclamation in their communities. The results suggest that the support of reclaiming closed landfills for recreation uses in the study areas should be facilitated if the local elected officials' perceived positively toward LR (perceived more benefits than risks) and if they perceived support from community referents. The regression of their behavioral intentions toward LR is considered to be a joint function of two significant predictors: (i) attitudes toward the act (Aact) -- perceived

consequences and preference evaluation, and (ii) subjective norms (SN) -- social pressure from their communities. By applying the model, the local elected officials' behavioral intentions toward LR could be predicted using a small set of constructs developed in this study. The model yielded an adjusted R^2 of 0.55 ($p < 0.001$).

Furthermore, the Aact was found to be a more significant predictor than was SN for the prediction of behavioral intentions. Perceived behavior control did not contribute to the prediction of behavioral intentions in this study. Subsequent analyses found that perceived benefits, one of two underlying components of the Aact, was a significant determinant of behavioral intentions. The perceived risk component did not contribute substantially to the prediction of the behavioral intentions. A two-step threshold assumption regarding benefit versus risk was supported. Concerns about liability resulting from landfill recreation reclamation, potential funding, the need of landfill end-use preplanning, and end-use regulation were also discussed.

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I have dedicated this dissertation to my family and especially to my wife, Yu-Ying; my father, Mr. Kuo Liu; and my father-in-law, Mr. Tieh-Chih Hwang. The understanding, support, and encouragement they have provided and the sacrifices they have made during these years in Michigan are the main force to push me to complete this dissertation. I hope their sacrifices will be rewarded many times over throughout many years to come.

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CHAPTER 1

INTRODUCTION

Resource recycling has become an important global concept in the 1990s. In addition to recycle reusable materials, recycling is being extended to include site reuse or land reclamation. "Site Reuse, Redevelopment, and Reclamation" was the top environmental issue for Michigan economic development, rated by the members of the Michigan Economic Developers Association in 1994. Site reuse or recycling applies to unsuitable land uses (landfills, brownfields and super-fund sites) that have been reused or restored to more productive developments (Main, 1995). A national conference emphasizing such a land use strategy was first launched by the National Golf Foundation (NGF) in 1995. The NGF conference, entitled "Landfill Golf Courses -- Suitable Developments for Otherwise Unsuitable Sites", was held in Charlotte, North Carolina, using a series of educational seminars regarding closed landfills and golf course development.

Across the United States, a number of closed landfills were developed with a variety of recreational use, such as the Sanlando softball complex in Seminole County, Florida (Mackey, 1996), and the golf course at Cave Creek Golf Course in Phoenix, Arizona (Saunders, 1997). Other recreational facilities such as playgrounds, trails also were built on closed landfills. For example, Byxbee Park built in the City of Palo Alto, California (I Spot, 1997). These recreation facilities might not be as pleasant as those in a natural setting, but they are a blessing for communities that are short of recreation space,

or in need of improving their living environmental quality.

However, the dilemma is that the concerns of potential risks also keep some communities away from this landfill reclamation business. The city of Urbana completed a study for its landfill post-closure recreation uses in 1985. Due to the concerns of costs and potential risks to public users, according to the city environmental manager, the plan was not implemented (Fletcher, 1997). Concerns of safety and criticism of previous landfill use from surrounding residents also delayed a local park development in East Lansing, Michigan (Gawenda, 1997). There could be more cities which have concerns about the safety and health problems not yet revealed. The issue of whether reclaiming closed landfills for recreation use or not has been a controversial topic in community recreation development. Thus, this study aims to examine local elected officials' attitudes toward landfill recreation reclamation in southern lower Michigan, and their underlying concerns regarding landfill recreation reclamation.

Urban Sprawl, Recreation Need, and Landfill Recreation Reclamation

Urbanization and Community Recreation

Michigan is a highly concentrated urbanized state with 80 percent of its people living in the metropolitan areas of southern lower Michigan (Michigan Department of Natural Resources, MDNR, 1991). However, Michigan's population is slowly moving from central cities in metropolitan areas to non-metropolitan areas. This back to nature attitude developed along with the population movement suggests an increasing desire for open space and outdoor recreation opportunities in metropolitan areas as well as

non-metropolitan areas.

The MDNR estimated that local government managed about 114,000 acres of recreation land in 1980 (MDNR, 1991). In the 1991-1996 Michigan Recreation Plan, MDNR indicated these local lands are more intensively developed; they play an extremely crucial role in local recreation. These local lands are close to home for most of their users, and thus can be used during small blocks of leisure time, without high travel cost, and by people with transportation limitations. However, this acreage is still too small for meeting local recreation needs. In the report, MDNR (1991) also indicated, as populations continue growing, the demand for open space and outdoor recreation opportunities has also risen from the previous decade, and will continue into the future. To meet this demand local governments have to obtain more recreation space for residents' recreation needs. However, the competition of the scarcity of land among housing, agricultural, industrial, and recreation uses has made it more difficult to acquire the land needed for recreation. Thus, MDNR has emphasized the acquisition of land for public access in the southern half of the lower peninsula.

The need of land acquisition also reveals the rising land costs problem in southern lower Michigan. Vacant land might be available in some urban communities, but land costs may be too high to acquire land for recreation. Michigan communities have extremely relied on the Michigan Natural Resources Trust Funds (MNRTF) for community recreation land acquisition and development (MDNR, 1991). Over the past 15 years, the MNRTF and its predecessor fund have provided over $170 million in land acquisition funding. Lands acquired have ranged from small parcels for neighborhood parks to large tracts for wilderness recreation and preservation. However, not all

communities could receive funding support from MNRTF. For example, in 1996, the MNRTF Board had received about 330 applications, requesting $68.9 million in grant assistance for recreation land acquisition and development (MDNR, 1996). The amount far exceeded the MNRTF's annual funding, approximately $20 million a year.

Without immediate access funding for land acquisition to accommodate growing population needs for recreation, some communities have tried to utilize marginal land such as riverfronts, floodplains, and wetlands to provide additional outdoor recreation opportunities for their citizens. Accordingly, landfills located at each host community may be a potential source to help fulfill community recreation needs.

One recent practice is to reclaim closed landfills for recreation uses, which might be influenced by land restoration concept. Restoration of a damaged landscape has been practiced since the early 1900s. Krohe (1993) stated, "Restore means salvaging damaged sites for new economic use, converting strip mines into parks or pastures that had little to do with the virgin land (p.72)." As landfill was initially introduced to solve the waste problems, its end uses might also provide an opportunity for those communities with increasing recreation needs to restore part of the damaged landscape in their communities for recreation uses. Therefore, when compared with other alternatives of parkland supply provision, the adoption of reclaiming landfill recreation may be a realistic alternative in certain situations. In addition, when considering the trends of urbanization, the scarcity of park land, and the rising land costs, reclaiming landfill for recreation uses is a significant agenda that landscape or recreation planners will face in the foreseeable future.

Landfill Recreation Reclamation

Landfill recreation reclamation is not a totally new idea, dozens of communities in the United States have reclaimed or restored closed landfills in their communities during the last decade. Reclamation cases could also be found in France and Canada. Back into 1863, when Paris established Parisian Park, this was probably the earliest of European public parks that was built on the grounds of a waste disposal site (Engler, 1995). It was not until 1961 that the first landfill golf course, in Marine Park Brooklyn, New York, was built in the United States (Saunders, 1997). Mitchell (1965) also documented a few landfill recreation developments in the early 1960s, which included a golf course in San Diego, California; and a park in Kenosha, Wisconsin.

In 1969, the Project Garden Cities: Turtle Mound was planned to reclaim a garbage dump as a park. The project was not built but had an influence on the waste landscape (Matilsky, 1992). In 1970, Calverton-Fairland Local Park was built on top of a reclaimed landfill in Silver Spring, Maryland (Garn, 1996). Later in 1976, Rundle Golf Course, an 18 hole course, was constructed over the old Beverly landfill in the city of Edmonton, Alberta, Canada (Edmonton, 1997).

More recently the city of Palo Alto, California built Byxbee Park on top of a closed landfill in 1991, which was nearly ten years after the master plan was developed. The park has gathered much positive response from residents since then (I-Spot, 1997).

Until the present, recreation uses of closed landfills have included reclaiming of landfills for playgrounds, ballfields, ski slopes, coasting hills (Sorg & Hickman, 1968; Brunner & Keller, 1972; Naber, 1987). Additional examples included soccer and baseball fields, walking and bicycling paths, and amphitheaters in Salt Meadows Park in Fairfield,

Connecticut; in the Evanston metropolitan areas, Illinois; and in DeKorte Park, New Jersey (Arent, 1989; Treadaway, 1989; Griswold, 1993). Several large tracts were converted into golf courses, for instance, in St. Lucie and Orlando, Florida; in Charlotte, North Carolina; in Phoenix, Arizona; and in Santa Clara and Spanish Bay, California (Matthews, 1994; Noah, 1994; Saunders, 1997).

In Michigan, the city of Riverview has developed a ski slope and lately has planned a golf driving practice range on a former tubing hill; while Lyon Township has put a 120 acres community park on top of a landfill with the support of Browning Ferris Industries (BFI) and the Michigan Department of Natural Resources. These communities have perceived benefits generated from the waste sites, such as contemporary needs of park and recreation uses, land redemption, and wildlife reserves.

Brownfields Redevelopment — A Potential for Community Revitalization

Along with the communities taking actions to reclaim their closed landfills, other community revitalization movements have been promoted across the United States. Such are known as "Brownfields Redevelopment." Brownfields were defined by the United States Environmental Protection Agency's (EPA) as "abandoned, idled or underutilized industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination" (Brownfields, 1998). To help the communities address environmental concerns associated with idled, underutilized or abandoned industrial and commercial properties, EPA announced the Brownfields Economic Redevelopment Initiative (Brownfields, 1998). The purpose of this Initiative is to help put brownfields facilities back to sustainable and beneficial reuse. The restoration

movement also included redeveloping brownfields for recreation uses. For instance, part of the football field in the Carolinas Stadium, North Carolina was built on a former state Superfund site after it had remained dormant for nearly a decade (Lee and Haas, 1995).

Brownfields redevelopment is also a priority for the Michigan Department of Environmental Quality (MDEQ). As the MDEQ has indicated, brownfields problems are not limited to large cities in Michigan, as small towns and villages all over Michigan also have suffered (Michigan's commitment, 1997).

> They, too, are discovering that the creative, cooperative efforts of state and local resources can breathe new life into old abandoned properties. A single project in a small municipality can have a tremendously positive impact on new job creation, revitalizing the look of downtown areas and bringing critical economic growth to the community (p.1).

The MDEQ has created a Brownfields Coordination Team in its Environmental Response Division, to help communities dealing with potential environmental contamination properties that prevents redevelopment and potential job creation. Pilot programs are already underway using funds from the federal Superfund program. Site Assessment Grants and Site Reclamation Grants are two grant programs offered by the MDEQ for investigation and remedy of contaminated property. These funds are available to promote economic development and property reuse. As of 1997, thirty-two grants for site reclamation totaling nearly $20 million have been made to support revitalization in Michigan Communities (Michigan's commitment, 1997).

Landfill waste disposal areas may be classified as brownfields, as Pontin (1998) stated, especially if they are in or adjacent to an urban area. In Michigan, landfills recreation reclamation might be considered as brownfields redevelopment if they meet MDEQ's criteria (Norgbey, 1998). For instance, a proposed site reclamation project must

show such things as environmental benefits, economic benefits, utilization of existing infrastructure, and utilization of public and private funding. An example in Michigan is from the city of Gibraltar, which is in the process of reclaiming one of its existing brownfield sites as a golf course. MDEQ is currently evaluating their proposal for site reclamation program grants. Another example in Massachusetts is a $65 million brownfield reclamation project near Boston (Reclamation project enjoys spoils of Boston's big dig, 1998). The town of Milton and the city of Quincy will transform three landfills into a 470-acre recreation complex, including a 27-hole golf course, athletic fields and hiking trails. The project will save Massachusetts more than $30 million to cap and close the landfills. Also the developer, the Quarry Hills Association, is projecting an average profit of $1.25 million per year.

In the State of Michigan, according to a 1997 database from the Michigan Department of Environmental Quality, currently, approximately 100 active landfills exist. The acreage of these facilities varies from less than 30 acres to over 100 acres. As society continues to rely on landfills for waste disposal, landfill numbers will increase in the future (Arrandale, 1993). It is critical to use these landfills effectively after they are closed. Their potential end uses might provide significant land parcels available to communities for recreation development if landfills are planned and operated with future reclamation in mind. Furthermore, a 30-year monitoring period by the owner is mandated by the 1994 EPA's regulation, after a landfill is closed. A traditional landfill closure design would protect the environment, but remain unproductive for at least 30 years. Thus, it is important that a landfill end-use plan which allows enhancing land productivity should be considered. The combination of potential funding sources and

assistance from both State and Federal governments will enable Michigan communities to have very good opportunities in reclaiming their closed landfills into more productive uses.

Statement of the Problem

Community Concerns Toward Recreation Uses of Closed Landfills

Although agreement is fairly widespread over the physical feasibility studies of landfill reclamation (Naber, 1987; Treadaway, 1989; Golden, 1994; Rux, 1995; Hurdzan, 1995), and a number of potential funding and assistance from both State and Federal governments such as brownfields redevelopment described previously; the concerns of potential risks may have made some communities hesitate to adopt the new approach for local park land expansion.

Even though the advantages of landfill reclamation do exist, that does not mean disadvantages or risks are not involved. The reasons that keep some communities away from the reclamation business might originate from previous perceptions of landfills, the public fear of the threats of contamination, and potential risks involve gas and ground settlement problems resulting from landfill operation.

Before further diffusing the practice, the issue landscape architects and/or recreation planners need to consider seriously is "What are the underlying factors that make a difference in communities' support for and opposition toward landfill recreation reclamation?" These underlying factors may be influenced by community perceptions and social/political concerns, which are discussed below.

Perceived Benefits versus Perceived Risk

In regard to the need of more recreation space as populations grow, especially in metropolitan areas, landfill recreation reclamation may provide a potential land source for future park and recreation development. The potential of this new source of supply is significant, since most urbanized areas have acres of landfill within their boundaries. The implementation of reclaiming closed landfills by municipalities or townships would not only alleviate the park land shortage problem, but also greatly improve community overall environmental quality, and boost the surrounding neighboring land value as well. It may further mitigate the negative impacts generated from landfill operations. Thus, the negative influences that caused the NIMBY syndrome could be reversed, and these idle lands could then become useful resources providing social and economic benefits to their host communities.

Nevertheless, people generally view landfill operations from a negative perspective (e.g., deteriorating environmental quality, jeopardizing public health). A host community may develop exclusively a revulsion to the idea of landfill recreation reclamation. It is due to the very notion of landfill may be considered dangerous and unpleasant (Bauman and Kasperson, 1974). The reason for the hesitation is properly due to the perceived risk that might occur in the field such as ground settlement, gas explosion, and water contamination that might cause potential safety or health hazards. For example, methane generation may cause a potential explosion, if it is not appropriately collected. The leachate, which was produced when solid waste decomposed or broke down, may contaminate groundwater and negatively affect the community drinking water system. For recreation users, the more direct impact is contact with

leachate on site, which would cause health concerns if they are not appropriately treated. Organic settlement can later crack foundations and trail surfaces, or cause depressions in the turf areas of golf course or sports fields.

Given the local officials' responsibility of protecting public health and the concerns of the uncertainty and liability involved in the landfill recreation reclamation, the personal caution of local officials, such as in the city of Urbana, Illinois is understandable. These may be the potential factors that may affect people's acceptance of the new strategy of park-recreation development. However, lack of evidence can show that attitudes toward reclaiming closed landfills for recreation uses were influenced by the negative perceptions toward the landfills operation. It would be useful to know how people perceive these potential environmental hazards and to what degree they are concerned.

Community Social and Political Aspects

Most cases mentioned thus far which have dealt with landfill reclamation focused primarily on physical feasibility, rather than evaluating social and/or political aspects. As Saunders (1997) stated:

> Though the benefits of such a project seems obvious, the reality of regional politics, the NIMBY factor, and volatile land value can all affect the chances for success. It takes a concerted effort from both regulatory agencies and planners to make these projects feasible (p.2).

Factors that might have a significant influence on the acceptance of the landfill recreation reclamation include community recreation demand, funding availability, support from local government, community residents, interested groups, and landfill owners if landfill is not owned by the local government.

It is critical for planners to understand whether a host community knows about the positive aspects of the transformation of landfills, and other negative repercussions. Then, what are their attitudes toward the reclamation if they are aware of the reclamation practices? In an attempt to reclaim landfills, several concerns regarding awareness, acceptance, and perceptions that could be derived from the land use practice are present below.

Does a host community know about landfill reclamation for recreation development? How does a host community perceive this kind of development? Are they concerned about any safety issues related to landfill use for recreation? Does the opposition, NIMBY fears, or negative images prevent a host community from using recreation facilities developed on a closed landfill? Then, Does a host community accept this kind of land reclamation practice?

In their study of wastewater reuse, Bauman and Kasperson (1974) stated, "If careful analyses of the potential obstacles had been undertaken prior to the diffusion of fluoridation, the history of its public acceptance might be substantially different (p. 670)." Thus, it is critical to the success of landfill recreation reclamation for a community to be aware of any potential social/political obstacles.

To reveal any potential obstacle, an extensive literature review was conducted to examine any related study presented in any conference, journals, or magazines. Only one study, so far, was found relevant to residents and professionals' opinions of landfill reclamation (Heumann, 1985). However, the study did not provide needed information to explain the different decision in landfill recreation reclamation. There is ambiguity in how these host communities perceive a landfill recreation reclamation project, and what

the potential obstacles are. The host communities' attitudes toward landfill recreation reclamation are unknown. No study has been identified that addresses the attitudes of how people support or oppose reclaiming landfills into recreation uses.

Local Decision Makers versus Community Residents

Given the long-standing public resistance to landfill siting and potential benefits which might provide to host communities, this study is mainly concerned with whether a closed landfill should be restricted solely to remain an idle space, or lead to major innovations in the provision of urban or rural park land supply for a host community. Thus, two further questions need to be addressed. First, will local governments (decision-makers and related officials) support landfill recreation reclamation? Second, will community residents (and interested groups) accept landfill recreation reclamation? Decision-makers, related officials, and community residents are considered the most relevant groups for having a direct influence on future development of the landfill end uses. The support of local officials and community residents in reclaiming closed landfills will strongly influence the promotion of landfill recreation end uses. It will also have an influence on future landfill reclamation projects in other communities' opinion formation. Consequently, if their decisions readily exclude closed landfill recreation reclamation as a viable alternative, it will be difficult to turn their landfill sites into community assets. Landfill use then will be the end of these potentially significant land parcels. However, their perceptions of the potential role of landfill recreation reclamation will reflect their underlying values and motives. Exploring factors that influence a host community's attitude toward landfill recreation reclamation will provide further understanding of how

this alternative land use may take effect, and their willingness to accept or support the practice will determine the success of landfill recreation end uses.

However, an investigation of both local elected officials and community residents is beyond the scope of this study. The present study then focuses on examining local elected officials' attitudes toward landfill recreation reclamation. Also the following factors were considered. First, even though closed landfill recreation end uses have greatly increased during the last decade, the adoption of closed landfill recreation end uses as an alternative in the provision of municipal and township recreation system has not been assessed carefully. Secondly, local elected officials generally represent the level of government closest and most responsible to the wishes of their citizens. Their attitudes may reflect the opinion of community residents. Knowing the level of acceptance by local elected officials toward landfill recreation reclamation and their intention to support the approach will help future landfill recreation practices.

Purposes and Objectives of the Study

As the number of sanitary landfills continue to grow on the Michigan landscape, local elected officials' attitudes regarding landfill reclamation for recreation use in their community are an integral part of community recreation decisions. Hence, the purpose of this study is to examine local elected officials' attitudes toward recreation uses of closed landfills. The study will examine whether local elected officials support or oppose potential reclamation projects in their community. The factors that affect their attitudes toward landfill recreation reclamation will be investigated. Ajzen's theory of planned

behavior (1985) provides the theoretical basis for the study. According to Ajzen (1988), attitude, in this case, is an overall evaluation judgment about the desirability of recreation development on closed landfill. The sum of a set of beliefs then determines attitude toward landfill recreation reclamation. Finally, attitude is assumed to influence various actions depending on required efforts, possibility of success and payoffs. Three main determinants in the theory, attitude toward the act, subjective norms, and perceived behavior control, were adopted as an applicable structure to assess local elected officials' attitudes toward landfill recreation reclamation.

The research objectives of this study, therefore, include the following.

1. To explore the relationship between local elected officials' perceptions and behavioral intention in the context of landfill recreation reclamation.

2. To construct measures of three determinants (attitude toward the act, subjective norms, and perceived behavior control) and behavior intention and test the relationship that exists between three determinants and behavior intention to support landfill recreation reclamation.

3. To examine the differences between local elected officials' perceptions of benefits and perceptions of risks associated with recreation end uses of closed landfills.

4. To explore any potential obstacles in landfill recreation reclamation.

Significance of the Study

In Michigan, most of existing landfills will be closed within the next 15 years. By the time they close, the locations of these sites properly become potential areas that are

suitable for recreation development. As available land disappears from metropolitan areas, closed landfills may only be the few open spaces remaining for park and recreation development. Thus, a productive use of these closed landfills is a situation in which no one loses, and community residents, landfill companies, and government agencies benefit. It is also critical to use closed landfills effectively as their numbers may increase in the future since communities will continue to rely on landfills for waste disposal. However, local elected officials' attitudes play an important role in the success of landfill recreation reclamation. Therefore, the significance of the study includes, but is not limited to the following.

(1) To provide information about local elected officials' attitudes and underlying factors for future planning and management.

(2) To contribute to policy formation regarding productive use of land resources by effectively reclaiming these potential idle lands for recreation uses.

(3) To facilitate future landfill recreation reclamation and make a more productive use of the closed landfill resources.

Definitions, Limitations, and Delimitation

Definitions

Various terms used in this study are operationally defined as follows:

1. Landfill recreation reclamation (LR)

Actions emphasize on preplanning and converting a sanitary landfill after it is closed to support recreation uses without damaging the closed layer of the landfill.

2. Survey subjects -- local elected officials

The study will survey local elected officials. A local elected official in this study refers to people serving in 1998 in each selected township or city level in southern lower Michigan. It usually included a supervisor, clerk, treasurer, and several trustee or council members from township board or city council.

3. Municipality and Community

In this study, municipality is referred to either as a city or a township which was included in the current study. Community is referred to the municipality and people the survey subject served.

4. Active landfill versus Closed landfill

Active landfill refers to those sanitary landfills currently operating or closed and being monitored under EPA regulations and/or under Michigan Act 641 at the time this research was conducted. It could be a type II landfill or a type III landfill. Closed landfill in this study refers to a landfill which has reached its capacity and is no longer taking waste.

5. Sanitary landfill, Type II Landfill and Type III Landfill

The following definitions are based on the definitions in the Michigan Department of Natural Resources, Waste Management Division, Act 641 Rule 105:

> Sanitary landfill means a type of disposal area consisting of 1 or more landfill units and the active work areas associated with these units. Sanitary landfills shall be classified as one of the following types of landfills:
>
> (i) A type II landfill, which is a municipal solid waste landfill and includes a municipal solid waste incinerator ash landfill.
>
> (ii) A type III landfill, which is any landfill that is not a municipal solid waste landfill or hazardous waste landfill and includes both of the following: (a) Construction and demolition waste landfills, (b) Industrial waste landfills (p.11-13).

Where "Municipal solid waste landfill" or "Type II landfill" means:

> A landfill which receives household waste, municipal solid waste, incinerator ash or sewage sludge and which is not a land application unit, surface impoundment, injection well, or waste pile. A municipal solid waste landfill also may receive other types of solid waste, such as commercial waste, non-hazardous sludge, conditionally exempt small quantity generator waste, and industrial waste. Such a landfill may be publicly or privately owned (p.10).

6. Superfund

The Superfund was established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The statute was better known as the Superfund since it taxed chemicals, petroleum products, and general corporate profits to finance the Hazardous Substance Superfund (Revesz and Stewart, 1995). The Act has provided a mechanism to identify and rank sites contaminated by hazardous materials such as a result of mining, petroleum refining, manufacturing, and waste disposal, which pose serious threats to human health and the environment (Portney and Probst, 1994). Some of these superfund sites might be considered as brownfields.

Limitations

Local elected officials may have a different interpretation of recreation development. They may refer recreation development to such facilities as golf courses, playgrounds, neighborhood parks, and ball fields. The study may not reveal which type of recreation development they have in mind. However, the study had asked about their recreation development preference.

The scope of the study was limited to investigate local elected officials in southern lower Michigan. Thus, inference of the results must proceed cautiously.

Delimitation

The study confined itself to examining communities that host an active landfill, including those in the stage of 30 years of monitoring in southern lower Michigan. It was delimited to a township or municipality that has at least one sanitary landfill, either type II or type III, currently operating or under monitoring in their district, either private or government owned.

Overview of Study Approach

Theory of planned behavior from Ajzen (1985) provides a theoretical foundation for the current study to reveal local elected officials' attitudes. The study is presented in five chapters. Specifically, Chapter Two reviews the literature relating to attitude measurement methods, theoretic approach, and landfill recreation reclamation, with an emphasis on developing a conceptual framework relative to the understanding and predication of intention to support landfill recreation reclamation. Chapter Three outlines the selection of the study population and the development of a survey instrument, sampling procedures, and survey administration. Chapter Four presents the validity and reliability of the measurement and the descriptive findings relative to the theory components. Hypothesis tests were reported and discussed. Chapter Five is devoted to assessing the usefulness of the conceptual framework for understanding and predicting future landfill recreation reclamation. Finally, implications for further research are also discussed.

CHAPTER 2

REVIEW OF LITERATURE

This Chapter contains a review of attitude related literature and presents the theoretical foundation for the study. This study is mainly concerned with the attitudes of local elected officials toward closed landfill reclamation for recreation uses. Special emphasis is placed on the discussion of the theory of planned behavior. Next, an examination of landfill recreation reclamation (LR) and its relevant issues are presented. In addition, literature related to environmental risk, and attitudes on land reclamation are briefly reviewed. Finally, the conceptual framework and hypotheses for this study are presented. Also included in this chapter are reviews of major factors related to LR that serve as the conceptual basis for the formation of the survey instrument.

Beliefs, Perceptions, and Attitudes

A large number of attitude theories have been proposed over the last fifty years to explain how and why people hold certain attitudes and the related phenomena of attitude and belief change. In their book "Attitudes and Persuasion", Petty and Cacioppo (1981) have grouped the various attitude theories into seven major approaches. These are the conditioning and modeling approach, the message-learning approach, the judgmental approach, the motivational approach, the attributional approach, the combinatory approach, and the self-persuasion approach. Each of these approaches emphasizes

different prospects and processes to explain the change of attitude and belief. For example, the combinatory approach, which includes information integration theory and theory of reasoned action, focuses on how the information that people received is evaluated and integrated to form an overall attitude toward an issue, object, behavior. These attitude theories and measurement constitute a broad and controversial field of study in social psychology. In social psychology, it is assumed a relationship exists between attitude and behavior. Thus, to understand and predict whether local elected officials support or oppose LR, it is necessary to begin with a brief review of the central concepts: attitude, belief, and perception and then focus on the discussion of the theoretical approach in this study.

Attitude and Behavior

Behavior is considered as an action or series of human actions performed by individuals. Behavior can be defined either as nonverbal action or verbal statements concerning behavior; both verbal and nonverbal responses are observable behaviors and reflect a person's underlying disposition or attitudes (Ajzen and Fishbein, 1980). In attitude research, social scientists have assumed that human action could be explained by attitude. According to Cohen (1981), attitude can be precursors or determinants of a person's behavior. Petty and Cacioppo (1981) further noted that a widespread agreement among social psychologists is that an attitude refers to a general and enduring positive or negative feeling about some person, object, or issue.

Moreover, attitudes include affective component, cognitive component and behavioral component (Tull and Hawkins, 1990; McAndrew, 1993). The affective

component, similar to the feeling that Petty and Cacioppo described, refers to people's positive or negative reaction toward an object or behavior that makes people evaluate the object or behavior in question as good or bad, pleasant or unpleasant. The cognitive component refers to knowledge or beliefs held about the object or behavior. The behavioral component refers to the action toward the object or behavior. For example, a person may exhibit a negative feeling toward a landfill site (negative affect with respect to the previous landfill image), but believe that a closed landfill is safe due to a strict monitoring system (positive cognitive component) and agree to a reclamation development (favorable behavioral component). Thus, to study local elected officials' attitudes would include the evaluation of their affective, cognitive, and behavioral components toward landfill recreation reclamation.

