

Electronic Thesis and Dissertation Repository

---

5-23-2017 12:00 AM

## Confrontational Stigma and Contested 'Green' Developments: Biosolid Facility Siting in the Rural Landscape

Sarah A. Mason-Renton, *The University of Western Ontario*

Supervisor: Dr. Isaac Luginaah, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree  
in Geography

© Sarah A. Mason-Renton 2017

Follow this and additional works at: <https://ir.lib.uwo.ca/etd>



Part of the [Environmental Studies Commons](#), [Human Geography Commons](#), [Place and Environment Commons](#), and the [Rural Sociology Commons](#)

---

### Recommended Citation

Mason-Renton, Sarah A., "Confrontational Stigma and Contested 'Green' Developments: Biosolid Facility Siting in the Rural Landscape" (2017). *Electronic Thesis and Dissertation Repository*. 4561.  
<https://ir.lib.uwo.ca/etd/4561>

This Dissertation/Thesis is brought to you for free and open access by Scholarship@Western. It has been accepted for inclusion in Electronic Thesis and Dissertation Repository by an authorized administrator of Scholarship@Western. For more information, please contact [wlsadmin@uwo.ca](mailto:wlsadmin@uwo.ca).

## Abstract

This thesis examines local residents' responses and reappraisal of a proposed and now operational biosolid (sewage sludge) processing facility, the Southgate Organic Material Recovery Centre (OMRC), in the Township of Southgate in rural Ontario. This research is grounded in geographical literatures related to the geography of health, emotional geography, and risk perception and facility siting. The significance of this research is based on a relative absence of literature on public perceptions of transformed waste products, such as biosolids, in rural landscapes and the need to better understand these perceptions and felt impacts in the context of rural residents' attachments to place. This is particularly relevant with the current drive towards a circular economy with an increasing acknowledgement of the importance of environmental sustainability put in the context of climate-change. The objectives of the research are to: (1) explore the risk perceptions associated with the OMRC and end usage of biosolids; (2) examine how the siting process is affecting residents' emotional and sensual geographies in time and place, and; (3) examine residents' reappraisal of an operational facility and reflections on facility siting process that brought the OMRC to their community.

Qualitative interviews with residents and municipal officials were conducted during the OMRC siting process (n=23) in 2012 and three years after the facility became operational, during the fall of 2015 to winter 2016 (n=16). Results show that residents' perceptions of biosolid recycling were varied and their scalar conceptions of place influenced the duality of perceptions of biosolids either as a waste or resource. Further, residents' varied place attachments, differential experiences of place change and community level identity threats emerged as important contextually based factors influencing residents' perceptions. Following facility operations, concerns shifted from primarily anticipatory anxieties to increased facility acceptance, although concerns for invisible impacts remained alongside sustained intra-community conflict. Residents

called for meaningful consultation and an increased participatory process rather than merely 'checking boxes' throughout the siting process.

Findings contribute to a limited body of research on place-based factors influencing risk perceptions, including varied place attachments and the relational experiences of place change. The results also contribute to an emerging field of inquiry into contested "green" developments, which may be considered by some as necessary for broader environmental sustainability and climate change adaptation. Also emerging from this research is a new form of facility siting risk: the social risk of conflict whereby lingering community conflict has led to what I refer to as "Confrontational Stigma" as it is related to the siting of contentious green facilities. This dissertation also provides practical contributions and policy implications when dealing with contested green developments in polarized communities. This research therefore calls for increased transparency around the uncertainty inherent in the beneficial reuse of biosolids to facilitate dialogue among community members with differing analytical paradigms. Further, it is important for developers and local officials alike to better understand residents' differential place attachments where a development is proposed. Given the inherent misunderstanding by the proponent, municipal officials and community-at-large, the use of a third-party facilitator such as a knowledge broker or conflict resolution specialist may seem necessary in situations such as Southgate to help to reconcile the communication deficits apparent in these contentious development proposals.

### **Keywords**

Waste Processing; Land Application; Uncertainty; Community Conflict; Place Attachment; Sense of Place; Risk Perception; Health; Sustainability

## Co-Authorship Statement

This thesis is comprised of a collection of papers which are either published or have been submitted for publication and are currently under peer review. While these papers were co-authored with my thesis supervisor and advisor, as first author I conceptualized the research project, conducted the actual research, analysis and writing for Chapter Four, Five, Six and Seven, with my co-authors providing guidance on manuscript revisions.

Chapter Four: Mason-Renton, S. A., and Luginaah, I. Conceptualizing waste as a resource: Urban biosolid processing in the rural landscape. *The Canadian Geographer* (under review)

Chapter Five: Mason-Renton, S. A., and Luginaah, I. (2016). Interfering with therapeutic tranquility: Debates surrounding biosolid waste processing in rural Ontario. *Health and Place*, 41, 42-49.

Chapter Six: Mason-Renton, S. A., Luginaah, I. and Baxter, J. (2016). Community divide as more detrimental than the plant itself: Confrontational stigma and community responses to rural facility siting. *Journal of Rural and Community Development*, 11(2), 22-44.

Chapter Seven: Mason-Renton, S. A., and Luginaah, I. Lasting impacts and perceived inequities: Community reappraisal of the siting of a regional biosolid processing facility in rural Ontario. *Journal of Risk Research*. (under review)

The bibliographies of the integrated articles are consistent with the University of Western Ontario Graduate and Postdoctoral Thesis Requirements.