Beliefs, Perceptions and Attitudes

A person's beliefs, as defined by Ajzen and Fishbein (1977), represent the ideas or information he/she has about other people, objects, and issues. The information may be factual or only one person's opinion. It may be positive, negative, or neutral. Beliefs may be formed on the basis of direct observation, from information obtained through outside sources, or by way of various inference processes. In this regard, beliefs are thought to contribute to the formation of cognitive or affective components. As Ajzen and Fishbein (1977) stated, when a person makes evaluative judgments about the information associated with issues, objects, or behavior, his/her belief becomes an attitude, or his/her attitude is formed.

Perceptions, as noted by Fisher, Bell, and Baum (1984), are influenced by

affective, cognitive, and evaluative components, all operating at the same time. Perceptions vary with the individual past experience and present values, needs, memories, social circumstances, and expectations. For example, as people perceive a landfill environment, the cognitive processes involved might include thinking about what people can do in that environment and they might compare this environment with alternative environments based on their knowledge. Moreover, people's feelings (i.e., disfavor, anger, fears) about a landfill influence their perception of it. Finally, evaluation of good or bad elements associated with a landfill environment will contribute to the formation of a person's perceptions.

Whether local elected officials support or oppose LR can also be viewed as adopting an innovation approach. Rogers (1983) stated the adoption process of innovation as a series of steps including: awareness, interest, evaluation, trial, and adoption. Perception appears to be the beginning of this adoption process. That is a person's awareness of landfill recreation reclamation, his/her interest in reclamation, and his/her evaluation of the outcome of the reclamation all influence his/her perceptions toward adoption or acceptance of a landfill recreation reclamation proposal. Overall, perceptions are certain processes that a person adopts to recognize the environment. Perceptions consist of information processed through inferring or constructing meaning from present experiences and memory of past experiences, which simultaneously involve affective, cognitive, and evaluation processes. What people perceive relies on the acuity of the individual's senses to notice or become conscious of something that exists or to understand the ease or difficulty of the task. Considering the formation of perceptions and the components of attitudes, a person's perceptions can be therefore considered very

closely related to his/her attitudes except no actual action.

In sum, a person's beliefs are underlying his/her perceptions and further become his/her attitudes toward an object or behavior. One might assume if beliefs toward LR could be identified, the evaluation of these beliefs of local elected officials will then provide an indication of their perceptions/attitudes toward LR. Knowing local elected officials' attitudes will presumably help predict the kinds of behaviors in which they are likely to engage.

In fact, the relationship between attitude and behavior is not that simple. The inconsistency between attitude and behavior has been examined and discussed in attitude research throughout the years. The major concern here is whether or not attitudes can predict behavior. Wicker (1969) reviewed about 50 studies in which verbal and overt behavioral responses were obtained and concluded that attitudes were often unrelated or only slightly related to overt behaviors. Similarly, McGuire (1969) in review of attitudes and attitude change stated that person's verbal report of his/her attitude has a rather low correlation with his/her actual behavior toward the object in question. Often what was argued is that attitudes are just one of several factors which influence behavior. To more accurately predict behavior, additional variables may need to be taken into account, such as personality traits, normative prescriptions of proper behavior, expected or actual consequences of the behavior, competing motives (Ajzen & Fishbein, 1980). These variables will be considered as independent contributors to behavior or serve as moderators of the attitude-behavior relationship. Ajzen and Fishbein (1980) proposed a conceptual framework in an attempt to incorporate attitude toward the act variable and subjective norm variable to predict behavior, known as the Theory of Reasoned Action.

The Theory of Planned Behavior (Ajzen, 1985) was formed later by adding a perceived behavioral control variable to the theory of reasoned action. The approach suggested that appropriate measures of attitude with additional variables could strongly predict behavior. The theoretical framework was considered appropriate for the present study and is concisely presented below.

Theory of Reasoned Action and Theory of Planned Behavior

Predicting Behavior from Intentions

To predict and understand a person's behavior is first to identify and measure the behavior of interest. Then, the underlying factors that determine the behavior can be examined. The theory of reasoned action, from Ajzen and Fishbein (1980), summarized a causal sequence to explain the relationships between beliefs, attitudes, behavioral intentions, and behavior and tried to understand and predict attitude and behavior change. In the theory, a person's intention to perform or not perform a given behavior is considered as the immediate determinant of the action. Ajzen and Fishbein (1980) stated that the theory is based on the assumption that people are usually quite rational and consider the information available to them. Ajzen and Fishbein also argued that people evaluate any potential consequence of their actions before they decide to engage or not engage in a given behavior. In the theory, behavioral intentions are assumed to capture the motivational factors that influence a behavior and refer to a measure of the likelihood that a person will engage in a given behavior. The most direct determinant of a behavior is a person's intentions to perform it. In other words, a causal relationship exists in which

a person's attitudes toward an object or act directly influences behavioral intentions, and the person's behavior is primarily determined by the behavior intentions. That is to understand a person's behavior is to measure the person's intentions. Behavior intentions served as indications of how hard people are willing to try, or how much effort they are planning to make. The stronger a person's intentions to engage in a behavior, the more the person are expected to try, and the greater the likelihood that the behavior will actually be performed.

Several studies have shown a high correlation between intentions and subsequent behaviors (Ajzen and Madden, 1986; Watters, 1989; Harrison, 1995). However, examinations of the relationship between intentions and past behavior are limited in the current study. It is due to few communities in Michigan that have reclaimed landfills for recreation uses. Furthermore, predicting behavior from intentions does not provide much information about the reasons for the behavior. To understand human behavior, it is necessary to identify the determinants of behavior intentions and to obtain more in-depth information to explain why people hold certain attitudes.

Determinants of Behavior Intentions

To measure an individual's behavioral intentions, the theory of reasoned action identified two determinants: (i) attitude toward an object, act, or behavior (Aact) and (ii) subjective norms (SN) for a specific behavior. The Aact is a personal factor and refers to the evaluation of the behavior in question as being liked or disliked, favorable or unfavorable. This variable provides information on a person's beliefs and feeling about the behavior. Subjective norms are more socially oriented referring to an individual's

perceptions of social pressure to perform or not perform the behavior. This variable provides information on social pressure from others.

A behavior may be considered as completely under a person's control if the person can decide to perform or not to perform a given behavior. However, most intended behavior such as losing weight, obtaining a loan, approving a proposal are subject to some degree of uncertainty (Ajzen, 1985). Behaviors that depend on some degree of non-motivational factors such as appropriate opportunities or on possession of adequate resources (time, money, skills, cooperation of other people) may interfere with behavior control (Ajzen, 1985; Ajzen and Madden, 1986; Ajzen, 1991). Thus, the theory of planned behavior (Ajzen, 1985), incorporated an additional determinant (perceived behavior control) along with Aact and SN into the theory to predict behavioral intention. Perceived behavior control (PBC) refers to a person's perceptions of the amount of control he/she has over performing the behavior in question. Therefore, key concepts in the theory of planned behavior include behavior, behavioral intention, attitude toward the act, subjective norms, and perceived behavior control. Each concept stands alone and may interact with each other. These components are further described in the following sections and their application in the current study is presented later in the conceptual framework section.

Attitude toward the Act and its Components

Attitude toward the act (Aact) indicates the degree to which a person has affective evaluation of those attributes possessed by the object or behavior in question. For example, a person may perceive to perform or not perform a behavior based on his/her

evaluation of a like or dislike, favorable or unfavorable, advantage or disadvantage. The importance of using a measure of attitude to understand and predict intentions is that the attitude measure is toward his/her own performance of the behavior in question (Ajzen and Fishbein, 1980). For example, if the behavior under investigation is "the use of a landfill recreation site", then the relevant attitude used to predict or explain this behavior should be the individual's attitude toward his/her use of a reclaimed landfill site. Ajzen and Fishbein (1980) noted that attitude toward the act also applies to any attitude toward persons, issues, objects, or institutions.

Attitude toward the act can be measured in two ways, directly and indirectly. Direct measure of attitude toward the act is considered as the best predictor of behavior intention. For example, using a semantic differential, respondents could be asked to rate an item by using evaluative scales, such as good versus bad, foolish versus wise, toward a behavior.

However, indirect measure of attitude toward the act assesses a person's perceptions or beliefs. Each belief links the behavior to a certain outcome or to some attributes such as costs or benefits resulting from the behavior. People form beliefs about a behavior or an object by associating it with various attributes or characteristics it possesses. For example, in a belief item that *supporting LR* (the object) will *provide additional recreation opportunities that the community needs* (the attribute). As Ajzen and Fishbein (1980) stated a person's life experiences lead to the formation of many different beliefs about various persons, issues, objects, behaviors, or actions that are generated through direct observation, accepting information from outside sources, or through inference processes. However, it appears that only a relatively small amount of

beliefs stand out at the time of attitude formation. These beliefs so called salient beliefs are the direct determinants of the person's attitude (Ajzen and Fishbein, 1980). According to the theory, Aact is determined by a person's salient beliefs about the behavior, termed attitude beliefs. The examination of the salient beliefs can provide more descriptive information that reveals the cognitive foundations or underlies beliefs that correspond to behavior intention.

Ajzen and Fishbein (1980) also noted people might differ in belief strength, i.e., their perceived likelihood that an object has or is associated with the attribute in question. For example, some local elected officials may be very certain landfill reclamation for recreation use is safe, while for others this may be only a vague notion. Some officials may feel very favorable toward additional recreation opportunity while others may slightly favor or even oppose such a consequence. Therefore, to understand why a person holds a certain attitude toward an object it is necessary to assess his or her salient beliefs that the object has certain attributes and his or her evaluation of those attributes. That is measuring the strength of a person's beliefs or the likelihood that the behavior is associated with a specific outcome.

To obtain a person's salient beliefs, Ajzen and Fishbein (1980) have suggested the simplest and more direct procedure is using a free-response format and asking a person to list the characteristics, attributes associated with the object in question. The first five to nine beliefs a person emits are his/her salient beliefs about the object. When eliciting salient beliefs about an object in question from a population through free response, certain beliefs occurring with the greatest frequency are then considered modal salient beliefs. These salient beliefs will then form the core of an attitude instrument.

Thus, a local elected official's attitude toward an object or event, such as landfill recreation reclamation, is determined by his/her beliefs that the event has certain attributes and his/her evaluation of those attributes. If his/her beliefs toward landfill recreation reclamation primarily associate with attributes that are favorably evaluated, his/her attitude toward the reclamation tends to be positive. Inversely, a negative attitude will result when a local elected official associates landfill reclamation mostly with unfavorable attributes. An individual may hold both favorable and unfavorable beliefs about an object. For example, a local elected official is in favor of additional recreation opportunities but disfavors it as a safety hazard. Therefore, a local elected official's attitude toward landfill recreation reclamation is viewed as corresponding to the total influence associated with his/her evaluation of modal salient beliefs elicited from a population (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980). His/her attitudes may be, therefore, assessed by calculating an index over responses to a set of belief items.

According to the theory, a person's attitude toward an object can be estimated by multiplying his/her evaluation of each attribute associated with that object by the subjective probability that the object has that attribute, then summing the products for all salient beliefs. A modal salient belief does not necessarily represent the attitude beliefs held by any given individual. However, they provide a profile of the beliefs that are assumed to determine the attitudes for most people of the population under investigation. Therefore, by measuring a local elected official's belief strength and his/her evaluations with respect to modal salient beliefs we can not only predict a local elected official's attitudes, but we also obtain information about the determinants of his/her attitudes (Ajzen and Fishbein, 1980).

Subjective Norm and its Components

A norm, as Bethlehem (1990) noted, usually refers to "a way of thinking or behaving that is regarded within a culture as the right way to think or behave, or a very common way to think or behave." In the theory, Ajzen and Fishbein (1980) stated that subjective norm (SN) refers to a person's perception that most people who are important to him/her think he/she should or should not perform the behavior in question. The concerns are various social pressures exerted by those important others in regard to the performance of the behavior. The more he/she perceives that those people think he/she should perform a behavior, the more he/she will intend to do so. On the contrary, if he/she perceived it was important that others think he/she should not perform a behavior, he/she will usually intend not to do so.

Subjective norm can also be measured directly and indirectly. A direct measure of subjective norm is usually obtained by asking respondents to rate the magnitude to which "important others" would support or oppose of his/her performing a behavior in question. Subjective norms are also a function of beliefs, which is the beliefs of a specific individual thinks he/she should or should not perform the behavior in question. These beliefs underlying a person's subjective norm are termed normative beliefs and these individual and groups are known as referents. According to the theory, the indirect measure of subjective norm constitutes two components, normative beliefs and motivation to comply (Ajzen and Fishbein, 1980). Normative beliefs represent the perceived degree of support for performing a given behavior from referents to the individual. Motivation to comply is the extent of the individual's likelihood to comply with the expectations of these persons.

As in the case of the attitude beliefs, local elected official's salient normative beliefs can be elicited in a free response format. The most frequently mentioned individuals or groups will be selected. A local elected official's normative beliefs can then be measured by using the Likert scale. Overall, subjective norms are also based on the evaluation of a total set of salient normative beliefs and each weighted by motivation to comply. That is the strength of each normative belief is multiplied by the person's motivation to comply with the referent in question, and subjective norms are directly proportional to the sum of the resulting products across the total number of salient referents.

Perceived Behavior Control and its Components

Traeen and Nordlund (1993) noted that what a person expects he/she will do in reality is a matter of perceived control. A person's actual behavior control usually is closely associated with resources and opportunities available to the person, which to some extent indicates the likelihood of behavior achievement (Ajzen and Madden, 1986). Unfortunately, it is often not possible to measure actual control prior to observing the behavior. However, it is possible to measure a person's perceived behavior control.

A person's perceived degree of control over a behavior reflects the subjective evaluation of different physical and social factors that may occur which facilitate the behavior or make it more difficult to perform (Ajzen, 1985). In other words, it refers to the person's belief as to the degree of perceived ease or difficulty of performing the behavior. The presence or absence of requisite resources and opportunities has direct influence on a person's intention (Ajzen and Madden, 1986). For example, the more

resources and opportunities a local elected official thinks he/she possesses (such as potential funding, revenue production), and the fewer obstacles or impediments he/she anticipates (such as safety, liability problems), the greater he/she perceives control over the behavior in question.

A person's beliefs about resources and opportunities may be viewed as underlying perceived behavior control, termed control beliefs. These control beliefs about behavior control are assumed to reflect past experience of oneself or his/her friends as well as anticipated opportunities or barriers toward performing the behavior. As in the case of the attitude and normative beliefs, it is possible to elicit these control beliefs from a population. The most frequently mentioned resources, opportunities, and barriers will be selected. Then, a person's control beliefs can be measured by using a Likert scale. According to the theory, the importance of control belief is multiplied by the perceived facilitating or inhibiting effect of the resource or opportunity under consideration, and the resulting products are summed to obtain an estimate of perceived behavior control.

The Application of the Theory

Both the theories of reasoned action and planned behavior have been applied to research in predicting and understanding people's intentions and behavior. Research has supported the validity of both theories in the prediction of diverse behaviors. For example, the theory of reasoned action has been used to measure attitudes and assess behavior in a variety of recreation settings. These studies included measurement of visitor attitude toward resource use and management (Kiely, 1979), predicting and understanding attitude toward participating in water skiing, pleasure cruising and fishing

(Fedler, 1981), measurement of attitudes of campers, canoeists, wilderness recreationists, wild river users (Cable, et al, 1987), and examining park and recreation students toward providing services to persons with disabilities (Austin et al, 1990). The theory has also been applied in other contexts such as environmental attitude toward household hazardous waste management (Zhao, 1992).

The theory of planned behavior also received substantial empirical support in a variety of attitude behavior studies. For instance, the theory was tested and supported in predicting and understanding college students' attendance of class lectures (Ajzen and Madden, 1986), predicting voting attitude and behavior in the 1988 presidential election (Watters, 1989), predicting visiting public drinking places (Traeen & Nordlund, 1993), predicting mothers' intentions to use Oral Rehydration Therapy (Hounsa, et al., 1993), predicting volunteer motivation and attendance decisions (Harrison, 1995), predicting health-related practices (van Ryn, et at., 1996), and predicting health-check attendance (Norman and Conner, 1996).

The relative importance of the predictors in the model upon intentions varies with contexts. In their health check study, Norman and Conner (1996) found the relative importance in descending order: attitude, subjective norm, and perceived behavior control. In Hounsa's (1993) study, attitude toward the act is the best predictor, then perceived behavior control. However, in college student attendance (Ajzen and Madden, 1986) and in visiting public drinking place study (Traeen and Nordlund, 1993) found perceived behavior control is the strongest predictor, then attitude toward the act.

So far, both theories provide a solid conceptual framework for instrument development to examine local elected officials' attitudes. To determine which theory is

more appropriate for the study, some issues related to landfill recreation reclamation are further discussed below.

Sanitary Landfills Development and Landfill Recreation Reclamation

This section is aimed at reviewing the development of landfill recreation reclamation and its associated problems. It begins with a brief review of the growth of sanitary landfills as well as recreation development on closed landfills. This serves to provide some critical background information with respect to the evolution of landfill recreation reclamation. Then issues associated with landfill recreation reclamation are discussed. These issues are brought up by host communities' concerns of risks as well as the potential benefits. The concepts of hazards and risks are briefly discussed due to the concerns about the potential risks affecting the development of landfill recreation reclamation.

Americans produced 195-million tons of solid waste in 1990, according to the U.S. Environmental Protection Agency (EPA), and that will increase to 220 million tons by year 2000 (Arrandale, 1993). The disposal of solid waste will continue to be a pressing problem in urbanized areas or even in rural communities. Several ways to dispose of solid waste such as incineration, open dumping, and sanitary landfilling are available. However, sanitary landfilling is considered as the preferred disposal method (Stead, et al., 1991) in regards to both economic and technical concerns. Although recycling rates are rising, it is estimated that approximately 72 percent of that garbage wound up at the landfills, and many smaller communities still rely almost exclusively on landfills

(Arrandale, 1993).

Prior to the 1970s, almost every town had its own open dump. It was often placed on what were called "useless" wetlands or in other out-of-the-way out-of-sight spots. During the 1970s and early 1980s, many of these dumps were closed (Page, 1993) due to either full to capacity, or to protect the groundwater system as well as public health, especially in wetland areas. The sanitary landfill method was then adopted to control the disposing of refuse on land to minimize nuisances or hazards to public health or safety (Sorg and Hickman, 1968). A sanitary landfill can deal with the large volumes of rubbish from urban development, and various forms of agricultural waste and industrial refuse. A sanitary landfill compacts trash, covers it over with dirt every day, instead of using open dumps, and establishes pollution control such as monitored groundwater. However, problems still occur with the sanitary landfill approach.

Issues of Sanitary Landfill -- NIMBY Syndrome

When the sanitary landfill method was introduced to solve waste problems in a civilized manner, it did not alleviate the problems. With the volume of solid waste increasing, in many communities, these sanitary landfills are filling up, and everyone wants their replacements to be built in someone else's backyard. Dunphy & Lin (1991) stated that new landfills are locally unwanted land uses (LU-LUs). In a local government managers surveyed, Dunphy and Lin (1991) identified solid waste management as the most significant issue, even rated ahead of drugs and education, faced by their community. Many communities are trying to haul waste out of town to avoid political

battles over siting new facilities. However, resistance is growing in many host communities that take other people's garbage.

This type of communities' attitudes toward a landfill is also recognized as Not In My Backyard (NIMBY) syndrome that occurred at different levels, from local community to regional, even national (Page, 1993; Gunderson, 1993). The public fears the threats of contamination and undesirable effects, and the concerns grew that landfills were polluting the surrounding environment. Raymond (1989) stated that communities that are close to selected landfills do not want to carry a long-term burden with the unpredictable threats to the health and living conditions of their residents. The factors accounting for this problem was usually called the "Big Three" in the local opposition to landfill operations.

The "Big Three" included water pollution, health risks, and decline in property values. The issues of groundwater contamination resulted from leachate downward into soils and drinking water tables that further affect public health. Potential explosive methane and other gases generated by decaying trash contribute to air pollution and affect public safety. The conflict over aesthetic and real estate values and the increasing concern for environmental quality around host communities are other issues. In addition, factors such as noise, odors, and consequent heavy truck traffic occurred around nice, quiet neighborhoods also piled up the opposition (Raymond, 1989; Dunphy and Lin, 1991; Mash 1991).

However, concerned with environmental pollution control and to reduce risk potential, the Environmental Protection Agency (EPA) required all landfills to comply with more strict standards effective in April 1994. The Subtitle D of the Federal Resource

Conservation and Recovery Act (RCRA) which established landfill design and performance standards required landfills to comply with certain criteria. These criteria include: (a) double plastic liners; (b) leachate recovery pumps, a system to collect the rain water and liquid (leachate) created when solid waste decomposes or breaks down; a place to treat leachate after it has been collected; and a means to verify that nearby underground water in not harmed; (c) gas collection or flaring systems, a gas recovery system (decaying trash releases methane gas); (d) impenetrable covers -- 6 inches daily, 18 inches cap; and (e) 30 years monitoring plan after landfill closed -- which requires monitoring gas, collecting leachate and preventing the cover from being disturbed. To comply with these standards, a closed landfill is expected to provide a more secure environment for the community and eventually more suitable for future reclamation.

Today, the problem of landfill siting is as difficult as that of protecting a wilderness area (Page, 1993) due to the strict regulations and increased opposition to landfills. These have not only reduced the hazardous landfill facilities, but also have made landfills harder to site, and increased waste processing expense (Page, 1993; Dunphy & Lin, 1991; Arrandale, 1993).

Issues of Landfill Redevelopment -- Landfill Recreation Reclamation

A recent significant trend involved landfill and recreation is so called landfill recreation reclamation (LR). The increasing affluence and leisure time and a growing population have placed an increasing pressure on outdoor recreation development. While new parkland becomes harder to find, people begin to utilize a closed landfill site for recreation development. For example, golf courses, community parks, ski hills, hiking

trails, and ball fields have been developed on or adjacent to closed landfills. The reclamation is considered beneficial to both host communities and landfill developers due to the factors such as low or no land cost, and additional recreational opportunities. Besides recreation demand mentioned above, several other attributes that might be taken into landfill recreation reclamation consideration and affect local elected officials' beliefs are discussed as follows:

(i) Property value -- The positive impact on surrounding land or property value after reclaimed landfills has been reported. For instance, golf course and science park were built on closed landfills in the city of Edmonton, Alberta, Canada. Since then, the property values of land adjacent to Edmonton's landfills went up 30 percent (Naber, 1987). The boosted land value of neighboring land in John F. Kennedy Presidential Library, Boston is another example (Naber, 1987). The Renaissance Community Park located on a landfill in Charlotte, North Carolina has increased land value and helped revitalize southwest Charlotte (Golden, 1994).

(ii) Location -- Landfill location can affect what can be done. Naber (1987) noted the John F. Kennedy presidential Library was built on Boston's Columbia Point, a former landfill, thanks to its location near Boston and the scenic harbor view it affords. While the growing communities gradually surround some previous remote landfills, the creation of additional recreation facilities may be a desirable solution for the communities.

(iii) Economics -- Economic factor is another factor that may significantly influence what can be done with a closed landfill. The acquisition costs for closed landfills are usually low compared with prices for surrounding land. However, the site construction and maintenance costs are relatively higher. It is estimated at least 20

percent more than a more conventional site (Hurdzan, 1995; Rux, 1995). In some cases, revenue production could be generated such as user fees resulting from golf courses, and ballfields.

(iv) Hazards and risks -- Nevertheless, to reclaim a closed landfill also has similar problems rooted in the fears of risk to public health and safety. Methane gas generation can cause a potential explosion danger. Settlement can cause foundations to crack or effect drainage in the turf areas or sport fields, or affect roads or tennis courts surfaces. Park users might be affected by the presence of hazardous waste materials or leachates on site that can cause health concerns about using the facility. The problem of odors generated from the decay of organic matter has potential to ruin the quality and experience and discourage use of the recreation facility. These are potential hazards that may exist on the reclaimed facility for a certain period of time. As in McCool and Braithwaite's study (1992), they distinguished hazard as a set of circumstances that may cause harmful consequences, and risk as the likelihood of being harmed by a hazard. Along with the definition, the hazards involved in the LR included methane gas, waste settlement, and leachate. And the risks are that people may be injured came from a potential gas explosion, uneven ground settlement, and direct exposure to leachate. As risks are a continuous concern in LR, more in-depth discussions follow.

McAndrew (1987) noted that a major difficulty people face when making decisions involving environmental hazards is that they are trying to make decisions under conditions of uncertainty. As Wilson and Crouch (1987) stated, "Risk implies uncertainty, so that risk assessment is largely concerned with uncertainty and hence with a concept of probability that is hard to grasp (p.267)." The perception of risk could cause

a difficulty in people's decision making. In review of landfill recreation development, the risk dilemma somewhat causes hesitation in some communities to develop recreation facilities on or adjacent to a landfill. The cases in the city of Urbana and the city of East Lansing previously mentioned in chapter one are examples.

Previous risk acceptance studies show, perceived benefits and perceived risks as the two factors that have been discussed and compared in their role of importance in studies of risk acceptance (Fischhoff, et al., 1978; Sokolowska and Tyszk, 1995). To understand the impact of benefits and dangers on acceptance of risky activities, Sokolowska and Tyszk (1995) assumed that people use a two-step threshold strategy. First, people evaluate the level of danger. They reject the activity if they consider the risk level is too high. If the perceived risk level is acceptable (meet a certain threshold, low or moderate risky activities), people look at the benefits side and then perceived benefits are the main determinant of their attitude. The result of Sokolowska and Tyszk's (1995, p733) study did support the assumption that acceptance of a activity with a low or moderate degree of risk has been mostly influenced by perceived benefits.

The concerns of residents' health and safety appear to have a significant influence on local government decision making. Last (1997) found in his study of local elected officials' decision making criteria that most zoning committee members' decisions were motivated by a desire to prevent harm to landowner health or safety by the proposed land use. If this is true, then the magnitude of perceived risk involved in landfill recreation reclamation will play an important role in its acceptance. However, no study was found that measured risk in that aspect. Nevertheless, in their study of the effect of risk beliefs on property values, McClelland, et al. (1990) found that a wide diversity of risk beliefs of

community residents exists towards a landfill. In general, two segments of responses are found. Some residents believed the risk to be very small and rated it at 10^{-5} in a risk ladder, which is approximately the risk from the average consumption of saccharin. The others believed the risk to be large and rated it at 10^{-2}, which is approximately the risk of smoking at least one pack of cigarettes per day. However, 51% of respondents in the study believed that health risk decline after landfill closure.

In addition, people may be not aware that time and proper engineering can resolve some of the problems related to landfill recreation reclamation. Most methane generation and waste settlement problems are expected to occur in the first few years after landfill closure. EPA's mandated methane and leachate monitoring and collection system can minimize the hazard problem. Furthermore, methane gas is only dangerous when it is contained in a closed structure. In an open environment, it is not dangerous (Treadaway, 1989). Planning and design landfill utilities with later recreation use in mind also can mitigate the problems. Therefore, it can be assumed if perceived risks including potential methane gas explosion, leachate contamination, ground surface settlement, were considered as acceptable in a recreation setting, then local elected officials' attitude toward landfill recreation reclamation will be mostly influenced by perceived benefits.

Benefit, according to Driver, et al. (1991), is a change that is viewed as advantageous. In other words, a change is an improved or desired condition plus positive impacts from production and use of leisure services or a gain to an individual, a group, to society. In this case, perceived benefits could be increasing property value, additional recreation opportunities, and economic advantages in the aforementioned literature review. The current study uses the assumption of perceived benefits outweighing

perceived risks. That is, supporters will perceive higher benefits resulting from landfill recreation reclamation while still perceiving certain level of risks, and opponents will perceive higher risk.

Attitude Study related to Landfill Recreation Reclamation

At the present, the only study found in attitude survey related to landfill recreation reclamation was from the city of Urbana, Illinois. The landfill post-closure recreational alternatives study (Heumann, et al., 1985) measures the impacts of conversion of the landfill site on surrounding land use from the perspective of adjacent land owners, local planners, real estate brokers, and developers. The study indicated the more intensive recreational use of a closed landfill area, the more likely the revitalization will occur. The study also reported that respondents indicated an active or a passive recreational use of the landfill would cause an increase in the demand for housing within the impact area. The respondents also projected land value increase after an active or a passive recreational conversion, but decreased after a noisy recreational use or no change after a revegetated alternative.

The landowners survey indicated that the active recreational alternative was most favored, rather than the passive recreational alternative. It also showed a generally positive response to all the conversion alternatives presented. The landowners interviewed expressed the alternative use must be one that can revitalize the area. The result of the planners, the real estate brokers, and developers interviewed showed all alternative recreation uses (active, passive, noisy, revegetation) would benefit the

surrounding area, with the exception of the noisy recreation use.