## Acknowledgments

As the proverb says *'it takes a village to raise a child'* and I have had the utmost supportive 'village' throughout this process. I am forever grateful.

First and foremost, is my outstanding supervisor, Dr. Isaac Luginaah who saw something in me years ago and encouraged my application to graduate school, making this all possible. I would not have gotten to this day if it was not for his support, encouragement and mentorship. He has opened many doors for me, providing countless research, development, and networking opportunities that have defined my educational experience. Isaac's selfless contributions, inspiration and guidance towards others truly summarizes his style and success in mentorship. Because of this, I have learned so much over the years, extending far beyond the material covered in this dissertation. I am extremely grateful for everything Isaac has provided. From him I have learned that success is a mixture of hard work, passion, thick skin and a good story with a cup of tea. I thank you sincerely.

I would also like to thank Dr. Jamie Baxter for his invaluable mentorship, research guidance, editorial support and overall encouragement throughout my graduate studies. I cannot thank you enough! As well, thank you to Dr. Chantelle Richmond and Dr. Joy Parr for your support and guidance with my project. To Lori, the graduate program would be lost without you. Thank you for your endless support and encouragement, most notably your scholarship assistance. It is reassuring to know graduate students always have you in their corner! To Joe, Angelica, Caroline, Karen, Barbara, Lelanya, Erika and all the other Geography Staff, thank you for your assistance and support.

Heartfelt thanks to the Southgate community members who gave their time to participate. I am extremely grateful and could not have completed this research without your time, input and honesty. Also, to all the other neighbours and community members who supported my work in the community – I will never forget your kind words.

Special thanks for the generous support from the Social Sciences and Humanities Research Council and the Vanier Canada Graduate Scholarship programs, as well as the University of Western Ontario for graduate funding and other support. Additionally, thank you to Western Research for grant support and to the Centre for Environment and Sustainability for travel and scholarship support.

Thank you to the fantastic members of the Environment, Health and Hazards Lab that have supported me. Foremost, a huge thanks to Tor. You were and still are a constant source of inspiration, encouragement and mentorship. To the rest of my lab family past and present – Chad, Meghan, Jenna, Vincent, Frederick, May, Andrea, Faith, Kilian, Roger, Carrie, Siera, Joseph, Moses, Jemima, Jenny, Florence, Rosalind and everyone else – I thank you for your help and moral support all these years. You have all made it a great environment to learn and grow in. To Leanne and Roger, thank you for your continued friendship and support from our first days as Masters students!

Last, my deepest gratitude to my friends, family and husband, words cannot fully describe how thankful I am to this community of people. To remarkable friends who have supported me through this time - Tawn, Gracie and Sierra - thanks for always being a listening ear. Thanks to Connie for being an inspirational mentor and for bringing perspective to my studies. To my Grandma and Grandpa, and the rest of my extended family members and friends, too many to all mention, who have offered a kind word of encouragement and taken interest in my work, know that you have all helped me get here. Heather, Jeff and Kailey, thank you for your endless support over the years and for always being in my corner. Jenna, your unrelenting pursuit of your career aspirations and successes to date has been an inspiration to me, thank you! Mom and Dad, you instilled a drive and determination in me that has carried me through. Thank you for being a constant light, for believing in me and most importantly making me believe in myself. Jake, you have been my rock. You have seen me through every step of my education and have kept me grounded throughout it all. Thank you for your constant patience, support, encouragement and love. You make the toughest days brighter.

# Table of Contents

Abstract.....	i
Co-Authorship Statement .....	iii
Acknowledgments.....	iv
Table of Contents .....	vi
List of Tables .....	xi
List of Figures .....	xii
List of Appendices .....	xiii
Chapter 1.....	1
1 INTRODUCTION .....	1
1.1 Contextualizing the Problem .....	1
1.2 Biosolid Processing and Recycling .....	3
1.2.1 Current state of science: health effects of exposure to biosolids .....	5
1.3 Community Context .....	6
1.4 Facility Siting Process .....	8
1.5 Research Objectives.....	13
1.6 Thesis Outline.....	13
Chapter 2.....	18
2 LITERATURE REVIEW .....	18
2.1 Introduction .....	18
2.2 Geographies of Health .....	18
2.2.1 The Emergence of Health Geography.....	18
2.2.2 An Emphasis on Place .....	19
2.2.3 Theoretical Turn.....	21
2.2.4 Critical Geographies of Health .....	23

2.3	Sense of Place and Place Attachments .....	25
2.3.1	Sensuous and Olfactory Geographies.....	27
2.4	Risk Society and Facility Siting .....	28
2.4.1	Risk Constructs.....	33
2.4.2	Risk Communication .....	36
2.4.3	Differing notions of ‘Acceptable’ Risk.....	38
2.5	Conclusion.....	40
Chapter 3	.....	42
3	METHODS.....	42
3.1	Researcher Positionality .....	42
3.2	What Impact has my role as both community member and researcher had on the research? .....	45
3.3	Participant Recruitment and Data Collection .....	49
3.4	Data Analysis.....	52
Chapter 4	.....	54
4	Conceptualizing Waste as a Resource: Urban Biosolid Processing in the Rural Landscape.....	55
4.1	Introduction .....	55
4.1.1	Theoretical Underpinnings of Waste as a Resource.....	58
4.1.2	Biosolid Recycling in Ontario, Canada .....	61
4.2	Methodology.....	63
4.3	Results.....	64
4.3.1	Biosolids – A Waste Product with Uncertain Risks .....	64
4.3.2	Biosolids – A Valuable Fertilizer Resource .....	66
4.3.3	The Waste Versus Resource Debate.....	67
4.3.4	Relationalities and What Belongs? .....	68
4.4	Discussion.....	70
4.5	Conclusion.....	76
4.6	References .....	77



Chapter 5.....	83
5 INTERFERING WITH THERAPEUTIC TRANQUILITY: DEBATES SURROUNDING BIOSOLID WASTE PROCESSING IN RURAL ONTARIO.....	84
5.1 Introduction .....	84
5.2 Method .....	89
5.2.1 Community Context .....	89
5.2.2 Study Sample and Procedure.....	90
5.3 Results.....	92
5.3.1 Community Values and Challenges to Ways of Life .....	92
5.3.2 Worrying about Core Values: Child Safety.....	93
5.3.3 Location, Location, Location .....	94
5.3.4 Contested Nature of the Community as a Restorative Landscape.....	96
5.4 Discussion and Conclusions .....	99
5.5 References .....	104
Chapter 6.....	110
6 THE COMMUNITY DIVIDE IS MORE DETRIMENTAL THAN THE PLANT ITSELF: CONFRONTATIONAL STIGMA AND COMMUNITY RESPONSES TO RURAL FACILITY SITING.....	111
6.1 Introduction .....	112
6.1.1 Place Attachments in Changing Rural Communities .....	114
6.1.2 Felt Impacts of Facility Siting Processes – Community Conflict and Stigma .....	117
6.1.3 Biosolid Facility Siting in Southgate, ON .....	119
6.2 Method .....	121
6.3 Results.....	123
6.3.1 Differences in Individual Values and Place Attachments .....	123
6.3.2 Changing Sense of Community and Intra-Community Conflict .....	124
6.3.3 Depth of Community Conflict .....	126
6.3.4 Community Stigmatization .....	127
6.4 Discussion.....	130

6.5 Conclusion and Implications .....	134
6.6 References .....	135
Chapter 7.....	143
7 LASTING IMPACTS AND PERCEIVED INEQUITIES: COMMUNITY REAPPRAISAL OF THE SITING OF A REGIONAL BIOSOLID PROCESSING FACILITY IN RURAL ONTARIO..	144
7.1 Introduction .....	144
7.1.1 Theoretical context.....	146
7.1.2 Community and Facility Siting Context.....	151
7.2 Methodology.....	152
7.3 Results.....	153
7.3.1 Community perceptions during the facility siting process .....	154
7.3.2 Experiences living with an operational waste processing facility .....	155
7.3.3 Residents’ reflections on the siting process: Calls for meaningful consultation .....	161
7.4 Discussion and Conclusions .....	165
7.5 Notes.....	170
7.6 References .....	170
Chapter 8.....	175
8 DISCUSSION AND CONCLUSIONS.....	175
8.1 Introduction .....	175
8.2 Summary and Contributions of Findings .....	175
8.2.1 Objective One: To explore the risk perceptions associated with the processing and end usage of biosolid waste. ....	175
8.2.2 Objective Two: To examine how the siting of this processing facility is affecting residents’ emotional and sensual geographies in time and place.....	177
8.2.3 Objective Three: To examine residents’ reappraisal of an operational facility and the facility siting process that brought it to their community. ....	178
8.3 Contributions of the Study.....	180

8.3.1 Theoretical Contributions .....	180
8.3.2 Methodological Contributions .....	187
8.3.3 Practical Contributions and Policy Implications .....	188
8.4 Research Limitations .....	191
8.5 Future Directions .....	192
Chapter 9.....	194
9 REFERENCES .....	194
APPENDICES .....	210
CURRICULUM VITAE.....	225

## List of Tables

Table 1-1 Selected sociodemographic characteristics for Southgate Township (Census Sub-division), Grey Country (Census Division), Ontario and Canada. ....	8
Table 1-2 Southgate, ON Eco-Industrial Park Site History, June 2011 – Spring 2017.....	10
Table 3-1 Participant characteristics by interview phase and general opinions of the OMRC. ....	51
Table 5-1 Participant characteristics segregated by general opinions of the OMRC. ....	91

## List of Figures

Figure 1-1 The Township of Southgate located in rural southwestern Ontario (left). The location of Southgate’s EcoPark, as well as the specific site of the Southgate Organic Materials Recovery Centre is shown (right) in relation to the village of Dundalk. ....	7
Figure 1-2 Conceptual progression and core concepts (bolded) interpretively developed in each manuscript.....	15
Figure 2-1 Harrington and Elliott’s (2015) (a) structural and (b) relational frameworks of risk perception accounting for individual and contextual level influences.....	31
Figure 4-1 A conceptual diagram showing biosolids as a waste or a resource and the impact of residents’ perceptions of scale on their response towards local biosolids processing. ....	73
Figure 6-1 The relationship between residents’ differing place attachments, responses to facility siting and perceived stigmas. The interaction between residents with both differing responses to facility development and varied place attachments propagates intra-community conflict and fuels confrontational stigma.....	131
Figure 7-1 Conceptual framework of community responses pre- and post-siting of a potentially noxious facility in their vicinity.’ .....	165
Figure 8-1 Relational framework conceptualizing the importance of relational experiences of place-change and community participatory interactions for influencing risk perception outcomes and the potential for intra-community conflict. ....	186