Alternative recreation activities regarding revenue production were also examined using site constraints, development costs, maintenance costs, surrounding impacts, and perceived demand. The study concluded that several revenue producing activities (i.e., golf, trailer camping) can be integrated with non-revenue producing activities such as hiking and a wildlife observation corridor.

Despite the positive results obtained from the study, the city did not convert the landfill into a recreation area due to the great health and safety concerns from the city management officials (Fletcher, 1997). Therefore, to examine local elected officials' attitudes toward landfill recreation reclamation in their community becomes an integral part of the community recreation development.

The Conceptual Framework for the Study

Perceived benefits and perceived risks of the development of a closed landfill into an outdoor recreation area have become a prominent issue. As controversy has grown, it has become apparent that little is known about whether local elected officials support or oppose landfill recreation reclamation. Thus, such problems may be aided by the studies of attitudes of local elected officials, based on the Ajzen and Fishbein's theory.

Research on the planned behaviors has demonstrated that when volitional control becomes questionable, the addition of perceived behavioral control significantly improves prediction of intentions as well as prediction of behavioral achievement (Ajzen and Madden 1986; Ajzen, 1988). In the present study, the decision of local elected officials

was considered more toward goal-directed issues, while their major duties concerned the value of community growth. In addition, their decision making was also influenced by some external control factors such as funding, location. Thus, the study was mainly based on the theory of planned behavior to develop an instrument to assess local elected officials' attitudes toward landfill recreation reclamation.

That is, the intention to support landfill recreation reclamation (LR) depends on a local elected official's attitude toward attaining the goal of community growth (development, benefits), on perceived social pressure to attain it, and on perceived behavior control over goal attainment. Beliefs concerning the likely consequences of the LR influence the attitude toward the goal. The attitude beliefs of likely consequences may be categorized into perceived benefits and perceived risks. Perceived benefits may be based on perceived economic gain or improvement of community living conditions, while perceived risks are mainly influenced by NIMBY syndrome in terms of previous landfill perceptions and risk concerns. Community situations such as awareness, interests, recreation demand, preference, and resources could have an impact on the attitude beliefs as well as the other two determinants, normative beliefs and control beliefs. Normative beliefs that significant referents from the community would approve of making an effort to support the reclamation influence the subjective norms. Control beliefs about likely facilitating or obstacle factors that the community possessed underlie perceived behavior control. A diagram of this conceptual framework based on the theory of planned behavior is presented in Figure 2-1.

Several different techniques are associated with attitude measurement. However, the semantic differential method, Thurstone's method, and Likert scaling may be the most

frequently used scaling method. The attitude measurement used for the current study is mainly based on the semantic differential and Likert scale. Attitude measurement could be conducted by testing a person's location on a unipolar or bipolar evaluative or affective dimension regarding landfill recreation reclamation.

Attitudes toward the act (Aact) can be measured by asking each respondent to rate each consequence belief toward LR on a Likert scale. According to the theory, a local elected official's attitude toward his or her support of LR can be estimated by multiplying his or her evaluation of each attribute associated with LR by the subjective probability that the practice has that attribute, then summing the products for all beliefs. However, the study did not use the product of attitude beliefs and affective evaluation suggested by Ajzen's theory. The operation was modified to fit the study context. This is further explained in the methodology section.

The subjective norms (SN) measure how a local elected official felt about important others' assessment of his/her performing the behavior on a Likert scale. The SN is quantified by summing the products of normative beliefs multiplied by the motivation to comply for referents. Normative beliefs, the respondent's perceptions of relevant referents' expectations regarding whether or not supporting LR, are measured by asking the respondent to rate on an unipolar Likert scale. Motivation to comply with each referent's expectations is measured by asking each local elected official the degree of agreement with each referent's expectation.

Perceived behavior control (PBC) is measured by rating of several barriers and opportunities toward LR. The responses are recorded on a bipolar Likert scale such as Likely to Unlikely. Their perceived importance of these factors in their decision making

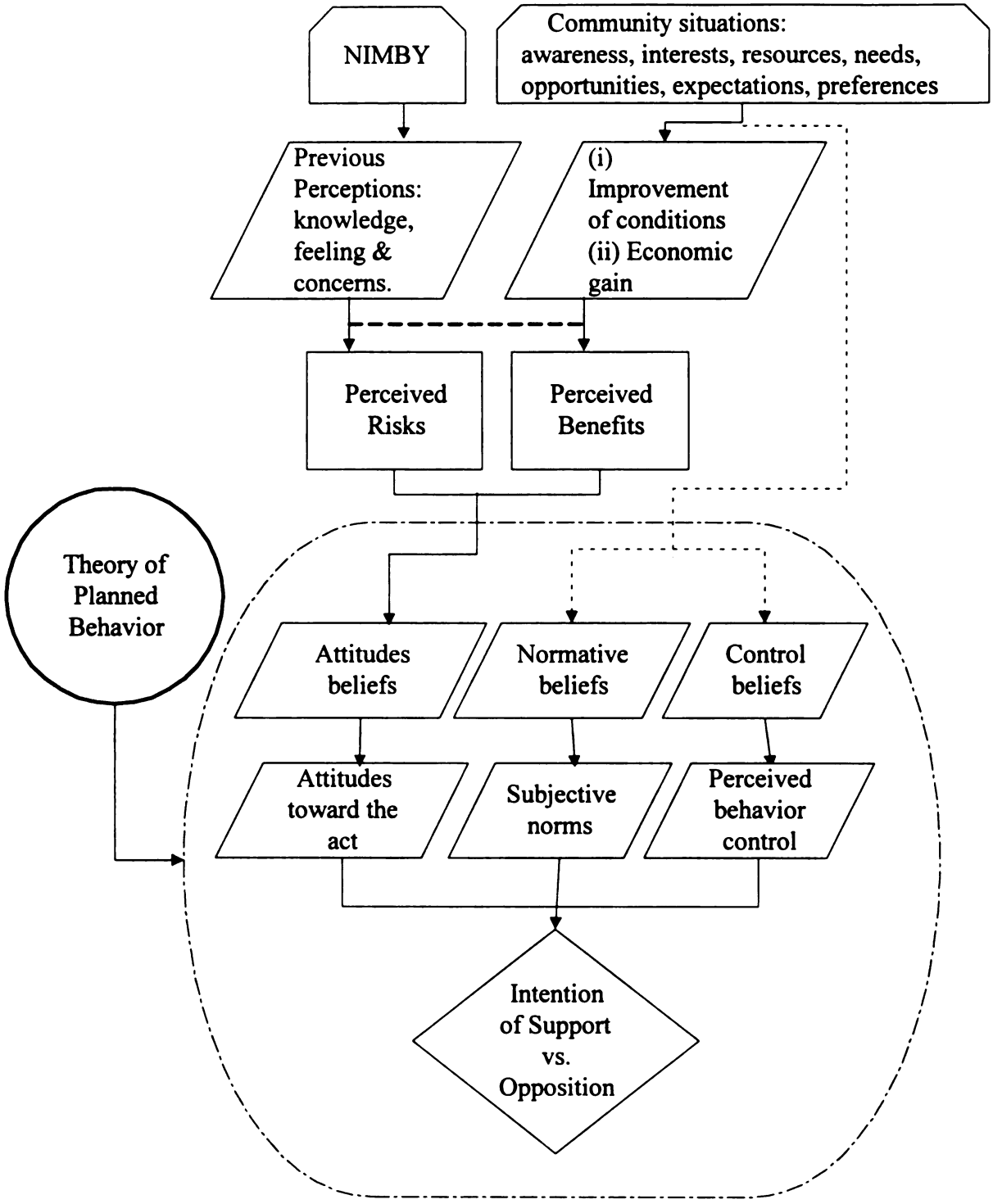


Figure 2-1. The Conceptual Framework of the Study

is measured on this unipolar Likert scale. The product of the scores of each barrier or opportunity multiplied by the perceived importance represented the measure of perceived behavior control.

Behavioral intentions (BI), the respondent's intention to perform a specific behavior (i.e., support or oppose the hypothetical development proposal) is measured by a bipolar Likert scale.

The above conceptual framework was adopted as a guideline for the development of the instrument in testing the theory and to identify the underlying factors that affect the intentions to support landfill recreation reclamation. Hypotheses were then designed according to the theoretical framework and are presented below.

Research Hypotheses

Hypotheses were mainly designed to examine the relationships between attitude toward the act (Aact), subjective norms (SN), perceived behavior control (PBC), and behavioral intentions. As stated in the literature review, the relationships of the attitudinal, normative and control determinants of the theory with behavioral intentions should be positively related, and four hypotheses were formed and stated in the null hypotheses form.

The following hypotheses examine the relationships between each determinant (Aact, SN, PBC) and behavioral intentions.

H_1: No relationship exists between the local elected officials' attitude toward the act and their behavior intentions to support landfill recreation reclamation.

H_2: No relationship exists between the local elected officials' subjective norms and their behavioral intentions to support landfill recreation reclamation.

H_3: No relationship exists between the local elected officials' perceived behavior control and their behavioral intentions to support landfill recreation reclamation.

The following hypothesis explores the relationship between three determinants (attitudes toward the act, subjective norms, and perceived behavior control) and behavioral intentions.

H_4: No linear relationship exists between the overall effects of the three determinants (attitudes toward the act, subjective norms and perceived behavior control) and the local elected official' behavioral intentions to support landfill recreation reclamation.

Three determinants (attitudes toward the act, subjective norms, and perceived behavior control) of the theory of planned behavior are considered as independent variables to predict the behavior intentions toward landfill recreation reclamation (dependent variable). Based on the above review and design, chapter three presents the processes of instrument development, sample design, data collection and analysis procedures.

CHAPTER 3

RESEARCH METHODS

The purpose of this study is to assess local elected officials' attitude toward landfill recreation reclamation. This study examines the differences in local elected officials' attitude toward the recreation uses of closed landfill(s) which are located close to their constituents. Thus the factors that affect the local elected officials' support and the degree of support of landfill recreation reclamation were investigated. This chapter presents the methodologies and procedures of the research including the following sections: study areas, population selection and sampling frame, determination of sample size, sample derivation, development of survey instruments, and data collection.

Sample Design

Study Areas

The major emphasis of this study was to survey, with a self-administered instrument, a representative cross section of local elected officials serving in a municipality in southern lower Michigan in 1998. The study areas were selected based on the following considerations:

First, the demand of parkland was considered. The need of landfill recreation reclamation is considered low in northern Michigan due to the scarce population results in less demand of parkland. Besides, more choices for the location of recreation space are

available. This is in contrast to southern lower Michigan where population density is greater and less open space is available for the growing population. Thus the need of landfill recreation reclamation is comparatively higher.

Second, the Michigan Natural Resources Trust Fund Board stated in their 1996 annual report, 329 applications requested a total of 68.9 million dollars in grant assistance for recreation land acquisition and development, and final approval was given to forty land acquisitions and twenty-six development proposals. Among forty land acquisition proposals, more than half of the proposals were made by counties in southern lower Michigan (MDNR, 1996).

Third, Sherman (1997), a physical engineer in the Michigan Department of Environmental Quality (MDEQ), stated that currently active landfill sites still are producing revenue, therefore, some funding could be set aside for future planning and development of potential recreation facilities associated with landfill reclamation. Also pre-planning can be established so that landfill operation would shape how the landfill can be used for future recreation. These active landfill sites are regulated under the Michigan Act 641 and the Environmental Protection Agency's (EPA) 1994 regulations. The EPA regulations require landfill using double plastic liners, a monitoring system, and impenetrable covers. As a result, it provides a much safer use environment than previous landfill sites that did not have a gas and leachate collection system. Therefore, the study area was focused on southern lower Michigan, which includes forty-one counties.

Sanitary Landfills in Southern Lower Michigan

Michigan currently has 105 active landfills according to the 1997 database from the Waste Management Division of the MDEQ. Seventy-four of these active landfills are

located in 28 counties in southern lower Michigan (See Figure 3-1). Among the 74 active landfills, 48 are Type II landfills and 26 are Type III landfills (See definition in the chapter one). Nine out of seventy-four of these landfills are closed under the 30 years monitoring requirements. Sixteen out of the seventy-four active landfills are owned by government agencies; the remaining fifty-eight landfills are owned by private firms. The total acreage of these landfills, including buffer areas, ranging from less than 20 acres to more than 400 acres. Approximately 33% of the landfills are below 20 acres; 39% of the landfills are between 21 and 65 acres; 9% of the landfills ranged from 80 to 110 acres; and 19% of the landfills are over 110 acres.

Study Population and Sampling Frame

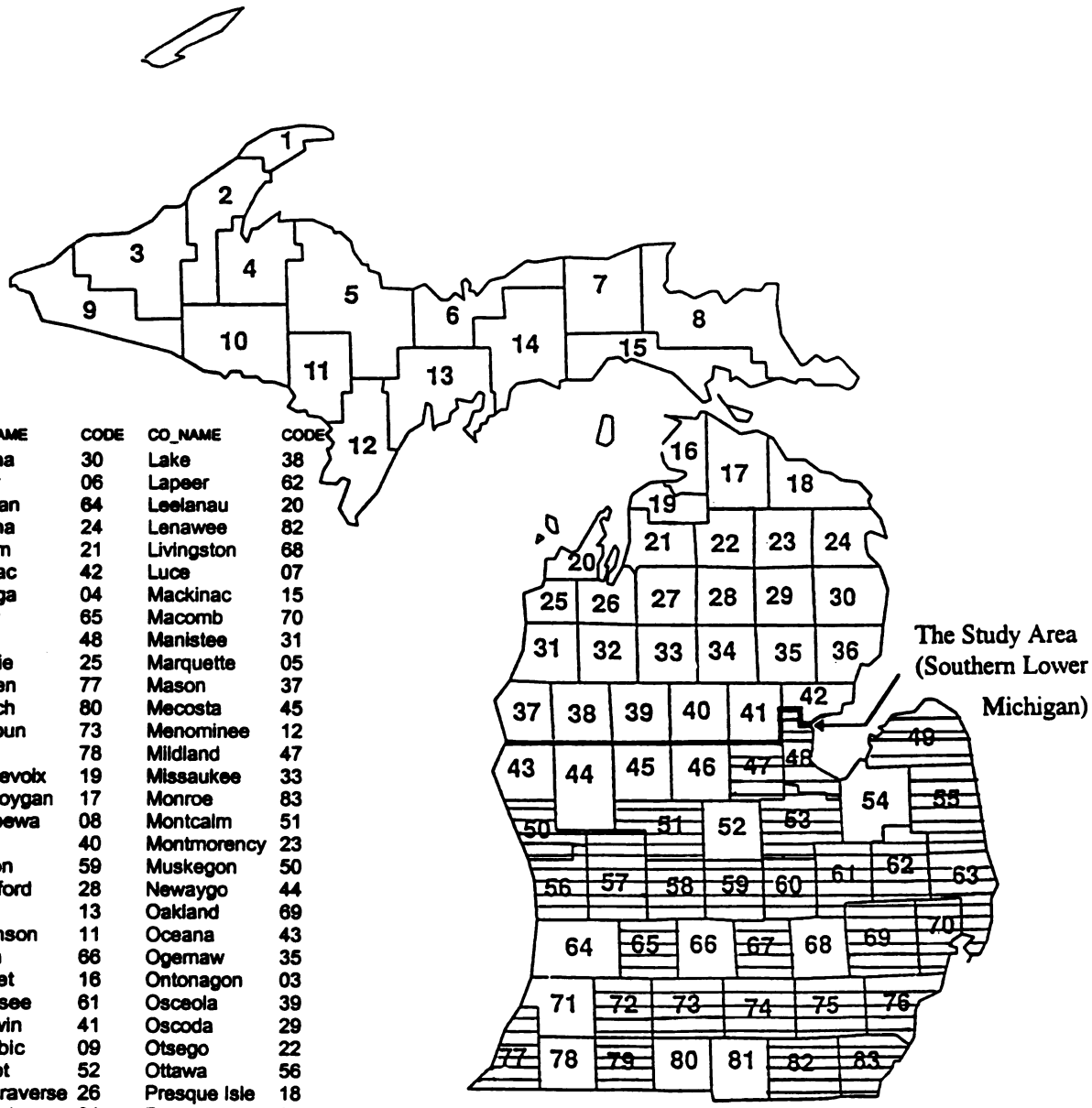
The study population includes local elected officials in southern lower Michigan municipalities (cities and townships) that have at least one active landfill regulated under EPA's 1994 regulation and Michigan Act 641, either currently under operation or closed under monitoring. Therefore, the study population was selected in two phases. Phase one, municipalities that have at least one active landfill located within their boundaries were identified within the twenty-eight counties mentioned earlier. In phase two, the city council members and township board members that serve in these identified municipalities were considered as the study population. More details are described in the following sections.

In phase one, two steps were performed to identify the municipalities that have an active landfill. Step one, a list of Michigan landfills was obtained from the Waste Management Division of MDEQ which contained information about landfills, such as

names of municipalities, types of landfills, ownership of landfills, status of landfills, and landfill acreage. There are sixty-one municipalities in the study areas consisting of seventy-four active landfills mentioned earlier. Some municipalities contain more than one landfill. Step two was taken to ensure that each identified municipality is a landfill host. The jurisdiction location (based on facility address and section number) of each landfill was searched and confirmed by using either the Street Atlas USA software (1997), county plat book (1997), or Michigan County Atlas (1989). Phone calls were made to some landfill offices to confirm their jurisdiction location where the landfill address was not valid in the previous approach.

A major task in phase two was to obtain lists of names and mailing addresses of local elected officials from the sixty-one identified municipalities. Since no single source contained all required name and address lists, the sampling frame was constructed based on three sources, the Michigan Township Officials Directory (1997), Carroll's Municipal/County Directory (1997), and the Directory of Michigan Municipal Officials (1997). Each municipality has 5 to 8 city council members or township board members, consisting of 382 local elected officials used as the study population.

Confirmation of the list of names was conducted because of the concern over replacement of some local elected officials in the 1997 November's election. An updated name and addresses list was obtained by making phone calls to each municipality in an attempt to reduce any hidden errors such as undelivered mail.



CO_NAME	CODE	CO_NAME	CODE
Alcona	30	Lake	38
Alger	06	Lapeer	62
Allegan	64	Leelanau	20
Alpena	24	Lenawee	82
Antrim	21	Livingston	68
Arenac	42	Luce	07
Baraga	04	Mackinac	15
Barry	65	Macomb	70
Bay	48	Manistee	31
Benzie	25	Marquette	05
Berrien	77	Mason	37
Branch	80	Mecosta	45
Calhoun	73	Menominee	12
Cass	78	Mildland	47
Charlevoix	19	Missaukee	33
Cheboygan	17	Monroe	83
Chippewa	08	Montcalm	51
Clare	40	Montmorency	23
Clinton	59	Muskegon	50
Crawford	28	Newaygo	44
Delta	13	Oakland	69
Dickinson	11	Oceana	43
Eaton	66	Ogemaw	35
Emmet	16	Ontonagon	03
Genesee	61	Osceola	39
Gladwin	41	Oscoda	29
Gogebic	09	Otsego	22
Gratiot	52	Ottawa	56
Grd.Traverse	26	Presque Isle	18
Hillsdale	81	Roscommon	34
Houghton	02	Saginaw	53
Huron	49	Sanilac	55
Ingham	67	Schoolcraft	14
Ionia	58	Shiawassee	60
Iosco	36	St. Clair	63
Iron	10	St.Joseph	79
Isabella	46	Tuscola	54
Jackson	74	VanBuren	71
Kalamazoo	72	Washtenaw	75
Kalkaska	27	Wayne	76
Kent	57	Wexford	32
Keweenaw	01		

Figure 3-1. The Study Areas

Stratification and Sample Selection

Stratification by population size of the municipality was considered appropriate. Consideration was given to the different recreation space demands of various municipalities with different population sizes. Therefore, each class of selected municipalities (i.e., city or township) was divided into two subgroups -- those municipalities with a population under 10,000 and those with a population of 10,000 and greater. The study areas contained thirty-nine municipalities with a population under 10,000 and twenty-two municipalities had a population of 10,000 or greater. This approach ensured that the study had an adequate sample to represent each subgroup. Separate lists were identified arranging municipalities according to their population size. The list of the names of local elected officials related to each subgroup was identified. Therefore, the study population included 225 city council or township board members from municipalities with a population under 10,000 and 157 city council or township board members from municipalities with a population of 10,000 and greater. The ratio of these two sub-groups is 1 to 1.43 for municipalities of populations 10,000 and greater and municipalities with populations under 10,000.

As survey researcher Babbie (1992) suggested, an ordered list is more useful in obtaining a greater degree of representativeness and thus decreasing a probable sampling error. The sample frame kept the order of geographic relationship. That is the sample frame was first listed in alphabetical order of county names and then listed in alphabetical order of municipality names to insure that an appropriate number of samples were drawn from the homogeneous group (i.e., same municipality). Under the alphabetical order, officials in each municipality were kept together instead of alphabetically sorting the list

by officials' names. Once the officials had been arranged by population size, a systematically random sample was selected across the entire rearranged list from each population subgroup for the required number of respondents.

Determination of Sample Size

To ensure an appropriate statistical analysis to be operated at the 95% confidence level with a sample error at 5%, an appropriate sample size of 190 was needed for the study. The appropriate calculations of the sample size are based on the following statistic formula.

$$n_o = (z_{d/2})^2 * (pq / d^2) \text{ and sample size } n^* = n_o/(1+ n_o/N)$$

where $z_{d/2} = 1.96$,
$pq = (0.5*0.5)$ as assumed equal population proportion,
$d = 5\%$ sample error,
n^* = sample size, and N = population size.

However, according to Hembroff (1998), a policy survey researcher at Michigan State University, increasing the sample size will reduce the sample error resulting from the cooperation rate and hidden errors such as missing lists or the wrong addresses. It was also necessary because of the low response rate in the pilot survey. Therefore, the sample size was proportionally increased to 243. This would ensure a sufficient sample for the two population subgroups for further analysis.

After sample size was determined, the sample of local elected officials was proportionally selected in 1 to 1.43 ratio from the two population subgroups, population 10,000 and greater and population under 10,000, respectively. This was to ensure same proportion of samples were drawn from each population subgroup. For the pilot survey, 37 local elected officials were systematically and randomly selected from the

municipalities with a population under 10,000. Twenty-six local elected officials were systematically and randomly selected from the municipalities with a population of 10,000 and greater. Thus, a total of 63 local elected officials were selected to complete a pilot questionnaire Form-97. For the main survey, 143 local elected officials were systematically and randomly selected from municipalities with a population under 10,000. The remaining 100 samples were drawn from municipalities with a population of 10,000 and greater. Hence, a total of 243 local elected officials were drawn from the study population to complete a questionnaire Form-98.

Development of Instrument

The new instrument developed in this study was an attitude inventory using a self-administered questionnaire. The new attitude instrument was developed through the following three phases (Light, 1976; Decker, 1980; Spector, 1992):

Phase I -- development of items for pilot questionnaire;

Phase II -- pilot questionnaire formatting, scaling, and testing (pilot survey), and revising;

Phase III -- construction of questionnaire form-98 for the main survey.

Phase I -- Development of Items for Pilot Questionnaire

The instrument development began with item development. The item development was based on a person' salient beliefs which Ajzen and Fishbein (1986) considered as the immediate determinants of the person's attitude and may be collected

using a free-response format (i.e., an open-ended questionnaire). Thus, an eliciting survey with an open-ended questionnaire (Appendix A) was conducted to determine belief items relevant to the three determinants: attitude toward the act (Aact), subjective norms (SN), and perceived behavior control (PBC). The results of these salient beliefs were then used in pilot questionnaire construction. The survey also avoided the appearance of belief items of no concern to local decision-makers on the final questionnaire.

Thirty questionnaires were distributed to randomly selected local elected officials with a cover letter. A qualitative content analysis of responses was conducted and most frequently mentioned items related to each determinant were retained as the basis for the formulation of the pilot questionnaire. Table 3-1 shows the results of the eliciting survey which included sixteen consequence beliefs for attitude toward landfill recreation reclamation, eight referents for subjective norms, and seven control beliefs for perceived behavior control.

Additional information obtained from the literature review and consultation with personnel associated with landfills such as state agents and engineer consultants were also considered in the development of the pilot questionnaire.

Phase II -- Pilot Questionnaire Formatting, Scaling, Testing and Revising

The pilot questionnaire (see Appendix B) was designed with three parts. Part one included 7 scales to examine local elected officials' perceptions toward landfill reclamation. Part two asked questions related to knowledge of landfill operation, preference of alternative landfill end use, and regulation concerns. Part three was designed to obtain information about (i) community recreation need, any end use plan,

Table 3-1. Frequency of the Eliciting Survey related to Consequence Beliefs, Normative Beliefs, and Control Beliefs.

Eliciting Response	Response frequency	Literature review
Consequence beliefs:		
Provide additional recreational opportunities	67%	observed
User safety and concern of settlement (stability of ground)	44%	observed
Large wide open space suitable for rec.	44%	observed
Fiscal responsibility, up-front capital costs	44%	observed
Potential liability with recreational facility on landfill	33%	observed
Funding or grant available, using tipping fees	33%	observed
Good for public relations	22%	observed
Public support/acceptance within community	22%	observed
Image: turn negative to positive	22%	observed
Maintenance concern	22%	observed
Good use of open space, maximize available land use	22%	observed
Cost: inexpensive source (if given by landfill owners)	11%	observed
Increase surrounding land values	11%	observed
Generate additional revenues		observed
Influence of previous dump/landfill image		observed
Not as pleasant as a regular recreation facility		observed
Normative beliefs:		
Township board of trustees & city council members; township officials -- (related department) directors of public works, finance, purchasing, park and recreation	89%	
Experts from recreation advisory committee, planning committee, consulting architects and engineers	78%	
State agency (DNR, DEQ)	33%	
County commissioners, county related staff	33%	
Landfill owners (support from owners)	33%	
Local media, local journalists	22%	
Residents/voters	11%	
Professional organizations, special interested groups: MML (Michigan municipal league), MUCCC, MRPA	11%	
Control Beliefs:		
Always need more parkland, community needs	33%	
Ownership concern -- funding from owner, opposition from owner	33%	
Self-supporting concern (minimization of up-front capital costs)	33%	
Potential health hazard and concern	22%	
Funding concern -- available funding	22%	
Acceptance concern -- public perceptions, community approve	22%	
Locations – suitability	22%	

and current status of landfill; and (ii) local elected officials' awareness of landfill recreation reclamation and experience involving landfill permission granting.

Items Formatting and Scaling

Measure of attitude toward the act.

The testing of the theory of planned behavior with the three determinants and behavior intention was included in part one of the questionnaire. The attitude toward the act (Aact) was influenced by a local elected official's beliefs that the event has certain attributes and by his/her evaluation of those attributes. Therefore, the Aact was examined in two sections. The consequence belief section evaluated local elected officials' perceived salient consequences of landfill reclamation project with 16 items (see example in Table 3-2). The evaluation of the belief strength section examined local elected officials' preference toward a landfill reclamation project with 8 items (see example in Table 3-2). Each statement was rated on a 5-point agree-disagree Likert scale.

Table 3-2. Example of Item Statement, Response Choice, and Scale Value for Consequence Belief and Preference Evaluation

Item statement	Response choice
Consequence belief:	
LR provides additional recreational opportunities for the community	SA --- PA --- NC --- PD --- SD
LR produces an unacceptable health hazard for public use	SA --- PA --- NC --- PD --- SD
Preference evaluation:	
I like the land reuse strategy, landfill reclamation (LR), for our community	SA --- PA --- NC --- PD --- SD
I am worried about the potential safety hazards in the field	SA --- PA --- NC --- PD --- SD

Scale value:
SA = Strongly Agree (2), PA = Partially Agree (1), NC = No Comment (0), PD = Partially Disagree (-1), SD = Strongly Disagree (-2).

According to the theory, belief strength associated with each outcome should be assessed in addition to assessing consequence beliefs. However, the current study contained a different approach from Ajzen's theory in evaluating belief strength. The reasons for this alteration are based on the committee's concerns and the potential problem found in the literature review.

First, according to the theory of planned behavior, belief strength associated with each of the salient consequences should be evaluated. Then, the attitude toward the act is predicted by the sum of the product of each item of the consequence beliefs multiplied by each item of the belief strength. However, the committee members were concerned about the same set of items used in two sections in the questionnaire that may cause confusion and result in many no responses in the other section.