## List of Appendices

Appendix A: NMREB Approval: Siting Process Community Interviews (2012).....	210
Appendix B: Letter of Information and Consent Form: Siting Process Community Interviews (2012) .....	211
Appendix C: Interview Guide: Siting Process Community Interviews (2012).....	214
Appendix D: NMREB Approval: Operational Community Interviews (2015-2016) .....	218
Appendix E: Letter of Information and Consent Form: Operational Interviews (2015 – 2016) .....	219
Appendix F: Interview Guide: Operational Community Interviews (2015-2016).....	222

# Chapter 1

## 1 INTRODUCTION

### 1.1 Contextualizing the Problem

Rural areas everywhere are experiencing change, and this change is not new, although many residents tend to look backwards and see a lost virtuous rural past (Thomas et al., 2011). Rural is no longer simply equated with agriculture due to the increasing influences of the global economy (Thomas et al., 2011; Woods, 2011). Rural areas are evolving socioculturally and demographically as urban residents migrate for an often idealized notion of rural life and an escape from urban environments (Hay, 1992). These new rural landholders often possess different perspectives on the rural landscape than farmers (Cooke and Lane, 2015; Cadieux and Hurley, 2011), which may result in increasing pressure on rural lands (Abrams et al., 2013). This influx of new residents may be welcomed and seen as bringing positive change to rural communities (Hoggart, 1997). However, this not always the case, as in some instances there may be conflict in rural areas between those who view it as a resource by relating the land as a means to an end through agricultural and primary sector practices, while others view the rural countryside as simple or an escape from the urban. In the latter, rural areas offer the idealistic potential of independence from urban centres as well as the goal to maintain the pastoral ideal or symbolic past which in reality is only loosely related to the rural past (Thomas et al., 2011; Sharma-Wallace, 2016). The intersection of productive and consumptive forces and ways of life juxtaposed in one locale has resulted in increasing conflict in these traditionally rural places (Bryant, 1995; Henderson, 2003). This movement of urban residents, accompanied by their often-differing notions of rural life, into rural areas is increasingly relevant and is changing the dynamics of many rural communities (Richmond et al., 2000). While not necessarily bordering urban regions, this contested rurality, influenced by urban forces of consumption, is representative of

the rural-urban interface (Masuda and Garvin, 2008; Kaiser and Nikiforova, 2006). The idea that the rural itself is contested and multidimensional is an important lens for this research (Halfacre, 2006; Woods, 2011; Masuda and Garvin, 2008;

Further, the relationality and connectivity within these interface regions, which have become sites of urban and rural forces and contestations, also contributes to instances of rural environmental injustices as rural areas are increasingly exploited by urban populations (Kelly-Reif and Wing, 2016). Rapidly growing urban populations are producing increasing volumes of waste, which are often transported to peripheral regions for management. Given the current challenges of siting waste disposal sites within urban areas, there has been an increasing influx of urban waste processing industries into rural communities (Fletcher, 2010). This influx of increasing volumes of urban waste and associated regional processing facilities is resulting in local level conflict in rural areas with opposition often directed towards how the movement of wastes or 'bads' regionally is entangled in the call for a paradigmatic shift, where wastes are no longer viewed as merely wastes but are transformed into beneficial inputs into other cycles (Morales and Oberg, 2012; Dreschsel et al., 2015). Thus, the need to examine better ways to safely reuse or extract nutrients from sewage sludges is increasingly prevalent (Gregson et al., 2015). This is fuelling controversy over 'green' techno-industrial developments, where the 'greenness' itself is often contested. For the purposes of this research, I define 'green' developments as a techno-industrial development that advances sustainability goals, is closed-loop, or that produces a value added 'resource' for beneficial reuse rather than a waste by-product targeted for disposal.

An example of this influx and transformation of urban wastes in rural landscapes are biosolid processing facilities and the subsequent land application of the end products. Biosolids, or processed sewage sludge, are produced as a by-product of municipal wastewater treatment plants and are commonly applied to agricultural land as fertilizer (OMAFRA, 2010). While there is general consensus among wastewater treatment



experts worldwide that sewage sludges are a good source of valuable nutrients (Tyagi and Lo, 2013), not everyone is as accepting of the reuse of these potentially noxious waste products within their locale (Beecher et al., 2004; Jones, 2011; Lowman et al., 2013; Peccia and Westerhoff, 2015; Dijkema et al., 2000; Beecher et al., 2005; Robinson et al., 2012). A growing number of anecdotal illness claims and nuisance complaints have resulted in the land application of biosolids being heavily scrutinized (Gattie and Lewis, 2004). However, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) still considers land application to be the most sustainable option for the disposal of biosolids as this practice will help to close the loop of urban-rural nutrient recycling (OMAFRA, 2010).