Second, Kiely (1979) indicated a potential error that may occur in the multiplication operation suggested by the theory. The data interpretation can be ambiguous since the same attitude score would arise for either support or opposition. For example, it can be ambiguous that whether the high scores in the attitude item were a result of many respondents strongly believing that LR provides additional recreation opportunities (+2) and strongly favor the action (+2), or to the contrary, the high scores were a result of many respondents strongly believe it did not provide additional recreation opportunities (-2) and strongly oppose the increasing recreation opportunities (-2). Both situations will give a product score of +4. Local elected officials may believe that LR allows revitalization of the adjacent areas (+2), but strongly oppose the consequence (-2). The same score may be achieved when an official strongly believes that revitalization will not occur (-2), but strongly favor the consequence (+2). The results provide no

meaningful information for further analysis.

Third, the review of literature also found that some studies applying the theory of planned behavior have different approaches in the measurement of attitude toward the act. For example, only the consequence belief dimension was adopted in Fedler's (1981) study of attitude toward participating in recreation activities. In van Ryn's (1996) study of health behavior, the attitude measure toward exercise was measured by the perceived benefits of exercise and perceived susceptibility to heart attack. The health study did not use the same item in the consequence belief to evaluate the belief strength. In both Netemeyer's (1991) voting behavior study and Norman's (1996) attitude toward attending a health check study only the direct measure of attitude was used. Belief strength was not assessed in either study. It appeared that modifications were made to meet different circumstances in various studies.

In the current study, the evaluation of the belief strength section was modified to focus on assessing affective factors in terms of their preference toward LR. Eight statements related to liking or disliking the LR outcomes were used instead of the 16 consequence belief items. The sum score of a total set of the consequence belief section and the preference section represents a local elected official's attitude toward the act in question.

Measure of subjective norms.

The subjective norms (SN) were assessed by normative beliefs and motivation to comply with referents. Thus, the SN also was measured in two sections. The normative belief section assessed the expectations of eight referents such as state agents, county commissioners, derived from the results of the phase I open-ended survey. The local

elected officials indicated the likelihood they think that each referent would support a closed sanitary landfill reclamation for recreation use in their community. A bipolar 5-point Likert scale ranging from 2 (very likely) to -2 (very unlikely) was used. In the compliance section, respondents were asked to address the degree to which they would comply with each referent's opinion on an unipolar 5-point Likert scale ranging from 1 (never) to 5 (very much). See Table 3-3.

The product score was obtained from the score of each normative belief multiplied by the score of the corresponding item of compliance. The sum of the eight product scores constituted the belief-based measure of subjective norms. The summing scores indicated how much the local elected officials cared whether the referents approved or disapproved of their support of landfill recreation reclamation in their community.

Measure of perceived behavior control.

The perceived behavior control (PBC) examined the local elected officials' beliefs regarding the importance of perceived external factors in his/her decision making, and the

Table 3-3. Example of Item Statement, Response Choice, and Scale Value for Normative Belief and the Degree of Compliance.

Item statement	Response choice
Normative belief:	
Your county commissioners	VL --- L --- NS --- UL --- VUL*
Your colleagues (township board or city council members	VL --- L --- NS --- UL --- VUL
Degree of compliance:	
Your county commissioners	VM --- AL --- O --- S --- N **
Your colleagues (township board or city council members)	VM --- AL --- O --- S --- N

Scale value:
* VL = Very Likely (2), L = Likely (1), NS = Not Sure (0), UL = Unlikely (-1), VUL = Very Unlikely (-2)
** VM = Very Much (5), AL = Always (4), O = Often (3), S = Sometimes (2), N = Never (1)

perceptions of the presence or absence of these factors may influence their intention to support landfill recreation reclamation. Thus, the PBC was also measured in two sections. The control belief section was to examine opportunities, resources, or barriers a local elected official perceived in his/her community. These factors included recreation demand, residents' attitude, and funding which were obtained from the phase I open-ended survey. The local elected officials expressed their beliefs regarding each of seven factors on a bipolar 5-point Likert scale (Table 3-4) that ranged from 2 (very likely) to -2 (very unlikely).

The important factor section was to examine important factors considered in the local elected officials' decision making. These were measured by an unipolar 5-point Likert scale with an endpoint labeled "very much" (5) and "never" (1), see Table 3-4.

The product score was obtained from the score of each control belief multiplied by the score of the corresponding item of important factor to obtain a product score. The sum of seven product scores constituted the belief-based measure of perceived behavior control.

Table 3-4. Example of Item Statement, Response Choice, and Scale Value for Control Belief and Important Factors in Decision-making.

Item statement	Response choice
Control belief:	
No available funds for development	VL --- L --- NS --- UL --- VUL*
Low community recreational demand exists in your area	VL --- L --- NS --- UL --- VUL
Important factor in decision-making:	
No available funds for development	VM --- AL --- O --- S --- N **
Low community recreational demand exists in your area	VM --- AL --- O --- S --- N

Scale value:
* VL = Very Likely (2), L = Likely (1), NS = Not Sure (0), UL = Unlikely (-1), VUL = Very Unlikely (-2)
** VM = Very Much (5), AL = Always (4), O = Often (3), S = Sometimes (2), N = Never (1)

Measure of the behavioral intentions.

Behavioral intention to support landfill recreation reclamation in their community was assessed with two items using a bipolar 5-point Likert scale that ranged from 2 (very likely) to -2 (very unlikely). The sum score was obtained to measure the local elected officials' behavior intention. See Table 3-5.

After item development, each questionnaire item statement was further examined for its wording and meaning (Spector, 1992). For example, whether an item statement is short, clear, well written, and contained a single idea. Then, these items were reviewed by the dissertation committee and accordingly revised the items based on the committee's comments and suggestions. A pilot survey was then administrated to test the newly developed instrument.

Table 3-5. Example of Item Statement, Response Choice, and Scale Value for Behavioral Intention

Item statement	Response choice
Behavioral intention:	
I would be willing to propose a reclamation project to the proper Committee for consideration	VL --- L --- NS --- UL --- VUL*
I would approve a project of recreation development on a closed landfill when it is brought to board meeting	VL --- L --- NS --- UL --- VUL

Scale value:
* VL = Very Likely (2), L = Likely (1), NS = Not Sure (0), UL = Unlikely (-1), VUL = Very Unlikely (-2)

Pilot Survey -- Pilot Instrument Testing

The pilot questionnaire was mailed to the sixty-three selected city council members or township board members in southern lower Michigan. As a result, twenty-one out of sixty-three (33 percent) of the selected local elected officials returned their

questionnaires. The pilot survey aimed to collect responses to each scale for analysis and refinement of the pilot questionnaire prior to their inclusion in the questionnaire Form-98.

Conducting the item analysis for pilot questionnaire revision.

The refinement of the pilot questionnaire was mainly based on item analysis. In addition, each individual item was inspected for skip patterns, non-response, and question order problems.

The item analysis is to examine the internal consistency of each scale and to produce a tentative version of a scale. In other words, the item analysis aims to find those items that form an internally consistent scale and to delete those items that do not interrelate. Internal consistency among a set of items suggests that they share a common variance or implies they measure the same underlying construct. A scale ideally should have reliability, in terms of a coefficient alpha, of at least 0.70 (Spector, 1992; Bourque and Clark, 1992) to be considered as a reliable scale.

Thus, the revision of the pilot instrument was mainly based on the results of the item analysis for reliability. The negatively worded item score was reversed to form the same direction prior to item analysis. Corrected item-total correlation was used as a selection criterion to delete or retain item to form the best scale possible. The corrected item-total correlation reflects the contribution of each item to the reliability of the scale. A positive corrected item-total correlation indicates that the item contributes to the reliability.

The statistics for corrected item-total correlation were presented in Table 3-6. Their mean, standard deviation, range, were presented in Appendix C, Table 1. The pilot questionnaire revision was based on the following findings.

Measure of attitude toward the act:

The coefficient alpha of consequence beliefs (16 items) was 0.75, preference (8 items) was 0.77, and the coefficient alpha for all 24 items was 0.86. However, initial item analysis revealed several low intercorrelation items in the attitude toward the act scale. First, the wording of some of these relatively low item-total correlation (ranging from 0.068 to 0.145, Table 3-6) items were refined and retained in the scale to ensure adequate content coverage. These items included item 3 (undesirable landfill image), item 9 (decline of adjacent land value), item 14 (involved a liability problem), item 16 (unacceptable health hazard) in the consequence belief section, and item 4 (feels annoyed about potential risk) in the preference section.

Second, item 5 (available funding) and item 7 (inexpensive way for land acquisition) in consequence belief were deleted due to the low item-total correlation and similar questions were asked in the perceived behavior control section. Item 6 (development cost) in the consequence belief section was deleted due to the low corrected item-total correlation and the respondents seemed not quite aware of the cost as several respondents did not answer the question.

Measure of subjective norms:

Measure of subjective norms was based on the product of normative beliefs and the degree of compliance. The coefficient alpha of the product of the two scales was 0.76. Most of corrected item-total correlations were 0.45 and above (Table 3-6), except item 3 (colleague) and item 8 (interested group). However, the deletion of these two items from the scale would not maximize the scale variance significantly. Therefore, no further revision was made and the eight referents were all retained in the questionnaire Form-98.

Table 3-6. Item-total Statistics for Pilot Survey

Items # in Pilot survey	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted	Alpha	Items revised or deleted
Behavioral intentions: (Section VII, N=18)					0.944	
INTE1	0.833	1.324	0.894 .			
INTE2	0.889	1.399	0.894 .			
Attitude Beliefs: (BC in Section I, BCEV in Section III, N=19)					0.858	
BC1	13.158	115.918	0.409	0.854		
BC2	13.000	114.667	0.647	0.845		
BC3	15.211	125.175	0.095	0.867		BC6*
BC4	14.421	118.035	0.370	0.855		
BC5	14.105	126.766	0.142	0.860		Deleted
BC6	14.895	125.544	0.199	0.859		Deleted
BC7	13.579	124.257	0.335	0.855		Deleted
BC8	14.579	116.480	0.531	0.849		
BC9	13.105	126.544	0.068	0.866		BC8*
BC10	13.421	123.035	0.366	0.854		
BC11	13.105	118.433	0.782	0.846		
BC12	13.526	113.485	0.779	0.841		
BC13	13.263	115.871	0.656	0.845		
BC14	15.158	126.140	0.145	0.860		BC11*
BC15	13.263	117.871	0.596	0.848		
BC16	13.211	125.287	0.135	0.863		BC12*
BCEV1	12.947	122.497	0.385	0.854		
BCEV2	12.842	117.807	0.666	0.846		
BCEV3	13.421	108.702	0.642	0.843		
BCEV4	14.842	127.140	0.105	0.861		BCEV8*
BCEV5	13.895	115.766	0.494	0.850		
BCEV6	13.053	114.830	0.816	0.842		
BCEV7	14.368	115.357	0.443	0.852		
BCEV8	12.895	117.766	0.753	0.845		
Normative Beliefs: (Section IV*SectionVI, N=16)					0.755	
PRO_NO1	18.250	126.333	0.545	0.731		
PRO_NO2	17.500	160.000	0.669	0.694		
PRO_NO3	16.688	188.496	0.215	0.767		Retained
PRO_NO4	15.563	167.329	0.539	0.716		
PRO_NO5	17.813	160.296	0.557	0.710		
PRO_NO6	19.938	180.196	0.458	0.732		
PRO_NO7	17.000	157.333	0.580	0.705		
PRO_NO8	19.000	202.667	0.156	0.767		Retained

Table 3-6 (Cont'd)

Items # in Pilot survey	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted	Alpha	Items revised or deleted
Control Beliefs: (Section II* Section V, N=18)					0.215	
PRO_CT1	-2.056	115.467	-0.053	0.303		Revised
PRO_CT2	1.444	124.026	-0.034	0.254		Revised
PRO_CT3	-0.167	85.441	0.218	0.055		Revised
PRO_CT4	-2.389	117.781	0.083	0.194		Revised
PRO_CT5	-2.278	118.801	0.034	0.220		Revised
PRO_CT6	-2.500	97.206	0.185	0.106		Revised
PRO_CT7	-0.722	100.918	0.151	0.137		Revised

* Item was revised and retained in the Form 98 (i.e., BC3 in pilot was revised into BC6 in Form 98).

Measure of perceived behavior control:

The item analysis of the perceived behavior control scale resulted in a low coefficient alpha 0.22 (Table 3-6). Corrected item-total correlations of these items were low, ranged from 0.034 to 0.218. As shown in the correlation matrix, most of the items have relatively low correlation with the other items. It could be the conceptual framework for this construct was weak or inappropriate for the respondent group (Spector, 1992). Additional literature was reviewed to find other factors used in local elected officials' decision making to ensure items used in the scale would be able to measure the PBC determinant. All seven items were rephrased and one item related to revitalization of surrounding areas was added into the questionnaire Form-98.

Measure of behavioral intention:

For the behavioral intention scale, the results of the item analysis show that a high intercorrelation was found with a coefficient alpha of 0.94. Scale variance was maximized and no revision was needed.

Other modification:

In part two of the pilot questionnaire, five items relating to local elected officials' knowledge of landfill operation were deleted. It was based on the results of the independent-samples t-test indicating no significant difference between low and high intention groups in knowledge aspect except in the preplanning approach (Table 3-7). It has to be noted here that the higher mean scores within the collection system indicated the respondents were generally quite aware of EPA's regulations. However, the

Table 3-7. Knowledge Differences between Low and High Intention Groups

	low and high intention	N	Mean*	T	Sig. (2-tailed)
Gas monitoring /collection system	Low	8	1.63	-0.447	0.661
	High	9	1.78		
Leachate collection system	Low	8	1.25	-1.921	0.088
	High	9	1.89		
30 years monitoring periods	Low	8	1.25	-1.525	0.158
	High	9	1.78		
First 5 years settlement	Low	8	0.25	-1.852	0.085
	High	8	0.88		
Rarely gas explosions	Low	8	0.38	-1.141	0.273
	High	8	0.88		
Little harm in properly closed landfill	Low	8	0.63	-1.181	0.256
	High	9	1.11		
Preplanning minimize safety concerns	Low	8	0.75	-2.311	0.035
	High	9	1.56		
Mega-landfill replace township landfill	Low	8	0.63	-1.141	0.273
	High	8	1.13		
More suitable size of mega landfill for rec.	Low	8	0.50	-0.447	0.662
	High	8	0.75		

* SA = Strongly Agree (2), PA = Partially Agree (1), NC = No Comment (0), PD = Partially Disagree (-1), SD = Strongly Disagree (-2).

respondents were uncertain about the settlement and potential for gas explosions. Another modification was performed to change the wording and format of alternative use questions. It was used to reflect the non-response problem that occurred in the pilot survey.

Overall, the results of the item analysis of the newly developed instrument show all scales had acceptable reliability except the measure of perceived behavior control. These items were then used in the formulation of the questionnaire Form-98 related to the theoretical framework.

Phase III -- Questionnaire Form-98 Construction

The questionnaire Form-98 (Appendix D) consisted of two portions:

First, the instruction portion explained the overall structure of the questionnaire and a note for the arbitrary use of "support" instead of "opposition" in the wording.

Second, the measurement portion was composed of two parts, (I) Perceptions toward landfill reclamation, and (II) Landfill and you. The first part mainly consisted of seven sections for testing the theory in terms of three determinants and the behavior intention statements as mentioned in the pilot questionnaire construction. Each section measured one of the constructs of the theory: (i) Your views toward landfill recreation reclamation -- a relatively direct measure of three determinants and behavioral intentions, (ii) Your perceptions of community support for measuring normative beliefs, (iii) Important factors in your decision making for evaluating strength of perceived behavior control, (iv) Your preference toward a landfill recreation reclamation for assessing preference, (v) Attitudes and limitations you perceived in your community for

measuring perceived behavior control, (vi) Your perceived consequences and anticipated risks or benefits for measuring consequence beliefs, (vii) Agreement with the referents' opinion for measuring compliance.

The second part was designed to collect information about community recreation needs, status of the landfill, ownership, officials' awareness of landfill reclamation, and experiences with the landfill permit granting process. It was divided into two sections with the following headings, (i) About landfill issues, alternative end uses, and regulation concerns; (ii) About you and your community.

Measurement

In Part One, a set of evaluative semantic differential scales with seven items as direct measure of the three determinants (Aact, SN, and PBC) was added into the questionnaire Form-98. For Aact, six items with a closed, semantic differential format were used to rate item on 7-point bipolar adjective scales for attitude, see example in Table 3-8. The sum of these six items served as a direct measure of attitude toward the act. For SN, one item assessed social pressure in a more global fashion, which used a 7-point "approve" versus "disapprove" scale (see example in Table 3-8). For PBC, one item measured the overall perceived behavior control on a 7-point scale (see example in Table 3-8). The behavior intention scale was also changed from a 5-point to a 7-point Likert scale. After recode, its scale value ranged from 3 (extremely likely) to -3 (extremely unlikely). That is 7 became –3, 4 became 0, and 1 became +3. The measure of attitude beliefs, normative beliefs, and control beliefs were all rated on the same 5-point scale used in the pilot questionnaire.

Table 3-8. Example of Item Statement, Response Choice, and Scale Value for Direct Measure of Aact, SN, and PBC

Direct measure of Aact*:
Extremely very slightly neutral slightly very extremely
wise ----------1----------2----------3----------4----------5----------6--------7---- foolish
beneficial ---------- 1----------2----------3----------4----------5----------6--------7----- risky
Direct measure of SN*:
If I support LR development in my community, most people who are important to me would ....
approve ----------1----------2----------3----------4----------5----------6-------- 7--- disapprove
Direct measure of PBC:
How much control do you have with the LR development in your community?
very little control ------1----------2----------3----------4----------5----------6-------- 7--- complete control

* Scale value for the scale was recoded to indicate the degree of positive and negative response, ranged from +3 to –3. For example, 7 became –3, 4 became 0, and 1 became +3.

Data Collection

Survey Administration

The revised instrument (Form-98) was administrated by mail to a new sample of 243 selected township board members and council members drawn from the same population. A cover letter and a self-addressed, stamped envelope for returning the questionnaire were included. A postcard reminder was sent one week after the initial mail. Approximately two weeks later, 28.4% (69) officials returned the questionnaire.

The first follow-up mailings were then administered to increase response rates. A follow-up letter and a new copy of the survey questionnaire were sent to non-respondents, and additional 46 responses were received. Thus the response rate increased to 47.3%. The second follow-up letter was sent two weeks later after the first follow-up mailing, and ten officials responded to the final request. Overall the total response rate was 51.4 percent, 125 out of the 243 local elected official samples. Among the 125 returned questionnaires, 118 were usable. Among 118 usable participants, 76 are from the

population under 10,000 and 42 are from the population 10,000 and greater.

No mail was undeliverable because of the verification effort described above. Two cases were unusable because of missing data. Five respondents returned the questionnaire blank at the end of follow-up stage, and indicated they were not able to complete the questionnaire since they have no idea or knowledge about the LR project. Thus, this would provide one explanation for those non-respondents. Also the responses were deemed adequate to represent the sample population. As a result, no non-response follow-up was initiated beyond the second follow-up mailing.

Data Processing

Data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) Release 7 for Windows 95. Respondents were asked to select a point along the Likert scale to represent their choice. Thus, in data coding, each response was later coded as a numerical value corresponding to their choice. The numerical value of each choice was presented in the previous tables.

While there were several negatively worded items on the questionnaire, their coding was reversed before data was analyzed. For instance, some items of consequence beliefs and preference scores were recoded to indicate agreement or disagreement with belief statements representing perceived benefits or risks toward reclaiming closed landfills. The control belief scores were recoded to indicate the degree of positive perception of community opportunities and needs. Using the RECODE procedure, the raw data in these items were reversed, so that the bipolar scale 2 became -2, 1 became -1, and vice versa; in the other unipolar scale 1 became 5, 2 became 4, 4 became 2, and 5

became 1.

To obtain a total score for each determinant for further analysis, the COMPUTE procedure was performed to create several new variables for each determinant. First, the product of control beliefs and normative beliefs was computed as described above. Second, a scale total score was obtained by summing each item score in the scale, which included scales of the attitude toward the act (Aact), behavioral intention, attitude beliefs (sum of consequence belief scores and preference evaluation scores), normative beliefs (sum of product scores), and control beliefs (sum of product scores).

During data cleaning, visual inspection of data file and frequency distribution were performed to examine the data structure and to check any data out of range or spurious data. Few coding errors were identified and corrected. There were a few cases where participants failed to answer an item in a scale, or circled two answers to the same question. As Bryman & Cramer (1997) and Peers (1997) suggested, an estimate missing value, which is mean score of the non-missing values in the same scale, was used as an appropriate index since the missing data appeared to be random. There were six cases where data for a scale were missing for several items; the whole scale was coded missing. Three cases were missing a whole scale or whole pages, but the remaining answers still provided valid data. Two cases with many missing value and/or incomplete responses were eliminated from the data set. Five cases were deleted since they were returned with no responses. A total of seven cases were omitted, resulting in 118 valid responses for further analysis.

The data analysis and discussions of the results are presented in chapter four, which include description, comparison, and test of relationship between variables.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

This chapter presents the analysis of the data collected from the local elected officials in southern Lower Michigan in 1998 and the results relating to the main purpose of the study. Test results pertaining to reliability and validity, using SPSS item analysis and principal component factor analysis, are presented first. The social attributes of the local elected officials and their differences in attitudes are examined and discussed. Then, the results of the study hypotheses concerning the relationship between behavioral intentions and three determinants, attitude toward the act (Aact), subjective norms (SN), and perceived behavioral control (PBC) are presented. In addition, the prediction model for the behavioral intentions and the underlying factors (beliefs) that influence local elected officials' support or opposition to landfill recreation reclamation are presented.

Assessment of Reliability and Validity

Reliability Test

Several methods for assessing reliability of measurements are available, such as alternative form, split-halves, test-retest (Carmines and Zeller, 1979, Peers, 1996). The most popular one is Cronbach's alpha for assessing internal consistency, also called coefficient alpha. However, one of the assumptions underlying the method is that it assumes a single phenomenon lies beneath the items (Light, 1976; Carmines and Zeller,

1979; Peers, 1996). Thus, prior to analysis of internal consistency, factor analysis was conducted to explore the dimensions of the newly constructed instruments.

Scale Dimension

Principal component factor analysis was employed in assessing whether an unidimensional scale exists. It is expected that a set of items is measuring a single phenomenon if results of the factor analysis meet the following conditions (Carmines and Zeller, 1979):

(i) All or most of the items have substantial factor loadings on the first component;

(ii) The first extracted component explains a large proportion of the variance;

(iii) All or most of the items have higher loading on the first component than on subsequent components;

(iv) Subsequent components explain fairly equal proportions of the remaining variance except for a gradual decrease.

Also Spector (1992) noted factor analysis can be used to explore possible subdimensions within the group of items selected, which can determine whether the items contain the intended components. For example, the attitude toward a behavior was constructed based on the perceived advantages and disadvantages of landfill recreation reclamation. It is expected to find two components from the factor analysis. However, it should form under the attitudinal dimension.

The consequence belief scale used in this study consisted of 14 items and was analyzed using principal component analysis. Table 4-1 displays that most of the consequence belief items have substantial factor loadings on the first component. These

factor loadings ranged from 0.50 to 0.79. The variance explained by the first extracted component was 44.7 %. According to Carmines and Zeller's guidelines (1979), the results imply that the consequence belief scale is measuring a single phenomenon.

In addition, the scales of preference evaluations, normative beliefs, control beliefs, and attitude toward the act (Aact) were also analyzed by using the principal component analysis. In the preference scale, all seven items were highly correlated, factor loading ranged from 0.63 to 0.82, on the first component, and the variance explained by the first extracted component was 48.3% (Table 4-2). The factor loading for the normative beliefs scale ranged from 0.67 to 0.83 (Table 4-3), the control beliefs scale ranged from 0.48 to 0.72 (Table 4-4), the direct measure of the attitude scale (Aact) ranged from 0.79 to 0.93 (Table 4-5), all make a substantial contribution to the first component. The variance explained by the first extracted component was 57.8% for the normative belief scale, 37.3% for the control belief scale, and 79.3% for the Aact scale. These results imply that all the above four scales measured a single phenomenon.

However, the factor analysis extracted two components from each scale of consequence beliefs, preference beliefs, and control beliefs. The scree test of their eigenvalues also indicated two factors should be rotated. To obtain an interpretable result, a Varimax rotation procedure was further conducted.

The rotated solution of the consequence beliefs scale yielded two interpretable factors. Inspection of factor I of the consequence beliefs reveals a positive perception toward landfill recreation reclamation. The beliefs loading highest on this factor are improve adjacent living conditions (0.84), additional recreational opportunities (0.75), allow revitalizing the adjacent areas (0.75), positive impacts on community image (0.75),

Table 4-1. Factor Loadings of the Consequence Beliefs Items

Consequence Belief Items	Extracted		Rotated	
	Component I	Component II	Perceived benefits ❖	Perceived risk ❖
improve adjacent living conditions	0.75	-0.38	0.84	0.10
additional recreational opportunities	0.77	-0.20	0.75	0.26
allow revitalizing the adjacent areas	0.68	-0.34	0.75	0.09
positive impacts on community image	0.79	-0.16	0.75	0.30
community asset	0.73	-0.21	0.73	0.23
increase adjacent property value	0.69	-0.25	0.72	0.17
promote positive public relations	0.69	-0.26	0.72	0.17
problem can be managed	0.69	0.00	0.57	0.39
threatening users' safety	0.74	0.39	0.40	0.73
threatening users' health	0.77	0.36	0.45	0.73
negative impact of undesirable landfill image	0.51	0.52	0.13	0.71
liability problem involved	0.60	0.39	0.28	0.66
higher maintenance costs	0.24	0.55	-0.10	0.59
small problem	0.50	0.22	0.29	0.46
Initial Eigenvalues	6.27	1.55	4.81	3.01
% of Variance	44.76	11.09	34.38	21.47
Cumulative %		55.85		55.85

Extraction Method: Principal Component Analysis. Two components extracted.
Rotation Method: Varimax with Kaiser Normalization.
❖ The underlined factor loading indicates which of the factors each item loading higher on.

Table 4-2. Factor Loadings of the Preference Evaluations Items

Preference Evaluations Items	Extracted		Rotated	
	Component I	Component II	Perceived benefits ❖	Perceived risk ❖
like land reuse strategy	0.81	-0.42	0.89	0.17
pleased with additional recreation opportunities	0.82	-0.37	0.87	0.22
like promoting positive public relation	0.64	-0.56	0.85	-0.05
like increasing house demand	0.65	-0.19	0.62	0.26
worried about potential safety hazards	0.66	0.61	0.14	0.89
uncomfortable about potential liability risk	0.63	0.60	0.12	0.87
uneasy when recreating	0.64	0.53	0.17	0.81
Initial Eigenvalues	3.38	1.69	2.73	2.35
% of Variance	48.35	24.13	38.97	33.51
Cumulative %		72.48		72.48

Rotation Method: Varimax with Kaiser Normalization. Two components extracted.
Extraction Method: Principal Component Analysis.
❖ The underlined factor loading indicates which of the factors each item loading higher on.

Table 4-3. Factor Loadings of the Normative Beliefs Items

Normative beliefs	Component I
county commissioners	0.83
Colleagues	0.81
community special interested groups	0.79
voters/residents	0.79
local media/journalists	0.78
state agents (DNR, DEQ)	0.70
experts in community	0.69
landfill owners	0.67
Eigenvalues	4.63
% of Variance	57.85

Extraction Method: Principal Component Analysis.
1 component extracted.

Table 4-4. Factor Loadings of the Control Beliefs Items

Control Beliefs	Extracted		Rotated	
	Component I	Component II	Requisite opportunity ✥	Perceived obstacle✥
Revenue production	0.72	-0.30	<u>0.75</u>	0.21
Revitalizing surrounding area	0.60	-0.35	<u>0.69</u>	0.10
Community recreational space need	0.61	-0.32	<u>0.68</u>	0.13
Available funds	0.61	-0.31	<u>0.67</u>	0.14
Adverse health/safety effect	0.60	0.63	0.08	<u>0.87</u>
Suitable location	0.48	0.49	0.08	<u>0.68</u>
Potential liability risks	0.71	0.20	0.43	<u>0.60</u>
Cost to obtain land	0.51	0.10	0.34	0.39
Eigenvalues	2.99	1.09	2.26	1.82
% of Variance	37.39	13.64	28.24	22.78
Cumulative %		51.03		51.03

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Two components extracted.
✥ The underlined factor loading indicates which of the factors each item loading higher on.

Table 4-5. Factor Loadings of the Direct Attitude Items

Direct attitude	Component I
good vs. bad	0.93
wise vs. foolish	0.91
beneficial vs. risky	0.90
pleasant vs. unpleasant	0.90
favorable vs. unfavorable	0.90
safe vs. harmful	0.79
Eigenvalues	4.76
% of Variance	79.33

Extraction Method: Principal Component Analysis.
1 component extracted.

etc. The factor I has been labeled Perceived Benefits. Factor II in the consequence belief scale appears as a negative perception toward landfill recreation reclamation. The beliefs loading highly on factor II are threatening users' safety (0.73), threatening users' health (0.73), etc. The factor II has been labeled Perceived Risk. The two factors accounted for 56 percent of the total variance of the consequence belief scale (Table 4-1).

The rotated solution of the preference evaluation scale also yielded two interpretable factors. Factor I in the preference evaluation scale has been labeled Perceived Benefits, including items such as like land reuse strategy (0.89), pleased with additional recreation opportunities (0.87), like promoting positive public relation (0.85). Factor II in the preference evaluation scale includes worried about potential safety hazards (0.89), uncomfortable about potential liability risk (0.87), and uneasy when recreating (0.81). The factor has therefore been labeled Perceived Risk. The two factors together accounted for 72 percent of the total variance of the preference scale (Table 4-2).

The rotated solution for the control beliefs yielded two interpretable factors. Inspection of the items defining the first factor reveals expectations of opportunity and improvement, such as revenue production (0.75), revitalizing surrounding area (0.69).

The factor has been labeled Requisite Opportunity. The second factor includes items such as adverse health/safety effect, suitable location, and potential liability risks. It has been labeled Perceived Obstacle. The two factors together accounted for 51 percent of the total variance of the control belief scale (Table 4-4).

In summary, the factor analysis of the attitude toward the act (Aact), the normative beliefs, and the behavioral intentions all revealed a unitary dimension. Therefore, each of these scales was considered unidimensional for the following reliability analysis. However, the other three scales (consequence, preference, and control belief) appeared to have two underlying dimensions instead of being unidimensional according to the data analysis presented thus far. The reliability of these scales were then tested with each underlying dimension.

Scale Reliability

For the present study, reliability of the newly constructed instrument was assessed using a test of internal consistency. As most of the scales were constructed as a Likert rating scale assuming unidimensionality, Cronbach's coefficient alpha was used in estimating the internal consistency of the scale as described in chapter three. An alpha value of at least 0.70 was considered necessary for a scale to be judged internally consistent (Spector, 1992). The higher the alpha coefficient, the better internal consistency a scale has. The scale then can be considered as a reliable measurement for the study.

Reliability of the pilot instrument has been reported in the previous instrument development section in chapter three. The revised instrument (Form-98) was further

tested in the main survey. The reliability of each scale was tested and is presented as the following.

Behavior intentions were assessed by means of two questions that examined the likelihood of supporting a landfill recreation reclamation proposal. The sum of the two responses served as the measure of behavioral intentions, having an alpha coefficient of 0.79 (Table 4-6).

A direct measure of attitude (Aact) was obtained by means of six semantic differential scales. An alpha coefficient for the Aact was high (0.95), as shown in Table 4-6. Item-total correlations ranged from 0.71 to 0.89. Although the deletion of item three

Table 4-6. Summary Table for Item-total Statistics Analysis of the Behavior Intentions, Aact, and Normative Belief Scales in Instrument Form 98

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted	Alpha	N of Cases
Behavioral intentions:						
INTE1 -- willingness to propose LR	1.345	2.332	0.666			
INTE2 -- intent to approve a LR project	0.647	3.413	0.666		0.791	116
Attitude toward the act (Aact):						
GATT1 -- wise vs. foolish	5.396	38.732	0.869	0.933		
GATT2 -- beneficial vs. risky	5.469	38.197	0.851	0.935		
GATT3 -- safe vs. harmful	5.910	40.828	0.713	0.951		
GATT4 -- pleasant vs. unpleasant	5.829	38.289	0.857	0.935		
GATT5 -- favorable vs. unfavorable	5.423	38.992	0.849	0.935		
GATT6 -- good vs. bad	5.396	39.169	0.893	0.931	0.947	111
Normative beliefs:						
PRO_NO1 - state agents (DNR, DEQ)	17.353	396.126	0.613	0.885		
PRO_NO2 - county commissioners	17.371	393.192	0.757	0.872		
PRO_NO3 - colleagues	16.560	373.327	0.736	0.873		
PRO_NO4 - experts in community	16.517	406.478	0.607	0.885		
PRO_NO5 - voters/residents	18.388	380.727	0.693	0.877		
PRO_NO6 - local media/journalists	18.078	412.542	0.696	0.879		
PRO_NO7 - landfill owners	17.155	406.550	0.576	0.888		
PRO_NO8 - special interested groups	18.638	388.581	0.715	0.875	0.893	116

(safe vs. harmful) from the Aact scale would have slightly improved alpha to 0.95, the item was retained since it highly correlated with the scale (r = 0.71).

The normative belief scale (indirect measure of subjective norms) consisted of eight items with an alpha coefficient of 0.89. Item-total correlation ranged from 0.57 to 0.75. The scale variance was maximized, as the deletion of one item from any of the scales would result in a reduction in the overall scale variance (Table 4-6).

The attitude belief scale (indirect measure of attitude) was composed of two scales, consequence scale and preference scale. Each of them contained two dimensions, perceived benefits and perceived risk. Green, et al. (1997) suggested that two correlations need to be computed if a measure assesses multiple dimensions. First, correlations between item scores and corrected total scores for the items' dimension should be computed. Second, correlations between item scores and total scores assessing different dimensions should be examined. Green, et al. noted an item should be correlated more with its own scale than with scales assessing different dimensions. Thus, item analysis was first employed to examine the correlation of an item with its own corrected total scale and to find those items that form an internally consistent scale and eliminate those items that do not. The corrected item-total corrections address whether the items on the scale have convergent validity. The bivariate correlation was then performed to examine the correlation between an item and total scores for different dimensions (discriminant validity).

The perceived benefits component in the consequence belief scale contained eight items with alpha value of 0.90. Item-total correlations ranged between 0.56 and 0.75 and no items were deleted from the scale as the scale variance was maximized (Table 4-7).

The perceived risk component in the consequence belief scale contained six items with alpha value of 0.79. Item-total correlations ranged between 0.32 and 0.72. The removal of item seven (higher maintenance costs) from the scale would have slightly improved the scale's alpha to 0.80, but the item was retained to maintain content coverage.

The perceived benefits component in the preference evaluation scale contained four items with an alpha value of 0.83 (Table 4-7). Item-total correlations ranged between 0.50 and 0.78. The removal of item three (like increasing housing demand) from the scale would have improved the scale's alpha to 0.87, however, the item was retained to maintain content coverage. The perceived risk component in the preference evaluation scale contained three items with an alpha value of 0.84. Item-total correlations ranged between 0.65 and 0.76 and no items were deleted from the scale as the scale variance was maximized (Table 4-7).

The results of these item analyses indicate the items on the perceived benefit and items on the perceived risk in both the consequence belief scale and the preference evaluation scale have convergent validity. The next step was to compute correlations between item scores and total scores assessing different dimensions.

The results indicate the perceived benefits component and perceived risk component in both the consequence belief scale (Table 4-8) and the preference evaluation scale (Table 4-9) have discriminant validity since each item correlated more with its own scale than with the other scale.

Alpha coefficients were computed to obtain internal consistence estimates of reliability for these dimensions. The alphas were all above 0.79 (Table 4-7). Furthermore,

Table 4-7. Summary Table for Item-total Statistics Analysis of the Attitude Belief Scale in Instrument Form 98

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted	Alpha	N of Cases
Consequence beliefs -- perceived benefits:						
BC1 - additional recreational opportunities	4.619	32.494	0.728	0.878		
BC2 - improve adjacent living conditions	5.195	30.039	0.759	0.875		
BC3 - allow revitalizing the adjacent areas	5.246	32.426	0.669	0.884		
BC4 - community asset	4.864	32.529	0.688	0.882		
BC5 - positive impacts on community image	4.907	32.000	0.739	0.877		
BC8 - increase adjacent property value	5.364	32.131	0.640	0.887		
BC9 - promote positive public relations	4.898	34.075	0.643	0.886		
BC14 - problem can be managed	5.246	34.495	0.566	0.893	0.896	118
Consequence beliefs -- perceived risk:						
BC6 - negative impact of undesirable landfill	-1.025	14.811	0.548	0.756		
BC7 - higher maintenance costs	-0.949	17.519	0.316	0.804		
BC10 - threatening users' safety	-1.720	13.896	0.699	0.716		
BC11- liability problem involved	-0.983	15.504	0.581	0.748		
BC12 - threatening users' health	-1.737	13.751	0.715	0.711		
BC13 - small problem	-1.381	16.529	0.396	0.790	0.789	118
Preference evaluation -- perceived benefits:						
BCEV1 - like land reuse strategy	1.746	8.926	0.784	0.739		
BCEV2 - like promoting positive PR	1.822	9.327	0.643	0.799		
BCEV3 - like increasing house demand	2.983	9.436	0.502	0.873		
BCEV4 - pleased with additional rec opp.	1.941	9.099	0.773	0.746	0.833	118
Preference evaluation -- perceived risk:						
BCEV5 - uneasy when recreating	-0.966	5.537	0.649	0.831		
BCEV6 - worried about safety hazards	-0.390	5.078	0.758	0.721		
BCEV7 - uncomfortable about liability	-0.339	5.799	0.709	0.775	0.839	118
Attitude beliefs (overall)						
BC1- additional recreational opportunities	5.042	210.571	0.717	0.922		
BC2 - improve adjacent living conditions	5.619	207.366	0.664	0.923		
BC3 - allow revitalizing the adjacent areas	5.670	212.206	0.606	0.924		
BC4 - community asset	5.288	211.318	0.659	0.923		
BC5 - positive impacts on community image	5.331	210.035	0.704	0.922		
BC6 - negative impact of undesirable landfill	6.720	214.511	0.480	0.926		
BC7 - higher maintenance costs	6.797	224.471	0.234	0.930		
BC8 - increase adjacent property value	5.788	211.519	0.585	0.924		
BC9 - promote positive public relations	5.322	215.212	0.608	0.924		
BC10 - threatening users' safety	6.025	207.119	0.730	0.922		
BC11 - liability problem involved	6.763	214.644	0.566	0.925		
BC12 - threatening users' health	6.009	206.179	0.756	0.921		
BC13 - small problem	6.364	217.413	0.437	0.927		
BC14 - problem can be managed	5.670	214.274	0.612	0.924		
BCEV1 - like land reuse strategy	5.102	207.084	0.744	0.921		
BCEV2 - like promoting positive PR	5.178	211.669	0.555	0.925		
BCEV3 - like increasing house demand	6.339	206.380	0.621	0.924		
BCEV4 - pleased with additional rec opp.	5.297	206.997	0.763	0.921		
BCEV5 - uneasy when recreating	6.068	211.842	0.487	0.927		
BCEV6 - worried about safety hazards	6.644	210.847	0.515	0.926		
BCEV7 – uncomfortable about liability	6.695	213.513	0.496	0.926	0.928	118

Table 4-8. Correlations between Item Scores and Total Scores for the Different Dimension on the Consequence Belief Scale

	Perceived benefits	Perceived Risk
Consequence beliefs -- perceived Benefits		
BC1 – additional recreational opportunities	**0.73**	0.49
BC2 – improve adjacent living conditions	**0.76**	0.41
BC3 – allow revitalizing the adjacent areas	**0.67**	0.38
BC4 – community asset	**0.69**	0.45
BC5 – positive impacts on community image	**0.74**	0.53
BC8 – increase adjacent property value	**0.64**	0.43
BC9 – promote positive public relations	**0.64**	0.40
BC14 – problem can be managed	**0.57**	0.51
Consequence beliefs -- perceived risk:		
BC6 – negative impact of undesirable landfill	0.33	**0.55**
BC7 – higher maintenance costs	0.12	**0.32**
BC10 – threatening users' safety	0.56	**0.70**
BC11- liability problem involved	0.43	**0.58**
BC12 – threatening users' health	0.60	**0.72**
BC13 – small problem	0.39	**0.40**

Table 4-9. Correlations between Item Scores and Total Scores for the Different Dimension on the Consequence Belief Scale

	Perceived benefits	Perceived risk
Preference evaluation -- perceived benefits:		
BCEV1 - like land reuse strategy	**0.78**	0.32
BCEV2 - like promoting positive PR	**0.64**	0.13
BCEV3 - like increasing house demand	**0.50**	0.30
BCEV4 - pleased with additional rec opportunities	**0.77**	0.35
Preference evaluation -- perceived risk:		
BCEV5 - uneasy when recreating	0.29	**0.65**
BCEV6 - worried about potential safety hazards	0.30	**0.76**
BCEV7 - uncomfortable about potential liability	0.28	**0.71**

the consequence beliefs and the preference evaluations were designed to assess a respondent's overall attitude beliefs. According to Spector (1992), although several scales measure one concept, all items should be analyzed using item analysis for a total score since it makes conceptual sense. Therefore, all items in both consequence beliefs and preference evaluations were analyzed together for a total score. Thus, reliability of the overall scale (21 items) was assessed. Most of the item-correlations in the overall scale were beyond 0.43. The coefficient alpha of this overall scale was 0.93. The results provide evidence of scale reliability.

The control belief scale (indirect measure of perceived behavior control) contained two components, the requisite opportunities and the perceived obstacle components. As with the attitude belief scale, both item analysis and bivariate correlation were conducted to assess the items. The results of the item analysis are displayed in Table 4-10. The requisite opportunity component contained four items with coefficient alpha value of 0.68. Item-total correlation ranged from 0.44 to 0.54. The perceived obstacle component contained four items with coefficient alpha value of 0.62. Item-total correlation ranged from 0.31 to 0.54 and no items were deleted from the scale as the scale variance was maximized.

The next step was to compute correlations between item scores and total scores for the different dimension. The results of the bivariate correlation (Table 4-11) indicate that the items on the requisite opportunities correlated more with its own scale, while the items on the perceived obstacle had two items that correlated slightly more with the other scale than their own scale. The two items were item 2 (potential liability risk) and item 6 (cost to obtain land). After examining the content of the items, keeping the two items in

Table 4-10. Summary Table for Item-total Statistics Analysis of the Control Belief Scale in Instrument Form 98

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha If Item Deleted	Alpha	N of Cases
Control beliefs -- requisite opportunity:						
PRO_CT1 - community recreational space need	-2.991	95.904	0.449	0.633		
PRO_CT3 - revenue production	-1.741	118.420	0.537	0.583		
PRO_CT4 - available funds	-0.621	109.368	0.440	0.626		
PRO_CT5 - revitalizing surrounding area	-3.026	111.904	0.458	0.614	0.678	116
Control beliefs -- perceived obstacle:						
PRO_CT2 - potential liability risk	-2.259	108.454	0.433	0.530		
PRO_CT6 - cost to obtain land	-5.345	114.698	0.308	0.622		
PRO_CT7 - suitable location	-6.336	110.173	0.347	0.594		
PRO_CT8 - adverse health/safety effect	-4.009	102.913	0.540	0.454	0.622	116
Control beliefs:						
PRO_CT1 - community recreational space need	-8.974	387.521	0.448	0.723		
PRO_CT2 - potential liability risk	-5.052	394.050	0.538	0.705		
PRO_CT3 - revenue production	-7.724	418.810	0.552	0.709		
PRO_CT4 - available funds	-6.603	408.102	0.447	0.722		
PRO_CT5 - revitalizing surrounding area	-9.009	414.791	0.446	0.722		
PRO_CT6 - cost to obtain land	-8.138	416.190	0.367	0.738		
PRO_CT7 - suitable location	-9.129	416.479	0.358	0.740		
PRO_CT8 - adverse health/safety effect	-6.802	413.760	0.446	0.722	0.749	116

Table 4-11. Correlations between Item Scores and Total Scores for the Different Dimension on the Control Belief Scale

	Requisite opportunity	Perceived obstacle
Control beliefs -- requisite opportunity		
PRO_CT1 – community recreational space need	**0.45**	0.34
PRO_CT3 – revenue production	**0.54**	0.42
PRO_CT4 – available funds	**0.44**	0.34
PRO_CT5 – revitalizing surrounding area	**0.46**	0.32
Control beliefs -- perceived obstacle:		
PRO_CT2 – potential liability risk	0.47	**0.43**
PRO_CT6 – cost to obtain land	0.32	**0.31**
PRO_CT7 – suitable location	0.28	**0.35**
PRO_CT8 – adverse health/safety effect	0.27	**0.54**

the perceived obstacle was more appropriate than moving the items to the requisite opportunity group. Overall, both the requisite opportunity and the perceived obstacle had convergent validity, while only the requisite opportunity's discriminant validity was supported.

As with the attitude belief scale, all items in both the requisite opportunity and the perceived obstacle were analyzed together for a total score. The reliability of the overall scale (8 items) was assessed. Most of item-correlations were beyond 0.44 (Table 4-10). The coefficient alpha of this overall scale was 0.75. The results provide evidence that the scale is reliable.

In sum, the reliability of the attitude toward the act (Aact), the attitude beliefs (including the consequence beliefs and the preference evaluation), the normative beliefs, and the control beliefs were moderately high, ranging from 0.75 to 0.95. The results of the reliability test show that internal consistency appeared adequate and consistent across the initial development samples (pilot survey) and final development samples (main survey), except in the control belief scale (Table 4-12). The control belief scale had a low alpha value in the pilot survey while the revised scale improved its internal consistency substantially from 0.21 to 0.75. It was concluded at this point that the newly developed instrument had acceptable levels of reliability. The scales were ready for the next step of validation.

Table 4-12. Alpha Value of the Pilot Survey and the Main Survey

Survey	Aact	Intentions	Attitude beliefs	Normative beliefs	Control beliefs
Pilot survey	N/A	0.94	0.88	0.75	0.21
Main survey	0.95	0.79	0.93	0.89	0.75

Validity Test

Any measuring device is valid if it does what it is intended to do. Content, construct and criterion-related validity are three types of validity usually assessed. The attainment of any of these types of validity indicates that the scale measures what it purports to measure. Criterion-related validity is based on some external criterion to the measuring instrument itself. However, no appropriate external behavioral criteria to validate the constructs exist in the present study. Nevertheless, the new instrument was constructed based on the theory of planned behavior to examine local elected officials' attitudes. Hence, hypotheses are developed to examine their causes and effects or correlation of the constructs. As Carmines and Zeller (1979) stated construct validity is based on the logical relationships among variables such as the three determinants and behavior intention. Therefore, construct validity is the most appropriate one to assess the validity of the newly developed instrument. It can be concluded that the measure has construct validity if the outcome of the measure is consistent with the theoretically derived expectations.

To assess construct validity, the three indirect measures (attitude beliefs, normative beliefs, and control beliefs) were expected to correlate with the three direct measures respectively according to Ajzen's theory. Also the three direct measures (Aact, SN, and PBC) were expected to correlate with the behavioral intentions.

Table 4-13 indicates the correlation between the indirect measure (i.e., attitude beliefs) correlated significantly ($p \leq 0.01$) with each corresponding direct measures (i.e., Aact). The coefficients were 0.73 (attitude beliefs and Aact), 0.64 (normative beliefs and SN), and 0.38 (control beliefs and PBC). The direct measures of Aact, SN, and PBC also

Table 4-13. Pearson Correlation Matrix of Indirect Measures, Direct Measures, and Behavioral Intentions

	Correlation coefficient	1	2	3	4	5	6	7
1	Intentions (N=116)	------						
2	Global attitude (N=111)	0.73						
3	Subjective norm (N=115)	0.61	0.77					
4	Perceived control (N=114)	0.27	0.22*	0.24*				
5	Attitude belief (N=116)	0.62	0.73	0.71	0.26			
6	Normative belief (N=116)	0.64	0.67	0.64	0.34	0.60		
7	Control belief (N=114)	0.28	0.31	0.29	0.38	0.43	0.38	------

*. Correlation is significant at the 0.05 level, all other correlations are significant at the 0.01 level.

correlated significantly ($p \leq 0.01$) with behavioral intentions. These correlations coefficients were 0.73 (Aact and intention), 0.60 (SN and intention), and 0.27 (PBC and intention). The correlations among these variables were found to be in agreement with the direction as the theory predicted. Overall, the positive association between variables provided evidence supporting the construct validity of the refined instrument (Form 98).

The content validity of the instrument was examined further. Content validity refers to the degree to which a measure reflects a specific domain of content. However, no method or procedure exists to determine whether the goal is achieved (Carmines and Zeller, 1979). Nevertheless, two methods were conducted to explore the adequacy with which important content would be covered in the current study. These methods included exploring the available literature on the subject of landfill recreation reclamation, and conducting an open-ended survey to identify the potential underlying dimensions. The responses to the open-ended survey were analyzed using content analysis to retain the most frequently mentioned items associated with the three determinants of Ajzen's theory

(see chapter 3, development of instrument section). Also the scales were reviewed by the dissertation committee before testing and revised accordingly. All of the above approaches were implemented to insure the content validity of the measurement.

Descriptive Analysis of Three Determinants and Behavioral Intentions

Descriptive statistics for the three indirect measures (attitude beliefs, normative beliefs, and control beliefs), direct measures (attitude toward the act, subjective norm, and behavioral control), and behavioral intentions were summarized in Table 4-14. A higher mean score indicates the respondents perceived much more positive attitudes (in term of attitude beliefs), stronger support from their community/referent (in term of normative beliefs), and more control (in term of control beliefs) toward supporting the landfill recreation reclamation. The results indicate that, in general, the local elected officials tended to have positive perceptions toward LR and feel support from the community/referent, however, they perceived less control toward LR. The local elected officials' behavioral intentions are further discussed below.

Table 4-14. Summary of Mean, SD, and Potential Range for Indirect Measures, Direct Measures, and Behavioral Intentions in the Main Survey

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Intentions	116	-6.00	6.00	1.99	3.08
Attitude toward the act	111	-17.00	18.00	6.68	7.46
Subjective norm	115	-3.00	3.00	1.07	1.51
Perceived behavior control	114	1.00	7.00	3.64	1.94
Attitude beliefs	118	-38.00	42.00	6.19	15.25
Normative beliefs	117	-64.00	80.00	19.96	22.44
Control beliefs	116	-76.00	80.00	-8.78	22.70

Local elected officials' behavioral intentions to support landfill recreation reclamation were measured on a 7-point Likert scale. Each respondent rated the likelihood he or she will propose a reclamation project and the likelihood he or she will approve a reclamation project. The sum of the scores indicates the direction of their intentions to either support or oppose a proposal for landfill recreation reclamation. Among 116 respondents, 58% of respondents tended to support the LR (above a mean score of 2), 31% of respondents remained neutral or undecided (scored between 1 and -1), and only about 11% of respondents leaned toward opposing the LR (scored between -2 and -6). These results indicate that the local elected officials' intentions to support LR were fairly positive (Figure 4-1).

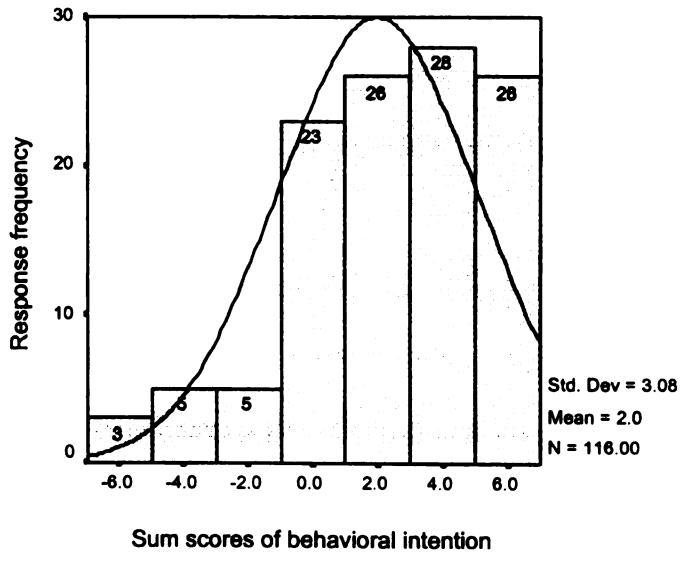


Figure 4-1. Histogram of Local Elected Officials' Behavioral Intentions

Figure 4-1 illustrates that intentions were negatively skewed (mean = 2, SD = 3.08). In order to compare the differences between local elected officials with different degrees of intentions, the respondents were divided into two groups based on summing the scores of their behavioral intentions. One group with scores of 2 or above was termed a high intention group that supported LR and the other group with mean scores below a mean score of 2 was termed a low intention group who may be slightly support or opposed to such a practice.

Analysis of Local Elected Officials' Attitudes

One of the objectives of this study is to explore the relationship between perceptions toward landfill recreation reclamation and behavioral intentions. The perceptions, as noted by the three determinants, served as independent variables while behavioral intentions served as the dependent variable in this study. The statistical analysis of local elected officials' attitudes began with examining the relationship between the three determinants and behavioral intentions using Pearson product moment correlation.

As Ajzen (1986) stated, additional external variables may be useful in predicting behavioral intentions. The respondents' social attributes which make a significant difference in behavioral intentions may be selected as additional criteria for prediction of intentions. The t-test was applied to examine the difference. Then, the chi-square test was applied to test the strength of the relationship between intentions and the selected nominal variables (i.e., awareness). Finally, multiple regression analyses were conducted to

identify important predictors of behavioral intentions.

Relationship between Three Determinants and Behavioral Intentions

Once the relationship among indirect measures, direct measures, and behavioral intentions had been examined, the hypothesized relationships between the three determinants (Aact, SN, PBC) and behavioral intentions were tested.

According to Ajzen's theory, the local elected officials will tend to support LR, when they evaluate it positively, when they believe that referents think they should support it, and when they believe fewer barriers will prevent their action or more opportunities will facilitate their action. Hypotheses I through III were based on the above assumption, and the Pearson correlation analysis was employed to analyze the relationships among the variables. Correlation coefficients between the variables are shown in Table 4-13 and Figure 4-2.

H_1: No relationship exists between the local elected officials' attitude toward the act and their behavioral intentions to support landfill recreation reclamation.

The local elected official's intentions to support LR was positive and strongly correlated with the direct measure of attitude ($r = 0.73, p< 0.01$). The null hypothesis was rejected. This means that if local elected officials perceived more benefits (advantages) than risk (disadvantages) toward LR development; their intentions to support LR were higher.

H_2: No relationship exists between the local elected officials' subjective norms and their behavioral intentions to support landfill recreation reclamation.

The local elected officials' intentions to support LR was positive and moderately correlated with the direct measure of SN ($r = 0.61, p< 0.01$). The null hypothesis was rejected. This means that if local elected officials perceived stronger social pressure from referents in supporting LR; their intentions to support LR were also higher.

H_3: No relationship exists between the local elected officials' perceived behavior control and their behavioral intentions to support landfill recreation reclamation.

The results indicate that local elected officials' behavioral intentions to support LR correlated positively but modestly with their perceived behavior control ($r = 0.27, p< 0.01$). The null hypothesis was rejected. This indicates that if local elected officials' intentions to support LR would be slightly higher when they perceived more requisite opportunities (i.e., funding) and/or less obstacle factors (i.e. risk) for LR development in their communities.

Differences in Social Attributes

In this study, it was assumed that the following variables might relate to local elected officials' intentions to support landfill recreation reclamation. Selected variables included population size of a municipality, landfill ownership, and respondent's experience in granting landfill permits. Independent-sample t-tests were employed to examine whether differences existed. Analysis of social attributes of the respondents was summarized and presented in Appendix E and in Table 1.

Table 4-15 indicates no differences existed in all tests except the awareness of landfill recreation reclamation. Local elected officials who were aware of LR had a

significantly different behavior intentions toward LR compared to those officials with less awareness. The aware group had stronger intentions in supporting LR than the non-aware group. No significant differences were found between different population groups, different landfill ownership status, and different experiences of landfill permit granting.