With steadily increasing urban populations, the volume of biosolid waste is increasing along with an increase in the proportion disposed of via land application, which has resulted in heightened public concern (Krogmann et al., 2001). For instance, in the Township of Southgate, in rural Ontario, Canada, a biosolids processing facility, the Southgate Organic Material Recovery Centre (OMRC) was proposed to be sited in the community's Eco-Industrial park in the summer of 2011. Controversy over this facility quickly escalated and intra-community conflict and polarization was evident. The facility became operational in the spring of 2013 (a full description of facility characteristics and siting events are included below in section 1.4). The OMRC produces a Canadian Food Inspection Agency (CFIA) certified fertilizer that is sold to local farmers for application to their agricultural land as a nutrient source.

## 1.2 Biosolid Processing and Recycling

Management of municipal sewage has emerged as an area where such waste can be treated and the by-product used for agricultural purposes. This is particularly relevant as many landfills are nearing capacity and some alternatives previously utilized, such as ocean dumping, are deemed unacceptable. Biosolids, or processed sewage sludge, are

defined by OMAFRA (2010, p. 109) as “organic fertilizer or soil amendments produced by the treatment of domestic wastewater... consisting primarily of dead microbes and other organic matter”. OMAFRA considers the application of biosolids on farmland to be the most sustainable option, as in addition to potentially avoiding both the economic and environment burdens of disposal that would otherwise be necessary (Axelrad et al., 2013), biosolids contain valuable nutrients which can improve soil quality and fertility, as well as reduce the need for chemical fertilizers. Supporting this narrative, the Greater Moncton Sewerage Commission, in New Brunswick, Canada, among other municipalities, are also moving towards the further processing of biosolids for land application, as they too believe it is more cost effective and environmentally acceptable when compared to land filling or incineration methods (LeBlanc et al., 2004).

As biosolids are being applied to land at greater intensities and processing facilities perceived as point sources are being developed, the general public has developed a heightened awareness surrounding health, safety and environmental impacts and this realization influences the public’s perception of risk (Robinson et al., 2012). The agricultural application of urban biosolids results in this product being transported mainly from urban areas to rural “spaces” for further processing. The implementation of rural biosolid land application as a solution to urban waste management has been disputed and like the debates surrounding the use of landfill waste as a resource (Dijkema et al., 2000), the notion of biosolids as a resource has proved controversial. Strong challenges from would-be “host” communities are arising from the real and perceived uncertainties and differing perspectives towards biosolids (Beecher et al., 2004). Concerns stem from problems associated with local management, as well as a great deal of uncertainty within the scientific literature surrounding the environment and health impacts of micro constituents (i.e., heavy metals, pharmaceuticals, personal care products and emerging contaminants) within the final product (Goven and Langer, 2009; Krogmann et al., 2001). Traditionally, research has revolved around examining potential environment and health effects of biosolids and has generally failed to acknowledge that biosolid facility siting, land application and opposition is a social issue

and has neglected to understand the public's evolving perception of this risk (Beecher et al., 2004). With the increasing realization that individuals act on their perceptions and not on risk as defined by experts, such as regulatory agencies or scientists there is a need to better understand how individuals develop these perceptions in their local context and how these perceived risks are known by individuals in their uniquely experienced time, place and community circumstances (Robinson et al., 2012; Beecher et al., 2004; Halstead and Whitcomb, 1994). This is particularly relevant in the context of increasing and unavoidable volumes of sewage sludge waste and a paradigmatic shift increasingly demanding more of our wastes by-products than merely to dispose of them out-of-sight and out-of-mind.

### 1.2.1 Current state of science: health effects of exposure to biosolids

The adverse human health effects due to exposure to biosolids remains equivocal in the existing literature (e.g., Beecher et al., 2004), which allows for a variety of claims to be made about negative impacts and for debates to be centered around not only the science but the politics of biosolid processing as well (Mason et al., 2015; Pal, 2014; Sabatier, 1987). Lewis et al. (2002) reported that residents who lived in close proximity to land application sites reported elevated levels of skin rashes, burning eyes, and throat and lung irritation after exposure to winds blowing from treated fields. This suggested underlying allergic reactions and alternative health effects. Lowman et al. (2013) found similar elevations in self-reported acute physical symptoms, such as respiratory and gastrointestinal irritations. Jenkins et al. (2007) conducted a review of 23 published studies on the health effects of biosolids and reported there was inconclusive evidence that biosolids resulted in viral infection. While most of the existing literature remains uncertain, Jenkins et al. (2007) concluded it was virtually impossible to prove a complete absence of health effects. Similarly, Robinson et al. (2012) discusses the lack of conclusive evidence regarding the potential health impacts of biosolids. In light of a growing number of illness claims, resistance and complaints regarding residential