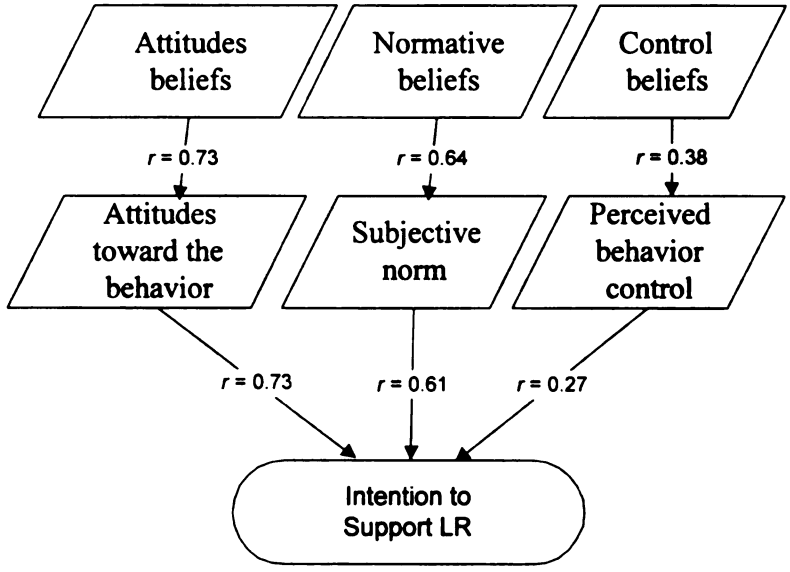


Figure 4-2. The Correlations between Indirect Measures, Direct Measures, and Local Elected Officials' Behavioral Intentions to Support LR

Table 4-15. Differences of Behavioral Intentions between Different Population, Ownership, Permit, and Awareness Groups

	Population		ownership		experience of landfill permit granting		awareness of landfill reclamation	
	10,000 and above	less than 10,000	public owned	private owned	Yes	No	Yes	No
Intentions to support landfill reclamation	2.35	1.78	2.29	1.92	2.38	1.64	2.73**	1.17**

** $P < 0.01$

Relationship between Social Attributes and Behavioral Intentions

Since awareness of landfill recreation reclamation makes a difference in local elected officials' intentions toward supporting LR, a chi-square test (a two-way contingency table, 2 x 2) and Phi coefficient (ϕ) were further employed. A Phi coefficient (ϕ) was computed to measure the strength of association between the intention variable and awareness variable. A large value of the Phi coefficient indicates that a high degree of association exists. The results indicate awareness and behavioral intentions were found to be significantly and modestly related (Pearson $\chi^2 = 8.74$, p=0.003, $\phi = 0.28$).

Among aware respondents, the experience of visiting a LR site might influence behavior intentions and this relationship was further examined. The results indicate that a significant and moderate relationship was found between the respondents have visited a LR site and their level of intentions toward LR (Person $\chi^2 = 4.16$, p= 0.04, $\phi = 0.26$).

It appears that both the awareness of LR and the experience of visiting a LR site among the aware group were significantly related to the local elected officials' intentions to support LR. However, the t-test and Phi-coefficient indicate that relationships between these variables were moderate, but significant.

This study assumed the local elected officials' intentions to support LR are related to the difficulty in obtaining recreation areas in their communities. The differences between low and high intention groups were examined.

The results indicate there is a significant difference in the local elected officials' perceptions of difficulty in obtaining new parkland in their communities relating to their level of intentions toward LR ($t = -2.72$, $p = 0.01$). The correlation coefficient ($r = 0.34$, $p = 0.01$) indicates that the variable correlated positively with behavioral intentions. In other words, the respondents tended to have higher intention toward LR as they perceived more difficulty in obtaining new parkland or recreation areas in their communities.

Overall, the awareness of LR and the degree of difficulty in obtaining recreation areas appeared to relate to the local elected officials' behavioral intentions, while the population size, ownership, and permit experience did not make any significant difference in the local elected officials' behavioral intentions. The local elected officials possessed higher behavioral intentions to support LR when they are aware of LR. Therefore, two variables, awareness and difficulty, were selected as additional criteria to predict the behavioral intentions.

Predicting Intentions

The key determinant(s) of the local elected officials' behavior intentions was examined in the null hypothesis IV using a multiple regression analysis.

H_4: No linear relationship exists between the overall effects of three determinants (attitude toward the act, subjective norms and perceived behavior control) and the local elected officials' behavioral intentions to

support landfill recreation reclamation.

Prior to the regression analysis, a bivariate correlation among the predictors (Aact, SN, and PBC) was conducted to examine potential multicollinearity problems. This analysis implies that regression coefficients may be unstable if multicollinearity exists. In other words, the regression coefficients are likely to vary from sample to sample (Bryman, 1997). The correlation matrix among the independent variables is shown in Table 4-16. Because none of the correlation coefficients between each pair of predictors is 0.80 or higher, this suggests that a multicollinearity problem is not evident.

The prediction of behavioral intentions to support landfill recreation reclamation was examined by a hierarchical multiple regression analysis. The direct measures of Aact, SN, and PBC served as predictors in the analysis. The Beta weights of the three determinants in a multiple regression equation indicate the relative importance in the prediction of the behavioral intentions.

In the analysis, Aact and SN, as two predictors according to the theory of reasoned action, were entered first. Then, the PBC was entered as an additional predictor based on the theory of planned behavior. Two additional variables (awareness of LR, difficulty in obtaining recreation areas) were entered in the equation later since they were

Table 4-16. Pearson Correlations Matrix among the Three Predictors

Determinants	(Aact)	(SN)	(PBC)
Attitude toward the act (Aact) (N=116)	1.00		
Subjective norm (SN) (N=115)	0.77**	1.00	
Perceived behavioral control (PBC) (N=114)	0.22*	0.24*	1.00

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

found to relate to the behavioral intentions, as noted previously. These linear relationships were expressed in the following regression equations:

(1) Intention to support LR = $b_0 + b_1(\text{Aact}) + b_2(\text{SN}) + \varepsilon$

(2) Intention to support LR = $b_0 + b_1(\text{Aact}) + b_2(\text{SN}) + b_3(\text{PBC}) + \varepsilon$

(3) Intention to support LR = $b_0 + b_1(\text{Aact}) + b_2(\text{SN}) + b_3(\text{PBC}) + b_4(\text{Diff}) + b_5(\text{aware}) + \varepsilon$

Table 4-17 shows the linear combination of Aact and SN was significantly related to the local elected officials' behavioral intention. The results of the first regression equation show that both Aact and SN made a significant contribution to the prediction of the behavioral intentions, F (2,107) = 68.38, $p \leq 0.001$. The F-test is a test of overall model fit. The small p-value associated with the F-test result in rejection of the null hypothesis. The multiple correlation coefficient (R) was 0.75, a squared multiple regression (R^2) was 0.56 indicating approximately 56 percent of the variance of the intention scale in the sample can be accounted for by the linear combination of the two determinants. An adjusted R^2 was 0.55.

Table 4-17. Results of Multiple Regression Analysis with the Behavioral Intentions Scores as the Criterion Variable and Aact, SN, and PBC Scores as Predictor Variables

Predictors	R	R^2	Adjusted R^2	Beta (direct measures) Aact	SN	PBC	difficulty	awareness	F-test
Aact+SN	0.75	0.56	0.55	0.54***	0.25**	-----	-----	-----	F(2,107)=68.38, $p \leq 0.001$
Aact+SN+PBC	0.76	0.58	0.57	0.52***	0.26**	0.06	-----	-----	F(3,105)=48.65, $p \leq 0.001$
Aact+SN+PBC + Diff.+Aware	0.76	0.58	0.56	0.51***	0.26*	0.02	0.03	0.07	F(5,100)=27.68, $p \leq 0.001$

***. Correlation is significant at the 0.001 level.

**. Correlation is significant at the 0.01 level.

*. Correlation is significant at the 0.05 level.

In the second regression equation, the linear combination of three determinants was significantly related to the intention scale, F (3,105) = 48.65, $p \leq 0.001$. The multiple correlation coefficient was 0.76. The R^2 increased from 0.56 to 0.58, which indicated approximately 58 percent of the variance of the intention scale in the sample can be explained by the regression model. An adjusted R^2 was 0.57 (Table 4-17). The addition of a perceived behavioral control variable slightly improved the model's predictive power, $\Delta R^2 = 0.02$. However, the partial correlation indicates only two determinants, Aact (r = 0.46) and SN (r = 0.25) were significant (Table 4-18). It appears that only two variables, Aact and SN, are useful predictors in predicting intentions to support the landfill recreation reclamation. The additional predictor (PBC) did not make a significant contribution to the prediction of behavioral intentions.

In the third regression equation, the R^2 remained virtually unchanged (Table 4-17) when two additional variables, the awareness of LR entered as dummy variable and the difficulty in obtaining recreation areas, were entered. It appears that these two variables did not contribute to the overall prediction of intentions.

Table 4-18. Coefficient Table for Multiple Regression Analysis with Predictors Aact and SN

						Correlation			Collinearity
Model	B	Std. Error	Beta	T	Sig.	Zero-order	Partial	Part	VIF
(Constant)	-0.09	0.27		-0.35	0.72				
Aact	0.22	0.04	0.54	5.31	0.00	0.73	0.46	0.34	2.47
SN	0.53	0.21	0.25	2.52	0.01	0.67	0.25	0.16	2.47

Dependent Variable: Behavioral Intentions

So far, the first regression equation with two predictors remains the preferred specification for predicting the local elected officials' behavioral intentions to support LR. The relative importance of these two predictors is indicated by the standardized coefficients (Beta), the Aact was 0.54, and SN was 0.25 (Table 4-17). The results show that the Aact was a more significant predictor than was SN for the prediction of local elected officials' behavioral intentions in supporting LR.

This study proceeds further into the model refinement by examined interaction effects, multicollinearity, and a possible curvature effect. A formal method of detecting multicollinearity is using variance inflation factors (VIF). The VIF measures how much the variances of the regression coefficients are inflated (Neter et al, 1990). A VIF value in excess of 10 is an indication of a multicollinearity problem. Thus, a VIF was calculated and presented in Table 4-18. As the results show VIF = 2.47 for both predictors, thus, multicollinearity among the two predictors is not a problem.

Since the predictors Aact and SN were highly correlated, to test the possible interaction effects Aact was multiplied with SN to obtain a product score. The product score was entered into a hierarchical regression analysis after Aact and SN. The results in Appendix F, Table 1 indicate the interaction effect to be non-significant (b = -0.03, p = 0.12). Thus, it was decided not to include any interaction term in the regression model.

A concern of a possible curvature effect was examined by adding the squared term of two predictors to the model. It contributes a little to the prediction of behavioral intention and both squared terms are not significant. The normality assumption was checked by examining a normal probability plot of the residuals from the fitted model. Figure 4-3 indicates that the residuals are reasonably normal. Overall, the regression

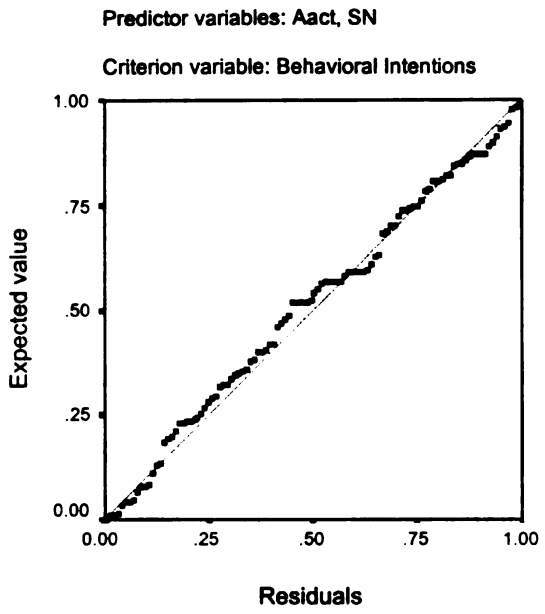


Figure 4-3. Normal Probability Plot of Regression Standardized Residuals

analyses presented thus far lend support to the first regression equation as the best model in predicting behavioral intentions with a linear relationship between behavioral intentions and two predictors (Aact and SN).

The study successfully identified two predictors helpful in understanding the local elected officials' intentions to support landfill recreation reclamation. In other words, one should be able to predict local elected officials' intentions by only examining a local elected official's responses in the direct measure of the attitude toward the act scale and the subjective norm scale. Indeed, 55% of the total variance of the local elected officials' intentions to support landfill recreation reclamation can be explained by the model.

Beliefs Underlying the Two Predictors

After identifying relatively important predictors, the direct measure of attitude (Aact) and direct measure of subjective norm (SN), the next step was to identify what elements of the significant theoretical constructs explained differences in the local elected officials' intentions to support LR. To gain insight into the considerations that influence local elected officials' intentions to support (or oppose) LR, it is necessary to review what beliefs the local elected officials hold. The construction of the Ajzen and Fishbein's theory allows examination of each determinant in more detail to understand the underlying beliefs that influence local elected officials' intentions to support LR. Ajzen (1986) stated that changing a person's attitude toward a behavior requires changing the attitude beliefs regarding the consequence of performing a specific behavior or the evaluation of those consequences. Changing a person's subjective norm lies in changing what a person perceives a specific referent group would want the person to do (normative beliefs). This information of significant difference in an underlying belief would be crucial for defining the content of future educational interventions.

Independent-sample t-test was employed to examine the difference between the high intention group and the low intention group among attitude beliefs and normative beliefs. The results may help explain why some local elected officials support LR and others do not.

Differences in Attitude beliefs underlying attitudes toward intentions.

For ease of discussion, both the consequence beliefs and preference evaluation items were arranged into two groups: perceived benefits and perceived risk in general. In

Table 4-19, the results of the independent-samples t-tests were outlined. All consequence belief items were significantly ($p \leq 0.001$) different between low and high intention groups except items (10), (13), and (14). The results of preference evaluations in Table 4-20 indicate that the high intention group was significantly different from the low intention group in all preference evaluations.

Table 4-19. Differences between the Low and the High Intention Groups in Consequence Beliefs

Consequence beliefs	High and Low Intention	N	Mean[♦]	t-ratio	Sig. (2-tailed)
1. Additional recreational opportunities	low intention	62	0.82		
	high intention	54	1.56	-4.20	0.000
2. Community asset	low intention	62	0.52		
	high intention	54	1.31	-4.48	0.000
3. Positive impacts on community image	low intention	62	0.56		
	high intention	54	1.20	-3.40	0.001
4. Promote positive public relations	low intention	62	0.60		
	high intention	54	1.20	-3.88	0.000
5. Improve adjacent living conditions	low intention	62	0.26		
	high intention	54	0.94	-3.15	0.002
6. Allow revitalizing the adjacent areas	low intention	62	0.15		
	high intention	54	0.93	-4.10	0.000
7. Increase adjacent property value	low intention	62	0.16		
	high intention	54	0.76	-2.96	0.004
8. Problem can be managed	low intention	62	0.23		
	high intention	54	0.85	-3.69	0.000
9. Liability problem involved[♣]	low intention	62	-0.81		
	high intention	54	-0.26	-2.94	0.004
10. Negative impact of undesirable landfill image[♣]	low intention	62	-0.66		
	high intention	54	-0.33[NS]	-1.51	0.135
11. Threatening users' safety[♣]	low intention	62	-0.19		
	high intention	54	0.61	-4.04	0.000
12. Threatening users' health[♣]	low intention	62	-0.15		
	high intention	54	0.59	-3.65	0.000
13. Higher maintenance costs[♣]	low intention	62	-0.53		
	high intention	54	-0.69[NS]	0.82	0.415
14. Is a small problem	low intention	62	-0.34		
	high intention	54	0.04[NS]	-1.89	0.061

[NS] Non-significant

[♦] Possible score ranged from -2 (strongly disagree) to 2 (strongly agree).

[♣] Item stated in a negative way in the questionnaire; and its mean score was reversed.

Table 4-20. Differences between the Low and the High Intention Groups in Preference Evaluations

Preference evaluations	High and Low Intention	N	Mean[♦]	t-ratio	Sig. (2-tailed)
1. Like land reuse strategy	low intention	62	0.69		
	high intention	54	1.61	-5.07	0.000
2. Like promoting positive public relations	low intention	62	0.63		
	high intention	54	1.52	-4.51	0.000
3. Pleased with additional rec. opportunities	low intention	62	0.50		
	high intention	54	1.44	-5.55	0.000
4. Like increasing house demand	low intention	62	-0.45		
	high intention	54	0.24	-2.81	0.006
5. Uneasy when recreating[♠]	low intention	62	-0.21		
	high intention	54	0.43	-2.65	0.009
6. Worried about potential safety hazards[♠]	low intention	62	-0.76		
	high intention	54	-0.13	-2.60	0.011
7. Uncomfortable about potential liability risk[♠]	low intention	62	-0.81		
	high intention	54	-0.19	-2.86	0.005

[♦] Possible score ranged from -2 (strongly disagree) to 2 (strongly agree).
[♠] Item stated in a negative way in the questionnaire; and its mean score was reversed.

It appears that the two groups of the local elected officials differing in level of intention to support LR also differ on most of the individual items of indirect measure of attitude. Furthermore, Table 4-19 indicates the high intention group was more positive toward perceived benefits than was the low intention group in the beliefs of LR would provide additional recreational opportunities ($\underline{M}$ = 1.56), become a community asset ($\underline{M}$ = 1.31), and positive impacts on community image ($\underline{M}$ = 1.20) and promote positive public relations ($\underline{M}$ = 1.20). The high intention group was less negative toward perceived risk than were the low intention group. For example, the low intention group perceived more negative impacts related to liability problem involved ($\underline{M}$ = -0.81), threatening users' safety ($\underline{M}$ = -0.19) and threatening users' health ($\underline{M}$ = -0.15) while the high intention group was more positive and felt that these problems could be managed (M =0.85). However, both groups implied that a previous negative image toward landfill operation

would have a negative impact on LR and their perceptions of maintenance costs were high.

In addition, the preference scale (Table 4-20) shows the high intention group strongly favored the land reuse strategy ($\underline{M}$ = 1.61), promoting positive public relations ($\underline{M}$ = 1.52), and pleased with additional recreation opportunities ($\underline{M}$ = 1.44). Both groups had a tendency to remain neutral (mean score toward zero) in response to the question of increasing housing demand in surrounding areas and the question of feeling uneasy when recreating on a landfill. But yet, the two groups were significantly different in their responses to these items.

In regard to perceived risk (i.e., liability, safety and health problems), the negative belief scores indicate that local elected officials were concerned about the potential risk while the belief scores toward the positive end imply they were concerned less or even had no concern at all about the risk. Table 4-19 and 4-20 show that the low intention group scored negative items (i.e., threatening safety and health, uneasy when recreating, worried about safety, and uncomfortable about liability) significantly lower than the high intention group. The mean scores shown indicate the high intention group believed that these outcomes might occur but they were more tolerant or less concerned about the risk.

Overall perceived benefits and overall perceived risk.

The analysis went further to examine the local elected officials' overall perceptions of benefits and overall perceptions of risk, which were based on the local elected officials' sum of scores in response to benefit and risk items previously identified in the factor analysis section. The overall perceived benefits score was obtained by the

summing of perceived benefits scores in both consequence beliefs and preference evaluations with a coefficient alpha value of 0.93 (Appendix F, Table 2). The overall perceived risk score was obtained by the summing of perceived risk scores in both consequence beliefs and preference evaluations with a coefficient alpha value of 0.85. Then, the mean scores were computed for both the overall perceived benefits and the overall perceived risk.

The frequency analysis illustrates that the local elected officials had a certain level of overall risk concern, about 55 percent had scores less than the mean score, ($\underline{M}$ = -0.27, SD = 0.79 and ranging between 2 and -2, see Figure 4-4). Approximately sixty percent of local elected officials had overall perceived benefits scores larger than the mean score ($\underline{M}$= 0.72, and ranging between 2 and -2, see Figure 4-5).

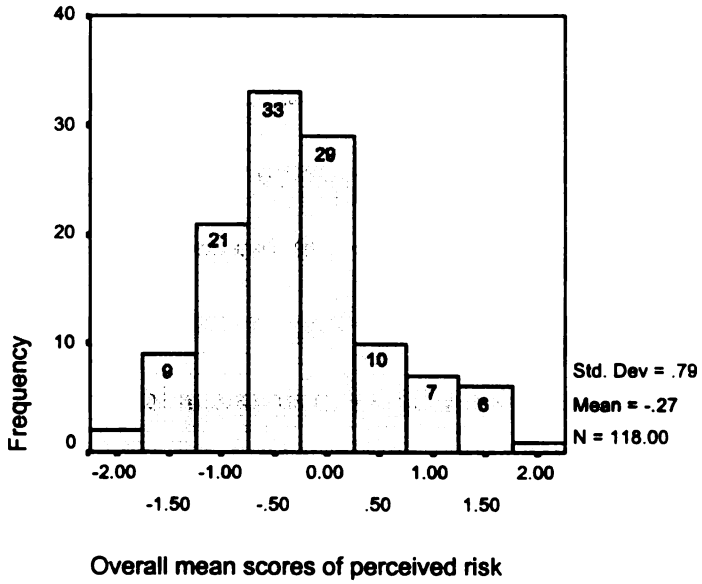


Figure 4-4 Histogram of Local Elected Officials' Perceived Risk

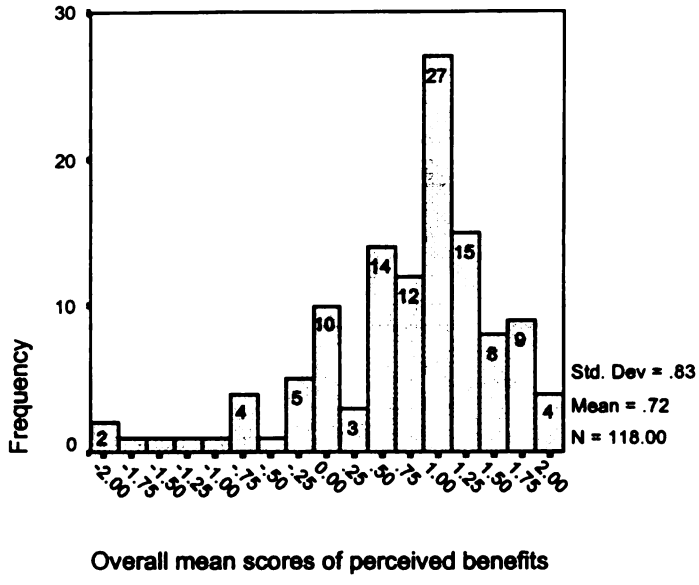


Figure 4-5. Histogram of Local Elected Officials' Perceived Benefits

An independent-sample t-test was conducted to assess the mean difference between low and high intention groups among overall perceived benefits and overall perceived risk. Table 4-21 indicates that the low and the high intention groups were significantly different in their overall perceived benefits and overall perceived risk.

The relationships among these variables were further examined by regression analysis. The results indicate a significant correlation existed between overall perceived benefits and behavioral intentions ($r = 0.63, p \leq 0.001$), and a significant, but negative correlation existing between overall perceived risk and behavioral intentions ($r = -0.45$, $p \leq 0.001$, Table 4-22). The high intention group had higher mean scores in terms of more positive perceptions of overall benefits toward LR while the low intention group had lower negative mean scores in terms of perceptions of overall risk toward LR. Both

Table 4-21. Mean Differences in Overall Perceived Benefits and Overall Perceived Risk between Different Intention Groups, and between Different Awareness Groups

		N	Mean	SD	t	Sig. (2-tailed)
Overall perceived benefits	High intention	54	1.13	0.57		
	Low Intention	62	0.38	0.85	-5.551	0.000
Overall perceived risk	High intention	54	0.008	0.86		
	Low Intention	62	-0.49	0.65	-3.490	0.001
Overall perceived benefits	Aware	63	0.95	0.65		
	Non-aware	54	0.45	0.93	3.314	0.001
Overall perceived risk	Aware	63	-0.07	0.82		
	Non-aware	54	-0.49	0.70	2.970	0.004

Table 4-22. Coefficient Table for Regression Analysis for Overall Perceived Benefits and Overall Perceived Risk

						Correlations		
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
(Constant)	0.58	0.38		1.53	0.13			
Over_benefits	2.09	0.33	0.56	6.27	0.00	0.63**	0.51 **	0.45
Over_risks	-0.48	0.35	-0.12	-1.38	0.17	-0.45**	-0.13	-0.10

Dependent Variable: Behavioral Intentions ($R = 0.64$, $R^2 = 0.41$, $F=38.99$, $p \leq 0.001$)
** $p \leq 0.001$

groups perceived positively toward the benefit consequences of LR and both groups were slightly more negative toward risk concerns. The mean score ($\underline{M} = 0.008$) of overall perceived risk shows officials in the high intention group were either uncertain or had less concern about the risk than the low intention group. Similar results were found in the examination of the aware group versus non-awareness group, $\underline{M} = 0.95$ vs. $\underline{M} = 0.45$; $\underline{M} = -0.07$ vs. $\underline{M} = -0.49$, respectively (Table 4-21).

It is interesting to note the relationship among these variables using a partial correlation analysis. The results show that overall perceived benefits were moderate and

significantly correlated with behavioral intentions when holding constant the perceived risk ($r = 0.51, p \leq 0.001$), while no significant relationship was found between overall perceived risk and behavioral intentions when holding constant the overall perceived benefits ($r = -0.13, p \leq 0.17$). The results of multiple regression analysis are presented in Table 4-22. It appears that the overall perceived benefits were the sole determinant of behavioral intentions. This finding supports Sokolowska and Tyszk's two-step threshold strategy as mentioned in chapter two.

In sum, the data related to overall perceived benefits and overall perceived risk presented thus far support the previous study assumption in chapter two. That is the opponents of LR will perceive higher risk (score toward negative end), and supporters of LR will perceive higher benefits resulting from LR while still perceiving risk at a certain level. However, the perceived risks were found not to be significant in predicting behavioral intentions while holding perceived benefits constant.

Normative beliefs underlying subjective norms.

Prior to testing the difference in normative beliefs, their frequencies were examined. The percentage of the local elected officials' responses toward each normative belief and their degree of compliance are presented in Appendix F, Table 3 and Table 4. For the degree of compliance, the local elected officials tended to feel stronger (more than often) about complying with the wishes of residents (87%), experts (86%), and their colleagues (84%). For perceived support of LR, the local elected officials considered that all referents were likely or very likely to be supportive, especially from experts (73%) and colleagues (72%). However, a certain proportion of responses, ranging from 18% to 41%

(Appendix F, Table 4), centered around the neutral value (not sure). Only a small percent of local elected officials considered referents opposed to LR.

The interesting thing to note here is about 60 percent (Appendix F, Table 4) of the local elected officials thought landfill owners were likely to support LR, but about 40 percent (Appendix F, Table 3) of the them were less inclined to comply with landfill owners' wishes. This makes sense because some respondents' comments on the fear that landfill companies may inappropriately use landfill recreation reclamation as a tactic to gain public support for approval of landfill siting.

The difference between the low and the high intention groups in normative beliefs and motivation to comply were further examined using independent-sample t-tests. Results should reveal who is the important referent(s) and will identify the tendency at which a local elected official will comply with referent(s).

Table 4-23 presents the mean belief scores for the two groups. The results show that perceptions of the low intention group and perceptions of the high intention group were quite different toward the referents' support of LR and toward the degree of compliance with referents. In compliance with referents' opinions, all mean scores are significantly different except for the local media. In fact, the local media opinions appear to be the least oriented toward compliance, according to their mean scores, for both groups in this study. Although the mean scores show that both low and high intention groups "often" (with mean score 3 or above) comply with referents' opinions, the high intention group indicated stronger motivation to comply with referents' opinions than did the low intention group.

The results shown in Table 4-23 also indicate that significant differences existed

Table 4-23. Mean Differences between the Low and the High Intention Groups in Perceived Support, Degree of Compliance, and Overall Effects

Referents	High and Low Intention	N	Mean scores of perceived support ♦	Mean scores of degree to comply ▲	Mean scores of product
State agents (DNR, DEQ)	Low intention	62	0.42	3.08	1.27
	High intention	54	1.06	3.89	4.28
County commissioners	Low intention	62	0.39	2.87	1.19
	High intention	54	1.13	3.44	4.31
Colleagues	Low intention	62	0.31	3.31	1.16
	High intention	54	1.46	4.04	6.15
Experts in community	Low intention	62	0.56	3.52	2.08
	high intention	54	1.28	4.04	5.30
Voters/residents	low intention	62	-0.05	3.42	-0.11
	high intention	54	0.89	3.91	3.67
Local media/journalists	low intention	62	0.32	2.44 ^{NS}	1.08
	high intention	54	0.98	2.87 ^{NS}	2.96
Landfill owners	low intention	62	0.79^{NS}	2.69	2.06
	high intention	54	0.96^{NS}	3.54	3.61
Community special interested groups	low intention	62	0.11	2.66	0.15
	high intention	54	0.78	3.22	2.76

^{NS}: not significant, others $p< 0.05$

♦ Possible score ranged from -2 (very unlikely) to 2 (very likely).

▲ Possible score ranged from 1 (never) to 5 (very much).

between low and high intention groups' normative beliefs of referents' support except the landfill owners group. According to the mean scores of normative beliefs, the high intention group perceived a much stronger support from all referents (except the landfill owners group) than the low intention group perceived. Both groups thought landfill owners would likely support LR. However, the low intention group was much more reluctant to comply with landfill owners' opinions. The high percentages of not sure response were further explained by the mean scores of the low intention group. As their mean scores approached zero, it indicates low intention group was not sure whether or not the referents would support LR, while the high intention group considered the referents likely to support LR. Among eight referent groups, four referent groups (state

agents, county commissioners, colleagues, and experts) received a higher mean score from the high intention group than from the low intention groups. The differences are more obviously in the mean scores of products. The product scores were obtained by the score of normative beliefs multiplied by the score of degree of compliance. The higher product score implies the referent(s) play an importance role in influencing the local elected officials' intentions. The results also indicate the high intention group perceived stronger support from the above four groups, especially their colleagues ($\underline{M}$ = 6.15) and the expert groups ($\underline{M}$ = 5.30).

On the other hand, the low intention group perceived weak support from voters/residents and community special interested groups, where the mean score of product score was -0.11 and 0.15, respectively. In sum, the state agents, county commissioners, colleagues, and experts groups may play a critical role which influence the high intention group' intention to support LR. On the other hand, the perceptions of weak support from residents and interested groups have more influence on the low intention group' intention.

A summary of the study findings are presented in chapter five, along with implications and discussions of the research findings. Recommendations for future research and conclusions are then presented.

CHAPTER 5

SUMMARY AND CONCLUSIONS

This study was conducted to test a conceptual framework based on the theory of planned behavior and to provide a better understanding of the local elected officials' attitudes toward the issue of reclaiming closed type II and type III landfills for recreation uses. The study further examined the underlying beliefs toward the two significant predictors (attitude toward the act and subjective norm) of behavioral intentions.

Summary and Implications

The study area was conducted in southern lower Michigan municipalities that have at least one active landfill. The study population (N=243) was stratified into two strata based on the population size of the municipality. A self-administrated questionnaire was mailed to the local elected officials who were systematically and randomly selected from the two strata. The total response rate was 51% with 118 valid responses. Although this response rate was typical of many mail surveys, the potential generalizability of the results need to be made with some caution.

Reliability and Validity Tests

Prior to determining the reliability and validity of the newly constructed instrument, the scale dimension was first examined. A unidimensional scale was confirmed for each scale developed in this study including the scales of behavioral

intentions, attitude toward the act, and normative beliefs by using principal component analysis. However, both consequence beliefs and preference evaluations consisted of two components: perceived benefits and perceived risks, while the control beliefs scale consisted of perceived opportunities and perceived obstacles.

The reliability test indicated that the newly constructed instrument (Form 98) had acceptable levels of reliability. The coefficient alpha for each scale tested ranged between 0.75 and 0.95. The construct validity of the instrument was supported by the expected significant and positive association between the three indirect measures and each corresponding direct measure -- attitude toward the act (Aact), subjective norms (SN), and perceived behavior control (PBC); and between each direct measure of Aact, SN, and PBC and behavioral intentions.

Local Elected Officials' Attitudes toward Landfill Recreation Reclamation

Behavioral intentions.

The results of behavioral intention scores show that local elected officials tended to express a positive attitude toward supporting landfill recreation reclamation. Approximately 58% of the respondents were likely to support LR while approximately 11% of respondents opposed it. The remaining respondents were either neutral or undecided.

Influence of social attributes.

The t-test results suggest that the population size, ownership, and landfill permit granting experience were not significantly related to the local elected officials' behavioral intentions. However, the local elected officials' behavioral intentions were positively

influenced by their awareness and experience of visiting a LR site. Thus, an attempt to enhance the local elected officials' experience of a LR such as providing related reclamation information or visiting a LR site may have a positive impact on their decision making related to supporting LR. The local elected officials who perceived their community as having difficulty in obtaining parkland or recreation areas also have stronger intentions to support LR. Thus, communities with increasing demand of recreation areas may be more supportive than those who are not. The findings of the local elected officials in favor of landfill end-use regulation may facilitate future policy formation.

Relationship between three determinants and behavioral intentions.

The results of the hypotheses tests supported the theoretical model based on the theory of planned behavior. First, the rejections of hypotheses I through III suggest that the loacal elected officials have a stronger tendency to support LR when they perceived more benefits would result from LR ($r = 0.73$), when they perceived support from their important referents($r = 0.61$), and when they perceived fewer barriers (i.e., liability) preventing their support or when they perceived more opportunities (i.e., funding) facilitating their support ($r = 0.27$).

Second, when considering the overall effects of Aact, SN, and PBC on behavioral intentions, the rejection of hypothesis IV shows both Aact and SN had stronger effects upon behavioral intentions than PBC did. The local elected officials' intentions to support LR were successfully predicted (R = .75) from their attitude toward supporting LR (Aact) and the social pressure they perceived from their community (SN). More specifically, the results of this study indicated the attitudes toward LR had a greater influence on local

elected officials' intentions to support LR than did subjective norms.

Beliefs underlying the two predictors.

The differences between the high intention group and the low intention group in attitude beliefs and in normative beliefs, the underlying beliefs of the two significant predictors of behavior intentions, are summarized below.

1. Attitude beliefs

The t-test results of the attitude beliefs suggest that the attitudes toward landfill recreation reclamation of the local elected officials were influenced by both consequence beliefs and preference evaluations. For example, the study results indicate that the underlying beliefs of the high intention group were based on the positive perceptions of the additional recreation opportunities, the creating of a community asset, promoting a positive community image, improving public relations, and favoring the land use strategy. On the other hand, the concern of the liability problems, the threat to users' safety and health made the low intention group lean toward opposing LR.

The attitude beliefs toward supporting LR consisted of two attitudinal components, perceived benefits and perceived risks. The weight (beta) of the multiple regression analysis indicated that the perceived benefits component was a significant attitudinal predictor of the behavior intentions to support LR. Nonetheless, the perceived risks did not contribute in predicting behavioral intentions to support LR. This could be interpreted as the uncertainty of risk perceived by the local elected officials. No one can assure that the risk will or will not occur, and how little or how severe the risk will be. Thus, it can be expected that some local elected officials oppose LR while others intend to take a chance on LR.

2. Normative beliefs

The t-test results of the normative beliefs suggest that subjective norms of the local elected officials were influenced by both the referents' opinions and the degree of compliance with the referents' opinions. The underlying beliefs of the high intention group were based on the perceptions of positive support from the referents and a higher degree of willingness to comply with the referents' opinions. On the other hand, the underlying beliefs of the low intention group were mostly neutral or not sure about whether the referents would support LR. The low intention group also complied less with the referents' opinions.

In terms of the importance of referents, the study found that experts, colleagues, state agents, and county commissioners were most important for the high intention group in making decisions to support LR; while residents and interested groups have more impact on the low intention group. Therefore, if residents and interested groups turn out to be supportive, then the low intention group may change its attitude toward LR.

Ajzen (1991) stated that each determinant of the theory of planned behavior reveals a different aspect of the behavior, and each provides information for an attempt to change it. The outcomes of this study suggest some practical implications for those who wish to promote LR. The results suggest that Aact and SN are two important variables in predicting support of LR. Thus, the first option should be to reinforce local elected officials' positive beliefs toward LR. The intervention program should increase their awareness in the benefits of LR. The second option could be addressing the support from important referents in their communities. The results of attitude beliefs of the low intention group also indicate that if one were to attempt to persuade the low intention

group to support LR, it would be most effective to convince them by using an information campaign that the liability problem can be prevented or mitigated and public safety can be secured.

Discussions

Three Determinants

In this study, the standardized regression coefficieants (beta) showed that Aact was a stronger predictor of intention than SN. This result was similar to Ajzen's study (1991) which compared studies using the theory of planned behavior. In Ajzen's finding, Aact made significant contributions to the prediction of intentions in most of the studies reviewed, whereas SN did not display a clear pattern of significant contribution. Thus, Ajzen claimed that personal consideration (Aact) tended to overshadow the influence of perceived social pressure (SN). This appears to be the case according to the beta in the current study.

The additional variables, perceived behavioral control (PBC), awareness, and parkland availability, did not significantly contribute to the prediction of intentions. Caution must be exercised in interpreting the regression models. The model did not state that Aact and SN are the only factors influencing the intention. Rather the model showed 56% of the total variance (an adjusted R^2 was 0.55) in the intentions to support LR was explained by Aact and SN. Other variables that account for some of the remaining unexplained variances in the behavioral intention measures need to be investigated.

The relatively insignificant effect of the PBC upon intention may mislead us to

make a false assumption that the control factor is not important in predicting support of LR. Ajzen and Madden (1986) have noted that a strong effect of PBC is expected only under two conditions:

> First, the behavior being predicted must not be under complete volitional control. When it is, then the concept of perceived behavioral control becomes largely irrelevant for prediction of behavior and the theory of planned behavior reduces to the theory of reasoned action. Second, perceptions of behavioral control must reflect actual control in the situation with some degree of accuracy. When this is not the case, the measure of perceived behavioral control can add little to the prediction of behavior (p.459).

This may provide some explanations for insignificant effects of PBC upon intentions. The local elected officials' intention to approve a LR proposal may be more toward volitional control instead of goal-directed. If this is the case, then the theory of reasoned action would be more appropriate for this study than the theory of planned behavior, as Ajzen and Madden (1986) discussed above.

However, with regard to the local elected officials' obligations, the perceived behavior control of the external factors such as funding, recreation demand, and liability should play an important role in their decision making process. Furthermore, Ajzen (1988, 1991) also stated that the realism of measuring PBC depends on the accuracy of the perceptions of behavioral control. Ajzen argued that a PBC measure might not contribute to the prediction of behavioral intentions: when a person has relatively little information about the issue or behavior, when requirements or available resources have changed, or when new and unfamiliar elements have entered into the situation.

The mean rating scores of the control beliefs centered around the uncertain response, the insignificant effect of PBC upon intentions may be the result of a lack of the required information about their community situations related to LR. The local elected

officials either felt uncertain about the real situation regarding their community or did not have adequate information to make appropriate judgment.

Another explanation is the process leading to the decision to support the LR may be over-simplified. The control beliefs scale developed in this study may not be able to reflect the complex effects of these external control factors on behavioral intentions.

Additional Concerns

This study also found that the local elected officials expressed their concerns about the potential liability, the lack of funding, and the need of preplanning. These issues are discussed below.

Liability and funding.

With regards to the liability concerns, it is critical to note that Michigan has taken actions to mitigate the risk and liability in redeveloping contaminated property. Michigan enacted P.A. 234 effective on July 1, 1991 which declared that the state was willing to enter into a covenant not to sue (CNTS) for past contamination liability at brownfield sites. P.A. 234 not only represents the state's interest in redevelopment and reuse of brownfield sites to initiate community revitalization, but also decreases the investors' financial risk of investing in brownfield redevelopment (Swartz, 1994). Whether a closed landfill, which is not a Superfund site, could be classified as a brownfield is subject to debate. However, the CNTS provides a good reference for mitigating liability concerns for landfill reclamation sites. Initiating similar laws and funding practices or adopting a CNTS format should be considered if the state, local government, and waste industry are to recognize the significant social and economic benefits generated by LR.

The following approaches may be considered to alleviate funding concerns. If closed landfills in Michigan were later considered as brownfields, they are then eligible to apply for Site Reclamation Grants to reclaim closed landfills for recreation uses. Also a potential state grant creating new funding sources to encourage landfill reuse might be considered. Additional funding may be obtained by revenues generated from the landfill reuse. For example, the cost of landfill closure and landfill reuse was supported by revenue generated from a golf course developed on the closed landfill in Yarmouth, Massachusetts (Reidy, 1996). Moreover, waste companies should be encouraged to actively provide funding to support the municipalities which intend to reclaim landfill for recreation uses through tipping fees.

Preplanning and phasing.

Some concerns have been raised in the survey with regard to the high rise landfill with a steep slope that provide very little level land at the top. It must be noted that the high rise and steep slope pattern can be changed in the landfill planning and design stages if landfill owners are willing to sacrifice some profits. By using the refuse as the sculpting medium, Fuss (1981) stated that appropriate landform for recreation use can be created under certain technological, physical, social, and economic constraints. Changing of the landfill design concept to overcome the landform and mechanic problems also was suggested by Golden (1994) and Rasmussen (1997).

A landfill host community, in general, has three opportunities to modify the final appearance of a landfill, which are before (planning stage), during (operation stage), and after a landfill operation (closed stage). It is most desirable to have the end use plan determined at a planning stage. The shape and slope of the landfill appearance then can

be created to accommodate the end use plan. The second chance would be negotiating appropriate end use during the landfill operation when expansion becomes necessary. After landfill closure, opportunities are still there but it is more problematic because of more limitations in landform modification. Thus, making an end use decision in the early stages is preferred as the size and shape can be created to fit the proposed use.

This study has shown most municipalities in this survey have no end use plan. Thus, the potential reclamation falls into the last two stages and becomes more problematic. However, successful reuses of closed landfills have been documented as discussed in the literature review. Nevertheless, all these concerns addressed one key issue, the importance of preplanning. If recreation end use is determined at a landfill planning stage, the landform can be constructed as the site is filled with refuse and the communities can see the vision of the final destiny of their closed landfill sites.

Another key point is phasing. Many recreation developments can be phased over time. If possible, develop off-site recreation areas in the first phase as a buffer zone. The expansion plan on the elevated site is constructed after the landfill has been closed for a certain period of time. For example in Broward County, Florida, a 90-acres of a proposed 588-acre landfill site was developed as a park at the beginning of landfill operation. The park will be expanded as more landfill parcels fill up (Naber, 1987). A multi-phased plan would allow balancing the technical constraints of a landfill and the aesthetic concerns as well as the need for future recreation uses.

It should be emphasized here that the liability and maintenance problems could be present even when equipped with good planning and high technology. The safety hazards due to methane gas as well as additional maintenance problems due to the heat from

garbage decomposition and uneven ground settling have been reported. Thus, a feasibility study of landfill end use should begin by examining the most appropriate use for each landfill in fitting its unique characteristics in different physical and social settings. The major issues to consider, including but not limited to, are the technological constraints imposed by landfill operation (i.e., whether equipped with a collection and monitoring system), the unique characteristics of the landfill site (i.e., type of refuse collected, size, final cover), community recreation needs, and economic issues.

Vision of future uses.

The results of this study show the local elected officials favored end-use regulation that might facilitate LR. The mandate of a landfill recreation end use plan as an acceptable final step of the solid waste management permitting procedure may be the best alternative for a closed landfill monitoring since it will benefit both local communities and landfill companies. However, since landfill companies do not have any legal responsibility to do any end use plan for the community at this time, local elected official's vision of the future use of a closed landfill is very critical. Local elected officials have to be proactive and take action to initiate the end use plan. A joint partnership of local, regional and state government units, landfill management agencies, and community residents is also critical to make landfill recreation reclamation feasible.

A note of caution.

A caution which needs to be mentioned here is that some local elected officials expressed their fears that landfill companies might use a recreation end use plan as a strategy to gain public support for approval of the landfill siting or expansion. Although this study showed local elected officials have expressed positive support toward landfill

recreation reclamation, landfill companies should not pursue landfill recreation reclamation as a tool to obtain community support for a landfill siting and expansion. Nonetheless, it is good to have a landfill company's commitment to create additional recreation opportunities for the welfare of the whole community.

Recommendations for Future Research

The development of a survey instrument is an ongoing process that usually never ends. This research may be an initial study on this subject. The construct validity of the instrument should continue to be monitored as the instrument is used with other samples and in other circumstances. Future study should extend to survey other regions in the U.S. and obtain additional information for comparison. A more general and larger size of population sample may improve the prediction of the intention model as well as to assess the general applicability of the model established in this study.

Supporting landfill recreation reclamation is expected to represent complex behaviors with some potential barriers. However, the perceived behavior control variable did not appear to be a significant component in predicting behavioral intentions. This may have resulted from methodological limitations such as the control beliefs elicited and tested in this study. The control belief measure used may not have captured enough specificity of the perceived behavior control. van Ryn, et al. (1996) suggested that prediction of complex behaviors with many barriers may be enhanced by including additional explanatory variables. For instance, in behavior with non-volitional elements, assessment of objective barriers to the behavior in question is likely to improve the

predictive power. Thus, a special effort to identify these objective barriers which reflect the communities' situations or differ from the control belief measure used in this study may improve the predictive power in future research. An interview with local elected officials with experience in LR would make a valuable contribution to perceived barriers or additional external variables, and further refine the instrument.

Ajzen's theory is dedicated to predicting a behavior in question. As behavioral intention is regarded as a mediating factor between antecedent beliefs and consequent action, it is essential to examine the relationship between behavioral intentions and actual behavior. However, the actual behavior (community with LR experience) was not examined due to the limited cases available for examination. For the same reason, the predictive power of past behavior was not able to be examined in this study although past behavior has been reported as a significant predictor (Traeen and Nordlund, 1993; Norman and Conner, 1996). The influence of past behavior upon behavior intentions may be obtained through a broader study scope such as a nationwide study.

Netemeyer, et al. (1991) noted that the individual difference variables such as self-knowledge may affect the theory's predictive validity. The study did not examine how the local elected officials' knowledge related to landfill regulation and safety issues. Since a person's cognition is influenced by his/her knowledge, the impacts of knowledge on perceived benefits and perceived risk should be assessed in a future study.

Public involvement is critical to introduce the idea and obtain feedback to formulate the designs and programs for LR. As stated in chapter one, community residents also play an important role in the success of LR. However, little is known about how community residents will react to the development and especially to what extent

residents will utilize the recreation facility. It is also unknown whether those who use the recreation facilities have any particular concerns. For those who do not participate, what are their primary concerns or what are the reasons they did not use the site? As a result, utilization of these facilities may be one of the indices for whether landfill recreation reclamation is successful or not. Further application of the conceptual framework among community residents might be able to identify those for which attitudes, subjective norms, and perceived behavioral control are important determinants and those which are not. This will be of considerable value for future planning and management purposes.

Conclusions

As of today, no one knows exactly how many landfills will close each year. However, considering the United States generates some 200 million tons of municipal waste each year, it can be expected more landfills will reach their capacity soon. Local governments need to prepare to answer the question: "What can we do with these closed landfills?" Some local elected officials in this study are ready to response to this challenge. The findings of this study indicate the local elected officials will support a project of reclaiming closed sanitary landfills for recreation uses. This study also successfully identified two factors helpful in understanding why more than half of local elected officials are supportive toward landfill recreation reclamation (LR) while a few of them do not. The identified factors, attitude toward the act (Aact) and subjective norms (SN) were useful in predicting the behavioral intentions to support LR, with approximately 56% of the variance being explained by applying the model. Moreover, the

results add support to Ajzen (1991) that subjective norms (SN) are less influential on behavioral intentions than attitude toward the act (Aact). Any attempt to understand LR without investigating attitudes could overlook a major influence upon the behavioral intentions. The findings also illustrate that the positive relationships exist among attitudes toward the act, subjective norms, selected external variables, underlying beliefs, and behavioral intentions.

The perceived behavior control (PBC) remains an unresolved issue that needs further study. The study was not successful in identifying the PBC that related to community situations in predicting behavioral intentions. The insignificant effect of this particular construct upon intentions should not mislead us to conclude that the PBC factor is not important in inducing support of LR. No contribution of the PBC may be a result of lacking information related to community situations.

It is important to note that the present study highlights the potential of using a social psychological model to increase our understanding in the context of local elected officials' attitudes toward landfill recreation reclamation. The use of the theory provides a basis for exploring future ways of facilitating local elected officials' involvement in reclaiming landfill for recreation uses in their communities. As noted, the Aact and SN can have an important impact on a person's behavioral intentions. The more positive consequences and higher referents' support the local elected official perceived, the stronger is the person's intention to support LR. To facilitate LR development, the information campaign must address the benefit statements that affect local elected officials' attitudes as early as possible and address local elected officials' concerns effectively such as the mandated monitoring system to reduce risks.

The underlying beliefs of each behavioral determinant provide the detailed descriptions needed to obtain substantive information about a specific social or behavior concern. The analyses of belief-based measures showed that attitudes toward LR can be separated into two attitudinal dimensions -- perceived benefits and perceived risks. This study indicated the supporters of LR perceived higher benefits resulting from LR while still expressed concerns about the latent risks that might be involved. This finding adds support to Sokolowska and Tyszk's (1995) two-step threshold strategy. The local elected officials' support/acceptance of LR indicated that LR was mainly considered as an activity with low or moderate degree of risk. Thus, perceived benefits became a significant determinant of the local elected officials' behavioral intentions to support LR.

The perceived benefits were based on perceived economic gain, and improvement of community living conditions, etc. The dominance of the benefit component may be a function of latent demand. As the combination of rising land values, a growing population, and the need for recreation areas occurs, closed sanitary landfills may become the few remaining spaces available and affordable for park and recreation uses in some municipalities. The EPA's requirement of a 30 years monitoring period after closure is another major incentive. Instead of leaving the land idle for 30 years, municipalities in urbanized settings might consider the suitability of various end use plans and take action to make the land more productive. Municipalities with landfills in rural settings should also plan ahead with any potential end use in mind. When urban sprawl occurs, the once remote landfill is going to be surrounded by newly developed communities sooner or later. The landfill sites would be ready for the productive use as long as preplanning was completed.

As addressed in the MDNR 1991 annual report, not much can be done in the distribution of natural resources, but we can take full advantage of the many potentials that exist in southern lower Michigan. The closed sanitary landfills would be one of the potentials that exist and could be reclaimed to provide additional recreation opportunities for the surrounding communities. Monitoring closed sanitary landfills while providing a recreation service seem to be an ideal combination. Moreover, it is possible to convert the site into revenue property such as a golf course providing a new tax base for local government. By transforming an unpopular necessity into an attractive asset may also help restore real estate values, and improve the surrounding living quality. Reclaiming landfill for recreation uses has been considered as one of the most appropriate end-uses. This approach can be an additional way of compensation to the host community.

Landfill recreation reclamation is certainly not going to be the major trend for park and recreation development in the future, but it would play an important part in solving one of our pressing environmental problems. Not every landfill is suitable for landfill recreation reclamation. The feasibility of every site should be examined on an individual site basis. For those communities with the need of expanding their park and recreation space and having a suitable landfill site, landfill recreation reclamation should be strongly considered in their end use plan. It is to be hoped that with all decent efforts and additional caution; an undesirable necessity of our society can be turned into a remarkable place for people in the future.

APPENDICES

APPENDIX A

THE ELICITING QUESTIONNAIRE

Dear Sir:

I am a graduate student at Michigan State University. Currently, I am doing a study related to recreational development on top of a closed sanitary landfill. Could you please help me with this project?

People have many different opinions about reclaiming closed sanitary landfill for recreational uses. Some communities around the nation have developed various types of recreational facilities on top of closed landfills (e.g., community park, golf course), while others are hesitate to do it due to the concerns of the risk potential. I would like to know what you, as an official of local government, believe about a landfill end use, and what factors will be used in making your decision to develop an alternative landfill end use.

Four questions are attached. There are no right or wrong answers. Your responses will help me in further understanding what factors influence your decision on landfill recreation reclamation. The data gathered would be used to construct a questionnaire that will be distributed to collect data for my dissertation. Please fill out the four questions attached; they will provide important data for my study. Your responses will be used for this study only and will be kept confidential.

When you completed the form, please return it in the postage-paid envelope provided as soon as possible. I appreciate your time and assistance in this study.

Sincerely,

Chia-Jen Liu
Graduate Student
E-mail: liuchiaj@pilot.msu.edu
(517) 353-5190

P.S. You may use E-mail to send your responses if you prefer.

First, please enumerate your perceived consequences -- advantages and disadvantages, benefits and costs --- of recreational development on closed landfill for your community. (Please use additional sheet as needed)

Second, please identify people or groups of people (such as media, state official) who would influence your support of a landfill recreation end use plan.

Third, please identify any barriers (i.e., funding, community demand, and location) that will influence your decision to support a landfill recreation end use plan.

Fourth, what other factors will be considered in your decision making process in terms of evaluating a landfill recreation end use plan?

(Please returns it in the postage-paid envelope provided.)

THANK YOU!

APPENDIX B

THE PILOT QUESTIONNAIRE FORM-97

SURVEY OF LOCAL ELECTED OFFICIALS' ATTITUDES TOWARD LANDFILL RECLAMATION FOR RECREATION USES

INSTRUCTIONS

This questionnaire consists of three parts:

Part A – Perceptions Toward Landfill Reclamation

The first part includes seven sections. Each section asks you about a different aspect of landfill reclamation.

Section	(i)	--- Your perceived consequences and anticipated costs/benefits
Section	(ii)	--- Opportunities and resources you perceive in your community
Section	(iii)	--- Your preference toward a landfill reclamation project
Section	(iv)	--- Your perception of community support
Section	(v)	--- Important factors in your decision making
Section	(vi)	--- Agreement with the referents opinions
Section	(vii)	--- Your intention of supporting recreational uses associated with a closed sanitary landfill in your community.

Part B – Landfill and Alternative Uses

Part two focuses on environmental issues, alternative uses and regulation need associated with landfill reclamation.

Part C – Background Information

Part three provides background information about your community and your experience with landfill permits and reclamation of closed landfills for recreational uses.

There are instructions regarding the nature of response in each section. There are no right or wrong answers. Please read the instructions for the scales carefully, as the items may appear similar in nature, but they are assessing different aspects. Please respond to every item.

Please feel free to mark any question that you feel unclear.

Thank you for your cooperation.

Please return the completed questionnaire **before February 2, 1998.**

Part One -- Perceptions Toward Landfill Reclamation

Section I. Your perceived consequences and anticipated costs/benefits

Please read each statement and circle the symbol which indicates your degree of agreement or disagreement of the perceived consequences and the anticipated advantages or disadvantages associated with recreational uses of a closed landfill in your community. Landfill Recreation Reclamation (LR) refers to "recreation uses of a closed sanitary landfill."

SA = Strongly Agree **PA** = Partially Agree **NC** = No Comment **PD** = Partially Disagree **SD** = Strongly Disagree

LR provides additional recreational opportunities for the community	SA	PA	NC	PD	SD
LR allows reclaiming land suitable for active or passive recreational uses	SA	PA	NC	PD	SD
The undesirable landfill image has a negative impact on LR	SA	PA	NC	PD	SD
A LR site has the same recreation appeal as a non-reclaimed recreation site	SA	PA	NC	PD	SD
There is funding (i.e., grants, tipping fees) available for landfill reclamation for recreation purposes	SA	PA	NC	PD	SD
The cost of LR is far more than establishing a non-reclaimed recreational site	SA	PA	NC	PD	SD
LR provides an inexpensive way to acquire additional park land for the community	SA	PA	NC	PD	SD
LR has higher maintenance costs than a non-reclaimed recreational area	SA	PA	NC	PD	SD
LR causes the decline of adjacent land value	SA	PA	NC	PD	SD
LR allows economic development on the adjacent land	SA	PA	NC	PD	SD
LR promotes positive public relations between the community and landfill owner	SA	PA	NC	PD	SD
A LR site receives support from the public sector (for recreation use)	SA	PA	NC	PD	SD
Recreational use of an EPA regulated landfill site is safe for public use	SA	PA	NC	PD	SD
Recreational use of a closed EPA regulated landfill involves liability problem	SA	PA	NC	PD	SD
LR turns a potential liability into a community asset	SA	PA	NC	PD	SD
LR produces an unacceptable health hazard for public use	SA	PA	NC	PD	SD

Section II. Opportunities and resources you perceive in your community

Please identify the likelihood the following conditions or attitudes will be presented in your community regarding recreation developments on a closed sanitary landfill.

VL = Very Likely **L** = Likely **NS** = Not Sure **UL** = Unlikely **VUL** = Very Unlikely

Residents' oppose recreational use of a closed landfill	VL	L	NS	UL	VUL
No available funds for development	VL	L	NS	UL	VUL
LR is non-self-supporting	VL	L	NS	UL	VUL
Liability risks will be involved	VL	L	NS	UL	VUL
The landfill location is unsuitable for recreational use	VL	L	NS	UL	VUL
Low community recreational demand exists in your area	VL	L	NS	UL	VUL
Landfill owners will not want to furnish the land with little or no cost	VL	L	NS	UL	VUL

(OVER)

Section III. Your preference toward a landfill reclamation project

Please indicate how much you agree or disagree with the consequences resulting from recreation development on a closed sanitary landfill in your community.