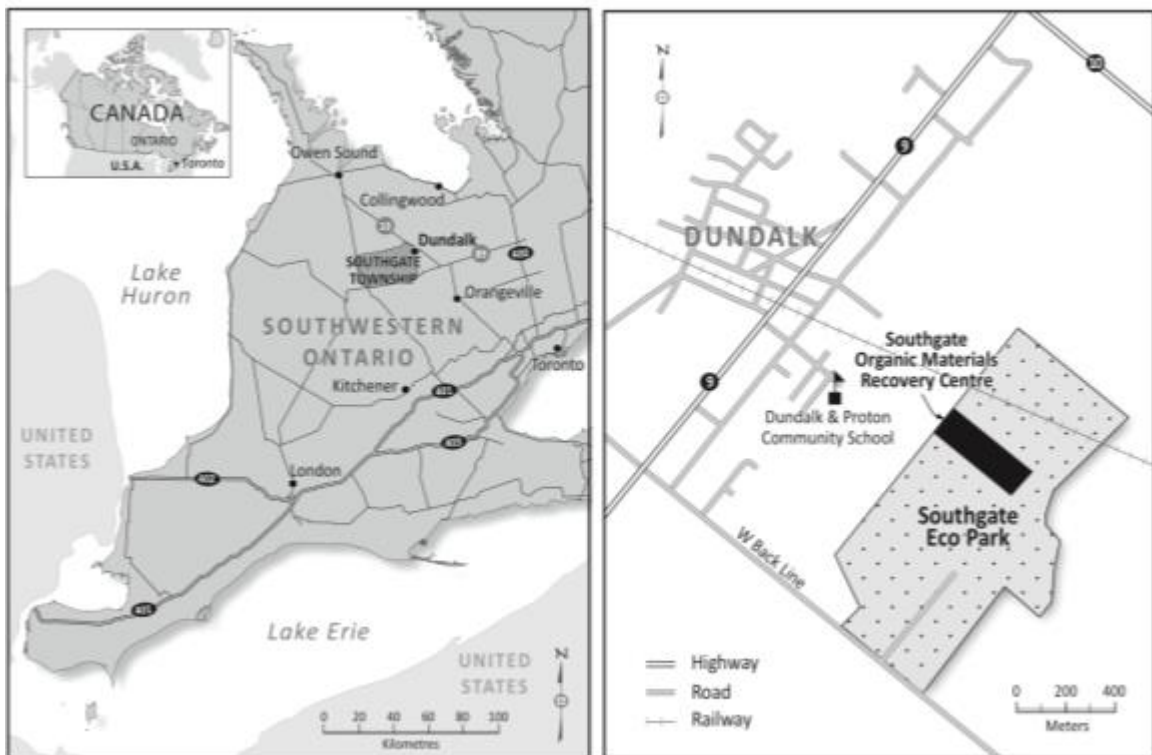
exposure to biosolids, regulatory bodies are being more vigilant (Gattie and Lewis, 2004), however, there remains room for increased regulatory monitoring and follow up (Lowman et al., 2013). It is with these uncertainties regarding the health effects of biosolids that the interaction between science and the politics of biosolid facility siting emerges.

### 1.3 Community Context

The Township of Southgate (population: 7,100; Statistics Canada, 2012) is in Grey County in rural Southwestern Ontario (Figure 1-1). Southgate is a rural middle-class community (median household income of \$56,480 compared with the provincial median household income of \$66,358 (Statistics Canada, 2012)) characterized by a greater ownership of private residences and greater proportion of young children as well as lower median age and educational attainment in comparison to Grey County residents (Table 1-1). Except for those residents living within the Town of Dundalk (population: 1,900; Statistics Canada 2012), most residents live in primarily rural areas.

Southgate is characterized by a recent high turnover of population and rapidly increasing income – likely due to influx of relatively wealthy exurbanites. While Southgate’s net population has not changed recently (net growth of 18 residents between 2006 and 2011), they have experienced substantial in- and out-migration (about 21.5% of current residents moved in to the community over this time period with similar rates of outmigration) resulting in population demographic and socio-cultural changes and influencing overall expectations of Southgate. However, between 1996 and 2006, when the median household family income almost doubled (\$30,803 to \$56,480 respectively), Southgate experienced a net population growth of 11% with the majority of these residents residing in the Village of Dundalk. This suggests that newer residents (less than 20 years of residence) have higher incomes than long-time residents do. These residents likely fall in to the growing commuter population living in the village,

whereby more than half of the population now commutes elsewhere, mostly to distant urban centres, to work. This has implications for residents' sense of place as a locale for refuge and restoration from their daily work rather than a place of work and production. As I observe, this can have implications for reactions towards community development. This has created an underlying tension in the township where some long-time residents perceive the increasing number of migrants to be a 'threat' to community values and stability.



**Figure 1-1** The Township of Southgate located in rural southwestern Ontario (left). The location of Southgate's EcoPark, as well as the specific site of the Southgate Organic Materials Recovery Centre is shown (right) in relation to the village of Dundalk.

**Table 1-1 Selected sociodemographic characteristics for Southgate Township (Census Sub-division), Grey County (Census Division), Ontario and Canada.**

Characteristics	Southgate	Grey County	Ontario	Canada
% mother tongue English only	83	95	68	57
% landed immigrants	9	7	29	21
% children (under 14 yrs.)	20	15	17	17
% young adults (25-44 yrs.)	21	20	26	26
% seniors (over 65 yrs.)	14	21	15	15
Median age of population	41.3	47.3	40.4	40.6
% with no certificate, diploma or degree (over 15 yrs.)	26	22	19	20
% with university degree (over 15 yrs.)	7	13	23	21
% owned private dwellings	90	79	71	69
Unemployment Rate (%)	6	7	8	8
Median commuting duration (min)	30.1	15.7	20.8	20.5
Median Individual Income (Cdn\$, over 15 yrs.)	25,687	28,511	30,526	29,878
Percent of Individuals in adjusted after-tax income quintile (Canadian distribution)				
Percent in bottom quintile	17	18	18	20
Percent in second quintile	33	24	19	20
Percent in third quintile	19	22	19	20
Percent in fourth quintile	17	20	21	20
Percent in fifth quintile	14	16	23	20
Prevalence of low income based on after-tax-low-income measure 18 – 64 years (%)	12.3	13.8	13.9	14.4