SA = Strongly Agree **PA** = Partially Agree **NC** = No Comment **PD** = Partially Disagree **SD** = Strongly Disagree

I like the land reuse strategy, landfill reclamation (LR), for our community	SA	PA	NC	PD	SD
I like LR which promotes positive public relations between community and landfill owner	SA	PA	NC	PD	SD
I would like to acquire more park land for the community even it is a closed landfill site	SA	PA	NC	PD	SD
I feel annoyed about the potential liability risk with landfill reclamation	SA	PA	NC	PD	SD
I feel uneasy when recreating on a landfill	SA	PA	NC	PD	SD
I am pleased with additional recreation opportunities for the community even it is on a closed landfill	SA	PA	NC	PD	SD
I am worried about the potential safety hazards in the field	SA	PA	NC	PD	SD
I feel landfill reclamation is good overall for our community	SA	PA	NC	PD	SD

Section IV. Your perceptions of community support

*Please indicate **the likelihood you think** that each referent would **support** a recreation development on a closed sanitary landfill **in your community**.*

VL = Very Likely **L** = Likely **NS** = Not Sure **UL** = Unlikely **VUL** = Very Unlikely

State agents/officials from DNR or DEQ	VL	L	NS	UL	VUL
Your county commissioners	VL	L	NS	UL	VUL
Your colleagues (township board or city council members)	VL	L	NS	UL	VUL
Experts in your community (i.e., engineer consultants, solid waste officials, recreational professional)	VL	L	NS	UL	VUL
Voters/residents	VL	L	NS	UL	VUL
Local media, local journalists	VL	L	NS	UL	VUL
Landfill owners	VL	L	NS	UL	VUL
Special interested groups in your community	VL	L	NS	UL	VUL

Section V. Important factors in your decision making

*Please indicate to what extent the following factors would **negatively influence your support** of a recreation development on a closed sanitary landfill **in your community**.*

VM = Very Much **AL** = Always **O** = Often **S** = Sometimes **N** = Never

Low community recreational demand exists in your area	VM	AL	O	S	N
Liability risks will be involved	VM	AL	O	S	N
No available funds for development	VM	AL	O	S	N
Residents' opposition to recreational use of a closed landfill	VM	AL	O	S	N
Landfill owners will not furnish the land with little or no cost	VM	AL	O	S	N
The landfill location is unsuitable for recreational use	VM	AL	O	S	N
LR is non-self-supporting	VM	AL	O	S	N

Section VI. Agreement with the referents opinions

This following questions address the degree you want to follow referents' recommendations regarding the support of a recreation development on a closed sanitary landfill in your community.

VM = Very Much **AL** = Always **O** = Often **S** = Sometimes **N** = Never

State agents/officials from DNR or DEQ	VM	AL	O	S	N
Your county commissioners	VM	AL	O	S	N
Your colleagues (township board or city council members)	VM	AL	O	S	N
Experts in your community (i.e., engineer consultants, solid waste, recreational professional)	VM	AL	O	S	N
Voters/residents	VM	AL	O	S	N
Local media, local journalists	VM	AL	O	S	N
Landfill owners	VM	AL	O	S	N
Special interested groups in your community	VM	AL	O	S	N

Section VII. Your intention to support the project

*Please indicate **your level of agreement** with the following statements regarding recreational uses of a closed sanitary landfill in your community.*

VL = Very Likely **L** = Likely **NS** = Not Sure **UL** = Unlikely **VUL** = Very Unlikely

I would be willing to propose a reclamation project to the proper committee for consideration	VL	L	NS	UL	VUL
I would approve a project of recreation development on a closed landfill when it is brought to board meeting	VL	L	NS	UL	VUL

Part Two -- Landfills and Alternative Uses

The following questions ask about issues with landfills, their alternative end uses and regulation need.

SA = Strongly Agree **PA** = Partially Agree **NC** = No Comment **PD** = Partially Disagree **SD** = Strongly Disagree

1. How strongly do you agree with the following landfill statements?

An EPA regulated landfill is required to have a gas monitoring and collection system	SA	PA	NC	PD	SD
An EPA regulated landfill is required to have a leachate collection system	SA	PA	NC	PD	SD
An EPA regulated landfill needs to be monitored for 30 years after close	SA	PA	NC	PD	SD
Most settlement will occur in the first 5 years	SA	PA	NC	PD	SD
Gas explosions rarely happen	SA	PA	NC	PD	SD
A properly closed landfill has little potential for actual environmental harm, especially with recreational uses	SA	PA	NC	PD	SD
Pre-planning of recreational end use can minimize the safety concerns	SA	PA	NC	PD	SD
Mega-landfill sites will replace township landfill sites	SA	PA	NC	PD	SD
The size of a mega-landfill is more suitable for recreational development	SA	PA	NC	PD	SD

2. What type of development do you consider as a most appropriate development on the closed landfills?

☐ Wildlife habitats ..... SA PA NC PD SD
☐ Passive recreation area (i.e., hiking trail, picnicking)..... SA PA NC PD SD
☐ Active recreation area (i.e., ballfield, ski area, golf course) ..... SA PA NC PD SD
☐ Open space with natural succession ..... SA PA NC PD SD
☐ Industrial development ..... SA PA NC PD SD

3. In surface mining, a reclamation plan is required for use after the mining operation. Do you think a post landfill-recreation conversion or end use plan should be part of the landfill regulations?

☐ Completely Agree ☐ Partially Agree ☐ No Comment ☐ Partially Disagree ☐ Completely disagree

Part Three — Background Information

Section I. Recreation and Landfills in Your Community

(1) Do you think your community needs more parkland? Yes ☐ No ☐

(2) Does your community have difficulty in obtaining new park/recreation space? Yes ☐ No ☐

(3) Who owns the landfill in your community? Public ☐ Private ☐

(4) If you have a closed landfill in your community, what is the current use of the site?
☐ No plan ☐ Don't know ☐ Use planned, please specified _____

(5) Did the landfill in your community have any end uses plan after it closed?
☐ Yes, go to Q 6 ☐ No, go to Q 7 ☐ Don't know, go to Q 7.

(6) Does the landfill end use plan provide recreation uses?
☐ Don't know ☐ Yes ☐ No, specified _____

Section II. About you

(7) What is your current position/official title? _____

(8) Have you had experience with the landfill permitting process? Yes ☐ No☐

(9) Do you know of any closed landfills that have been transformed into recreational uses, such as parks, golf courses, etc.?
☐ No
☐ Yes, How did you learn about it?
☐ Workshop ☐ Meeting ☐ TV ☐ Newspaper ☐ Friends ☐ Others _____

(10) Have you ever visited a recreational facility developed on a closed landfill?
☐ No
☐ Yes, if possible, please indicated name of the facility and location (city, state) _____

(11) We invite you to make any comments here.

_____

_____

Your contribution to this study is greatly appreciated.
Please put the questionnaire in the enclosed postage-paid envelop and return it
BEFORE FEBRUARY 2, 1998.

APPENDIX C

Table 1. Summary of Mean, SD, Range, and Potential Range for the Three Indirect Measures in Pilot Survey

		N	Mean	SD	Range	Min.	Max.
Attitude Beliefs:	BC1	20	1.15	1.31	4	-2	2
	BC2	20	1.35	0.99	4	-2	2
	BC3	20	-0.90	1.25	4	-2	2
	BC4	20	-0.20	1.28	4	-2	2
	BC5	20	0.25	0.72	3	-2	1
	BC6	20	-0.50	0.83	3	-2	1
	BC7	20	0.75	0.64	2	0	2
	BC8	20	-0.30	1.03	3	-2	1
	BC9	20	1.25	1.12	4	-2	2
	BC10	19	0.89	0.74	3	-1	2
	BC11	20	1.25	0.64	2	0	2
	BC12	20	0.85	0.93	3	-1	2
	BC13	20	1.05	0.89	3	-1	2
	BC14	20	-0.80	0.83	3	-2	1
	BC15	20	1.05	0.83	3	-1	2
	BC16	20	1.10	1.02	4	-2	2
	BCEV1	20	1.40	0.75	2	0	2
	BCEV2	20	1.50	0.76	2	0	2
	BCEV3	20	0.90	1.37	4	-2	2
	BCEV4	20	-0.50	0.76	3	-2	1
	BCEV5	20	0.30	1.26	4	-2	2
	BCEV6	20	1.30	0.80	2	0	2
	BCEV7	20	-0.10	1.29	4	-2	2
	BCEV8	20	1.40	0.68	2	0	2
Normative Beliefs	PRO_NO1	18	1.78	4.71	20	-10	10
	PRO_NO2	16	2.75	2.65	12	-4	8
	PRO_NO3	17	3.35	2.76	10	0	10
	PRO_NO4	17	4.41	2.83	10	0	10
	PRO_NO5	18	2.17	2.94	12	-2	10
	PRO_NO6	18	0.28	2.05	10	-5	5
	PRO_NO7	17	3.06	3.09	10	0	10
	PRO_NO8	17	1.18	1.51	4	0	4
Control Beliefs:	PRO_CT1	20	0.65	4.27	16	-10	6
	PRO_CT2	19	-2.95	2.90	12	-10	2
	PRO_CT3	19	-1.21	4.87	18	-10	8
	PRO_CT4	20	1.05	2.74	11	-5	6
	PRO_CT5	19	0.58	3.20	15	-5	10
	PRO_CT6	19	1.05	4.12	20	-10	10
	PRO_CT7	19	-0.68	4.03	20	-10	10
Intention:	INT_1	18	0.89	1.1827	4	-2	2
	INT_2	18	0.83	1.1504	4	-2	2

APPENDIX D

THE REVISED QUESTIONNAIRE FORM-98

SURVEY OF LOCAL ELECTED OFFICIALS' ATTITUDES TOWARD LANDFILL RECLAMATION FOR RECREATION USES

INSTRUCTIONS

In this particular questionnaire we are mainly concerned with your views toward a potential landfill reclamation project for recreational use in your community.

This questionnaire consists of two parts:

Part A -- Perceptions toward Landfill Recreation

The first part includes seven sections. Each section asks you about a different aspect of landfill reclamation.

Section (i) -- Your views toward landfill recreation development proposal
Section (ii) -- Your perceptions of community support
Section (iii) -- Important factors in your decision making
Section (iv) -- Your preference toward a landfill recreation reclamation
Section (v) -- Attitudes and limitations you perceive in your community
Section (vi) -- Your perceived consequences and anticipated costs/benefits
Section (vii) -- Agreement with the referents opinions

Part B -- Landfill and You

This part focuses on landfill issues, alternative uses, and regulation need associated with landfill reclamation. It also includes background information about your community and your experience with landfill permits and end uses of closed landfills.

There are instructions regarding the nature of response in each section. There are no right or wrong answers. Please read the instructions for the scales carefully, as the items may appear similar in nature, but they are assessing different aspects.

*For convenience and time's sake, we are evaluating community **support** of landfill recreation projects. We could just as easily have asked about **opposition** toward LR. Our choice between the two was essentially arbitrary.*

Be sure you answer all items --- **please do not omit any.**

Thank you for your cooperation. Please return the completed questionnaire **as prompt as possible.**

Part One -- Perceptions Toward Landfill Recreation

Section I. Your views toward landfill recreation development proposal

Following is a series of word pairs which are used to describe your opinions and feelings about landfill recreation reclamation, please circle the number between each pair that best describes your opinions and feelings. Please circle only one number per line for each word pair.

For me to support Landfill Recreation (LR) development in my community is .....

	extremely	very	slightly	neutral	slightly	very	extremely	
wise	1	2	3	4	5	6	7	foolish
beneficial	1	2	3	4	5	6	7	risky
safe	1	2	3	4	5	6	7	harmful
pleasant	1	2	3	4	5	6	7	unpleasant
favorable use	1	2	3	4	5	6	7	unfavorable use
overall good	1	2	3	4	5	6	7	overall bad

If I support LR development in my community, most people who are important to me would ....

approve ---------- 1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ---------- 7 ---------- disapprove

How much control do you have with the LR development in your community?

little control ---------- 1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ---------- 7 ---------- complete control

I would be willing to propose a reclamation project to the proper committee for consideration.

likely ---------- 1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ---------- 7 ---------- unlikely

I would approve a project of recreation development on a closed landfill when it is brought to the board meeting.

likely ---------- 1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ---------- 7 ---------- unlikely

Section II. Your perceptions of community support

*Please indicate **the likelihood you think** that each referent would **support** a recreation development on a closed sanitary landfill **in your community**.*

VL = Very Likely **L** = Likely **NS** = Not Sure **UL** = Unlikely **VUL** = Very Unlikely

State agents/officials from DNR or DEQ	**VL**	**L**	**NS**	**UL**	**VUL**
Your county commissioners	**VL**	**L**	**NS**	**UL**	**VUL**
Your colleagues (township board or city council members)	**VL**	**L**	**NS**	**UL**	**VUL**
Experts in your community (i.e., engineer consultants, solid waste officials, recreation professional)	**VL**	**L**	**NS**	**UL**	**VUL**
Voters/residents.....	**VL**	**L**	**NS**	**UL**	**VUL**
Local media, local journalists	**VL**	**L**	**NS**	**UL**	**VUL**
Landfill owners	**VL**	**L**	**NS**	**UL**	**VUL**
Special interested groups in your community.....	**VL**	**L**	**NS**	**UL**	**VUL**

Section III. Important factors in your decision making

*Please indicate to what extent the following factors will be considered in your decision making regarding recreation development on a closed sanitary landfill **in your community**.*

VM = Very Much **AL** = Always **O** = Often **S** = Sometimes **N** = Never

Community need for additional recreation areas	VM	AL	O	S	N
Potential liability risks	VM	AL	O	S	N
Revenue production via leagues, fees charges etc.	VM	AL	O	S	N
Funds for development are available	VM	AL	O	S	N
Revitalization of the surrounding area will occur	VM	AL	O	S	N
Obtain land at little or no cost	VM	AL	O	S	N
Suitable location for recreation use	VM	AL	O	S	N
Adverse users' health and safety effect	VM	AL	O	S	N

Section IV. Your preference toward a landfill recreation reclamation

*Please indicate how much you agree or disagree with the consequences resulting from recreation development on a closed sanitary landfill **in your community**. **Landfill Recreation (LR)** refers to **"recreation uses of a closed sanitary landfill."***

SA = Strongly Agree **PA** = Partially Agree **NC** = No Comment **PD** = Partially Disagree **SD** = Strongly Disagree

I like the land reuse strategy, from landfill to recreation use, for my community...	SA	PA	NC	PD	SD
I like LR which promotes positive public relations between community and landfill owner	SA	PA	NC	PD	SD
I think LR will increase the demand for housing in the surrounding area	SA	PA	NC	PD	SD
I am pleased with additional recreation opportunities for the community even it is on a closed landfill	SA	PA	NC	PD	SD
I feel uneasy when recreating on a landfill	SA	PA	NC	PD	SD
I am worried about the potential safety hazards in the field	SA	PA	NC	PD	SD
I am uncomfortable with the potential liability risk with landfill reclamation	SA	PA	NC	PD	SD

Section V. Attitudes and limitations you perceive in your community

If your community proposes a recreation development on a closed sanitary landfill, please identify the likelihood the following limitations or attitudes will be present.

VL = Very Likely **L** = Likely **NS** = Not Sure **UL** = Unlikely **VUL** = Very Unlikely

No need to acquire more park or recreation areas	VL	L	NS	UL	VUL
Big potential liability risks	VL	L	NS	UL	VUL
No revenue production	VL	L	NS	UL	VUL
No available funds (i.e., grants, tipping fees) for development	VL	L	NS	UL	VUL
No revitalization will occur in the surrounding area	VL	L	NS	UL	VUL
Landfill owners will not want to furnish the land at little or no cost	VL	L	NS	UL	VUL
The landfill location is unsuitable for recreation use	VL	L	NS	UL	VUL
Adverse effect on users' health and safety	VL	L	NS	UL	VUL

Section VI. Your perceived consequences and anticipated costs/benefits

Please indicates your degree of agreement or disagreement of the perceived consequences and the anticipated advantages or disadvantages associated with recreational uses of a closed landfill in your community. ***Landfill Recreation (LR)*** *refers to* ***"recreation uses of a closed sanitary landfill."***

SA = Strongly Agree **PA** = Partially Agree **NC** = No Comment **PD** = Partially Disagree **SD** = Strongly Disagree

LR provides additional recreation opportunities for the community	SA	PA	NC	PD	SD
LR will improve living conditions in adjacent areas after closure	SA	PA	NC	PD	SD
LR allows revitalization of the adjacent areas	SA	PA	NC	PD	SD
LR turns a potential liability into a community asset	SA	PA	NC	PD	SD
LR will contribute to positive impacts on community image after closure	SA	PA	NC	PD	SD
The undesirable landfill image has a negative impact on future recreation daily uses of a reclaimed site	SA	PA	NC	PD	SD
LR has higher maintenance costs than a non-reclaimed recreation area	SA	PA	NC	PD	SD
LR will increase nearby owner property value	SA	PA	NC	PD	SD
LR promotes positive public relations between the community and landfill owner	SA	PA	NC	PD	SD
LR posts a threat to public users' safety	SA	PA	NC	PD	SD
Recreational use of a closed EPA regulated landfill involves liability problem	SA	PA	NC	PD	SD
LR has adverse health effect on public users	SA	PA	NC	PD	SD
Potential ground settlement and gas problem is small	SA	PA	NC	PD	SD
Potential ground settlement and gas problem can be managed	SA	PA	NC	PD	SD

Section VII. Agreement with the referents opinions

This following questions address the degree you want to follow referents' recommendations regarding the support of a recreation development on a closed sanitary landfill in your community.

VM = Very Much **AL** = Always **O** = Often **S** = Sometimes **N** = Never

State agents/officials from DNR or DEQ	VM	AL	O	S	N
Your county commissioners	VM	AL	O	S	N
Your colleagues (township board or city council members)	VM	AL	O	S	N
Experts in your community (i.e., engineer consultants, solid waste, recreation professional)	VM	AL	O	S	N
Voters/residents	VM	AL	O	S	N
Local media, local journalists	VM	AL	O	S	N
Landfill owners	VM	AL	O	S	N
Special interested groups in your community	VM	AL	O	S	N

Part Two – Landfills and You

Section I — About landfills issues, their alternative end uses and regulation need.

SA = Strongly Agree **PA** = Partially Agree **NC** = No Comment **PD** = Partially Disagree
SD = Strongly Disagree

(1). How strongly do you agree with the following statements?

Mega (regional) landfill sites will replace city/township landfill sites ..... **SA PA NC PD SD**

The size of mega-landfill has good potential for recreational development ..... **SA PA NC PD SD**

There is a difficulty in obtaining new recreational areas in my community..... **SA PA NC PD SD**

In surface mining, a reclamation plan is required for use after the mining operation. Do you think a post landfill recreation conversion should be part of the landfill permit regulations? ..... **SA PA NC PD SD**

(2). What type of development do you consider as the **most** appropriate development on closed landfills?

☐ Open space with natural succession ☐ Passive recreation area (i.e., hiking trail, picnicking)
☐ Wildlife habitats ☐ Active recreation area (i.e., ball fields, ski area, golf course)
☐ Combination of active and passive recreation area ☐ Other _____

Section II — About Your Community and You

(1) Who owns the landfill in your community? Public ☐ Private ☐

(2) If your community has a closed landfill, what is the current use of the site?

Current use planned, please specify ☐ _____

Don't know ☐ No plan ☐ Not applicable ☐

(3) Did the landfill in your community have any end use plan after it is closed?

☐ No, go to Q 4 ☐ Don't know, go to Q 4.

☐ Yes, Does the landfill end use plan provide for recreational uses?

Don't know ☐ Yes ☐ No ☐ please specify other use_____

(4) Have you had experience with the landfill permitting process? Yes ☐ No ☐

(5) Do you know of any closed landfills that have been transformed into recreational uses, such as parks, golf courses, etc.?

☐ No

☐ Yes, How did you learn about it?

☐ Workshop ☐ Meeting ☐ TV ☐ Newspaper ☐ Friends ☐ Other_____

Have you ever visited a recreational facility developed on a closed landfill?

☐ No

☐ Yes, please indicated name of the facility and location (city, state) _____

(6) We invite you to make any comments here. (Please use additional sheet if needed)

Please put the questionnaire in the enclosed postage-paid envelop and **return it as prompt as possible.**

THANK YOU

APPENDIX E

Descriptive Analyses of General Attributes of Respondents

It may be useful and informative to present some of the findings related to the attributes of the respondents. Table 1 in Appendix E summarizes the results of the analysis. In regard to the community background section, among 118 respondents, 64.4% are from municipalities with a population under 10,000, and 35.6% are from municipalities with a population 10,000 and greater. Most of respondents (68.4%) indicated that landfills in their communities are owned by the private sector while 29.9% are owned by the public sector. Only 1.7% respondents indicated that they have both public and private owned landfills in their communities.

In regard to current status (closed or active) of the landfill in their community, 6.3% of the respondents stated they don't know, 41.1% of the respondent stated the landfill in their communities are still active or under operation, and 38.4% respondents stated that their landfills were closed with no future plan. Approximately 14% of the respondents indicated that their closed landfills have an end use plan. These end use plans included golf course practicing facilities, a community park, a gun range, a model airplane field, and a soccer field. A few of these plans were implemented; most of them are still under consideration.

To explore the future end use of a closed landfill, the study asked the officials whether an end use plan for their landfills after closure exists. About half (44.6%) of the respondents reported the landfill in their community has no end use plan after closure.

One third (33.7%) of the respondents did not know whether a plan exists or not.

Table 1. Summary Table for Frequency Distribution of General Attributes of the Local Elected Officials

Variables		Frequency	Percent
Community background:			
Population group	Under 10,000	76	64.4
	10,000 and greater	42	35.6
	Total	118	100.0
Landfill ownership	Public owned	35	29.9
	Private owned	80	68.4
	Both	2	1.7
	Total	117	100.0
Current use of closed landfill	Don't know	7	6.3
	Closed with use planned	16	14.3
	No plan	43	38.4
	Not applicable, still active	46	41.1
	Total	112	100.0
Any end use plan after landfill closed	Don't know	34	33.7
	Yes	17	16.8
	No	45	44.6
	Not applicable	5	5.0
	Total	101	100.0
Personal experience:			
Experience with permit process	Yes	53	46.1
	No	62	53.9
	Total	115	100.0
Awareness of landfill - recreation	Yes	63	53.8
	No	54	46.2
	Total	117	100.0
Experience of visiting LR site	Yes	23	35.9
	No	41	64.1
	Total	64	100.0
Ways to learn about LR	Workshops	6	5.1
	Meetings	7	6.0
	TV	7	6.0
	Newspapers	13	11.1
	Friends	10	8.5
	Others	18	15.4
	Not applicable	56	47.9
	Total	117	100.0

Only 16.8% of respondents indicated their landfills have an end use plan after closure. Among those with an end use plan, eleven respondents reported their plan included recreation uses.

With regard to the personal experience section, the results of local elected officials' experiences with granting a landfill permit indicated that 46% of the respondents have been involved in the landfill permit granting process. More than half (53.8%) of the respondents were aware of landfill recreation reclamation. However, only 36% of the aware respondents had visited a landfill recreation reclamation site. The major ways the respondents learned about landfill recreation reclamation were either from their own community experience, newspapers or friends. About one third learned from TV, meetings or workshops.

This study revealed the local elected officials' responses to the development of mega-landfill, the difficulty in obtaining parkland in their community, regulation need for a landfill recreation end use plan, and their preference of alternative uses. The results of these findings are presented in Appendix E, Table 2.

In response to the size of a future landfill, more than one third of the respondents (33.9%) strongly agreed a mega-landfill will replace a small landfill. In regard to size for recreation use, approximately 61% of the respondents tended to agree that a mega-landfill provides a size that is more suitable for recreation use. Only 18% of the respondents indicated a mega-landfill would not provide suitable size for recreation use.

The local elected officials were asked whether or not their communities had difficulty in obtaining new recreation areas. More than half of the respondents acknowledged that the difficulty existed. One third of the respondents did not think their

communities have problems in obtaining new parklands or recreation areas.

In regard to regulation needed for a landfill recreation end use plan, about 76% of the respondents indicated that regulation is needed, and about 10% of the respondents did not agree with the need for regulation. With regard to the alternative uses of closed landfills, the results indicate that development of mixed active and passive recreation use was most preferred (41.6%), then was active recreation use (21.2%). Approximately 11% respondents preferred wildlife habitat use, while about 7% preferred open space use, and about 6% preferred passive recreation use. Approximately 9% of the respondents preferred any recreation end uses while about 4% preferred to do nothing on a closed landfill.

Table 2. Summary Table for Frequencies of Agreement with the Issue of Mega-landfill, Parkland Difficulty, and Need of Regulation by Local Elected Officials

Issues		strongly disagree	partially disagree	no comment	partially agree	strongly agree	Total
Mega-landfill replace small landfill	Frequency	6	9	22	41	40	118
	%	5.08	7.63	18.64	34.75	33.90	100.00
Mega-landfill provides more suitable size for rec.	Frequency	7	14	24	47	24	116
	%	6.03	12.07	20.69	40.52	20.69	100.00
Difficulty in obtaining new recreation areas	Frequency	17	21	13	39	26	116
	%	14.66	18.10	11.21	33.62	22.41	100.00
Regulation of recreation end use plan	Frequency	8	4	15	35	54	116
	%	6.90	3.45	12.93	30.17	46.55	100.00

APPENDIX F

Table 1. Coefficient Table for Multiple Regression Analysis in Testing Interaction

	B	Std. Error	Beta	t	Sig.
(Constant)	0.03	0.28		0.11	0.92
Product	-0.03	0.02	-0.15	-1.57	0.12
SN	0.62	0.22	0.29	2.84	0.01
Aact	0.25	0.05	0.61	5.50	0.00

Dependent Variable: Behavioral Intentions

Table 2. Summary Table for Item-total Statistics Analysis of the Overall Perceived Benefits and Overall Perceived Risk

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted	Alpha	N of Cases
Overall perceived benefits:						
BC1 – additional recreational opportunities	7.449	83.224	0.796	0.917		
BC2 – improve adjacent living conditions	8.025	80.589	0.754	0.918		
BC3 – allow revitalizing the adjacent areas	8.076	84.328	0.671	0.922		
BC4 – community asset	7.695	84.641	0.680	0.921		
BC5 – positive impacts on community image	7.737	83.854	0.724	0.920		
BC8 – increase adjacent property value	8.195	84.004	0.638	0.923		
BC9 – promote positive public relations	7.729	86.558	0.666	0.922		
BC14 - problem can be managed	8.076	87.490	0.577	0.925		
BCEV1 - like land reuse strategy	7.509	81.415	0.794	0.917		
BCEV2 - like promoting positive PR	7.585	83.783	0.620	0.924		
BCEV3 - like increasing house demand	8.746	81.576	0.627	0.925		
BCEV4 - pleased with additional rec. opp.	7.703	81.971	0.781	0.917	0.927	118
Overall perceived risk:						
BC6 – negative impact of undesirable landfill	-1.873	41.035	0.554	0.840		
BC7 – higher maintenance costs	-1.797	45.958	0.283	0.863		
BC10 – threatening users' safety	-2.568	38.880	0.743	0.821		
BC11- liability problem involved	-1.831	42.313	0.566	0.839		
BC12 – threatening users' health	-2.585	38.963	0.733	0.822		
BC13 - small problem	-2.229	44.434	0.361	0.857		
BCEV5 - uneasy when recreating	-2.525	38.969	0.605	0.835		
BCEV6 - worried about potential safety hazards	-1.949	37.792	0.688	0.825		
BCEV7 - uncomfortable about potential liability	-1.898	39.699	0.633	0.832	0.853	118

APPENDIX F

Table 3. Percentages of Local Elected Officials' Degree of Compliance with Referents

	state agents	county commissioner	colleagues	community experts	voter/ residents	local media	landfill owners	interested groups
never	5.08	5.08	3.39	3.39	3.39	20.34	9.32	9.32
sometimes	22.88	33.05	12.71	11.02	8.47	29.66	30.51	35.59
often	22.03	23.73	27.12	23.73	33.05	22.88	21.19	23.73
always	20.34	17.80	29.66	30.51	26.27	11.86	15.25	16.10
very much	28.81	19.49	27.12	31.36	27.97	13.56	22.88	15.25
Mean	3.42	3.11	3.64	3.75	3.64	2.63	3.09	2.92

N=118

Table 4. Percentages of Local Elected Officials' Normative Beliefs (Perceived Support from Referents)

	state agents	county commissioner	colleagues	community experts	voter/ residents	local media	landfill owners	interested groups
very unlikely	3.42	1.71	2.56	0.85	5.98	2.59	2.56	5.13
unlikely	0.85	5.13	7.69	3.42	13.68	4.31	1.71	7.69
not sure	41.03	29.91	17.95	23.08	28.21	35.34	35.90	41.03
likely	30.77	44.44	47.01	52.14	41.03	43.97	24.79	32.48
very likely	23.93	18.80	24.79	20.51	11.11	13.79	35.04	13.68
Mean	0.71	0.74	0.84	0.88	0.38	0.62	0.88	0.42

N=117

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