Source: Statistics Canada, 2011 National Census and National Household Survey

## 1.4 Facility Siting Process

In the fall of 2012, the Southgate OMRC completed a heated siting process. Though controversial, the OMRC was approved and became operational in spring 2013. Lystek International Inc. (hereinafter referred to as Lystek) is the primary proponent and owner of the facility. The Southgate OMRC is a regional facility, accepting biosolids from exclusively from surrounding urban areas, including the Greater Toronto Area. Lystek processes, markets and sells the end product, LysteGro Fertilizer, to local farmers to meet the nutrient needs of their agricultural land.

The siting process for the proposed Southgate OMRC began in June 2011 when Southgate Township agreed to sell the EcoPark property upon approval from the then

Ontario Ministry of the Environment (MOE; at the time of publication the MOE is now the Ministry of Environment and Climate Change, MOECC) (Table 1-2). The EcoPark, a recently developed industrial park looking for 'green' industry in Southgate, is located on the periphery of Dundalk (the only sizable village in the township) behind a local primary public school property and residential neighbourhood. Local residents were already dealing with an outdoor yard-waste composting operation located adjacent to the proposed biosolid facility site; this was the only other industry located within the park at that time. At the time the OMRC was proposed, many residents had been complaining of odour and increased truck traffic from the compost facility, which is believed to have influenced residents heightened perceptions towards the biosolid facility in question. In August 2011, Lystek filed their Certificate of Approval Application to the MOE. Shortly thereafter, the public was made aware of the proposal and public meetings were held.

Throughout the siting process, community conflict escalated hastily and the social and emotional impacts of this siting process emerged through increased challenges to local governance, hostile public debate through news media and visible fracture within the community. With the proximity of the facility to the kindergarten to grade three elementary school property (Figure 1-1) many town residents became very concerned for child health in particular. This pitted many town residents against rural agricultural residents, who were not living in proximity to the facility, and thus presumably less susceptible to potential risks from closer proximity to the facility, and who also stood to gain from this affordable nutrient resource. However, it is important to note that the nature of this facility and its output of a fertilizer product to be applied to agricultural land generated two types of exposures – those related to the processing facility directly and those associated with the end product both through direct contact with the land as well as infiltration into the food chain. Nevertheless, these farmers were exposed to the Lystegro nutrient spread on their fields, however perceived relative risks as negligible when compared to existing exposures to chemical fertilizers and other agricultural risks.

This propagated feelings of inequity among many town residents, who felt they were unduly exposed with little direct benefit.

**Table 1-2 Southgate, ON Eco-Industrial Park Site History, June 2011 – Spring 2017**

Date	
Ongoing	<b>At the time of publication, the OMRC continues to operate in Southgate and sell their LysteGro product to surrounding farmers for use as an agricultural fertilizer.</b>
October 2014	Municipal Election
Fall 2013	*During this election a new mayor and four of five new councilors were elected LysteGro Product produced at OMRC is applied as fertilizer amendment to local agricultural fields
<b>May 2013</b>	<b>OMRC began operation and processing</b>
<b>December 19, 2012</b>	<b>Environmental Review Tribunal dismisses SPIRG's leave to appeal application</b>
December 7, 2012	SPIRG ordered to pay a portion, \$40 000, of Southgate's legal costs
October 31, 2012	SPIRG appeals building permit ruling
October 26, 2012	SPIRG filed their Application for Leave to Appeal to the Environmental Review Tribunal
October 2012	Construction begins on processing specific aspects of facility
<b>October 9, 2012</b>	<b>MOE Issues Compliance approvals to Lystek</b>
October 2, 2012	Building Permit Upheld
September 4, 2012	Third and final court date regarding building permit appeal
July 19, 2012	Second court date regarding building permit appeal, injunction made permanent
July 12, 2012	Judge imposes interim injunction to end blockade
July 7, 2012	Eco-Walk, protest through Dundalk
June 27, 2012	Southgate council passes motion for a legal option to end blockade if necessary
April 26, 2012	First court date regarding building permit appeal
April 17, 2012	Mayor and Lystek meet with band chief of Six Nations of the Grand Council
<b>April 4, 2012</b>	<b>Blockade Began</b>
March 2012	Building shell construction begins
February 16, 2012	SPIRG files building permit appeal
February 2, 2012	Southgate issues 'shell' building permit to Lystek SPIRG and CCOS hold public information meeting in Holstein (West end of Township)
February 1, 2012	SPIRG and CCOS hold public information meeting in Dundalk
January 31, 2012	First Public Advisory Meeting is held
January 24, 2012	Lystek opens information office
December 21, 2011	Council approves Lystek's site plan agreement
December 7, 2011	Southgate officially sells land to Lystek
November 31, 2011	MOE Environmental Registry 90 Day Public Review Comment Period Ended
October 12, 2011	Second Public Meeting held by Lystek
September 28, 2011	SPIRG and CCOS hold public information meeting
September 1, 2011	MOE Environmental Registry Public Review Comment Period Begins
September 1, 2011	First Public Meeting held by Lystek
<b>August, 2011</b>	<b>Lystek submits Certificate of Approval application to MOE and community becomes aware of the proposal</b>
June 15, 2011	Southgate privately agrees to sell land to Lystek conditional upon their receipt of MOE approvals

Source: Information was obtained from a combination of field work experience, information posted on Southgate's municipal website, the Ontario MOE's website, as well as community meetings and events posted in the Dundalk Herald. (Amended from Mason et al., 2015)



In February 2012, the municipality issued a building permit for the shell, stating they were “putting their confidence” in the MOE to decide whether or not the facility will be safe and not cause harm to the community. The municipality ruled that if certificates were granted by the MOE, the proponent could proceed with construction on the waste specific aspects of the facility. In response to this, the Southgate Public Interest Research Group (SPIRG), an existing local community activist group, pursued legal action against the township appealing the building permit that was issued to the proponent as a means to terminate (or at the very least postpone) that facility’s development. SPIRG members and other local residents also initiated a blockade of the road to the EcoPark in conjunction with some members of the Six Nations of the Grand River.

Following a long-standing debate throughout the community, the building permit case was ruled in favour of the municipality and the MOE administered an Environmental Compliance Approval to Lystek in October 2012. SPIRG then appealed this approval. However, in December 2012 the Environmental Review Tribunal dismissed SPIRG’s case due to their failure to meet the “statutory requirements” (Ontario Environmental Registry 2013).

The OMRC became operational in the spring of 2013 with the first application of the LysteGro product being applied to local farmland in the fall of that year. Operation has increased at a steady rate annually since, with the facility now operating at their current full capacity, with an average of 4 – 7 incoming trucks per day during land application (PAC May 2016) and 9 - 11 incoming trucks per day when land application is not permitted due to field conditions (PAC Nov 2015; during land application season, many municipalities choose to land apply their biosolids through approved Non-Agricultural Source Material Plans, rather than have them further processed and stored at the OMRC, thus reducing incoming traffic). At the time of publication, the OMRC was accepting biosolid material from Toronto, Peterborough, Scarborough, Halton, Guelph, Orangeville, The Region of Durham, Owen Sound, Arthur, Mono and Tay Township. Outgoing material averaged about 500 – 1000 m<sup>3</sup> per day, dependent on weather, with

18,000 m<sup>3</sup> being land applied in July of 2015 (PAC August 2015). It was noted that the OMRC is struggling to meet the product demand of local farmers.

This community was chosen as a case study of contested 'green' developments, which produces an end 'resource', in the rural landscape, based on the tense conflict and opposition that contributed to persistent claims making throughout the facility siting period and for the years to follow. The nature of the facility, involving urban biosolids and a fertilizer end product of use to the agricultural community, has resulted in unique debates surrounding contentious green developments and resulted in intra-community conflict in this small rural Ontario community among residents with differing ways of life and place attachments, and particularly between the agricultural and commuter or retirement community. Furthermore, with regulations becoming increasingly stringent and the application of lesser processed biosolid products becoming less tolerated, other regions are also looking to get more from their biosolids as a means of beneficial reuse and nutrient recovery. A contemporary example of this heightened controversy is that of the Thompson-Nicola Valley Region in British Columbia, whereby the provincial government is undergoing a comprehensive review of the current Organic Matter Recycling Regulations in response to public demand, in an attempt to protect public health and the environment, but also to encourage the beneficial reuse of such products, rather than simple disposal. This case study will provide baseline knowledge in the related risk management and community issues that can occur in similar contentious green debates.

With public acceptance and social feasibility remaining a major issue for the implementation of sewage sludge processing technologies, which are touted as green and sustainable by some (Tyagi and Lo, 2013), there is need for understanding the public's response to the reuse of these stigmatized and contested waste by-products (Edelstein, 2004). Public acceptance of emerging waste technologies is heavily influenced by socially constructed risk perceptions, and without understanding how individuals and groups evaluate and respond to risks, well-intended policies for the

siting of such waste facilities and 'recycling' the end product as a fertilizer might be ineffective and may instead be instigating and or propagating increased community conflict and altering residents' sense of place in their community. Additionally, the increasing pace and potential of this industry to grow, suggests a need for studies examining community responses, evolving perceptions and their role in facility siting. Previous studies (Beecher et al., 2004; Beecher et al., 2005; Robinson et al., 2012; Goven and Langer 2012; Krogmann et al., 2001) have highlighted risk perceptions regarding disposal and land application, however studies placing a primacy on community context and examining responses to transformed waste products sold for their resource value are lacking.

## 1.5 Research Objectives

This thesis is written as a collection of four manuscripts contributing to a broader narrative concerned with the appraisal of, response to and reappraisal of a proposed, then operational biosolid processing facility in the Township of Southgate. The research findings are guided by the following three objectives.

1. To explore the risk perceptions associated with the processing and end usage of biosolid waste.
2. To examine how the siting process is affecting residents' emotional and sensual geographies in time and place.
3. To examine residents' reappraisal of an operational facility and reflections on facility siting process that brought the OMRC to their community.

## 1.6 Thesis Outline

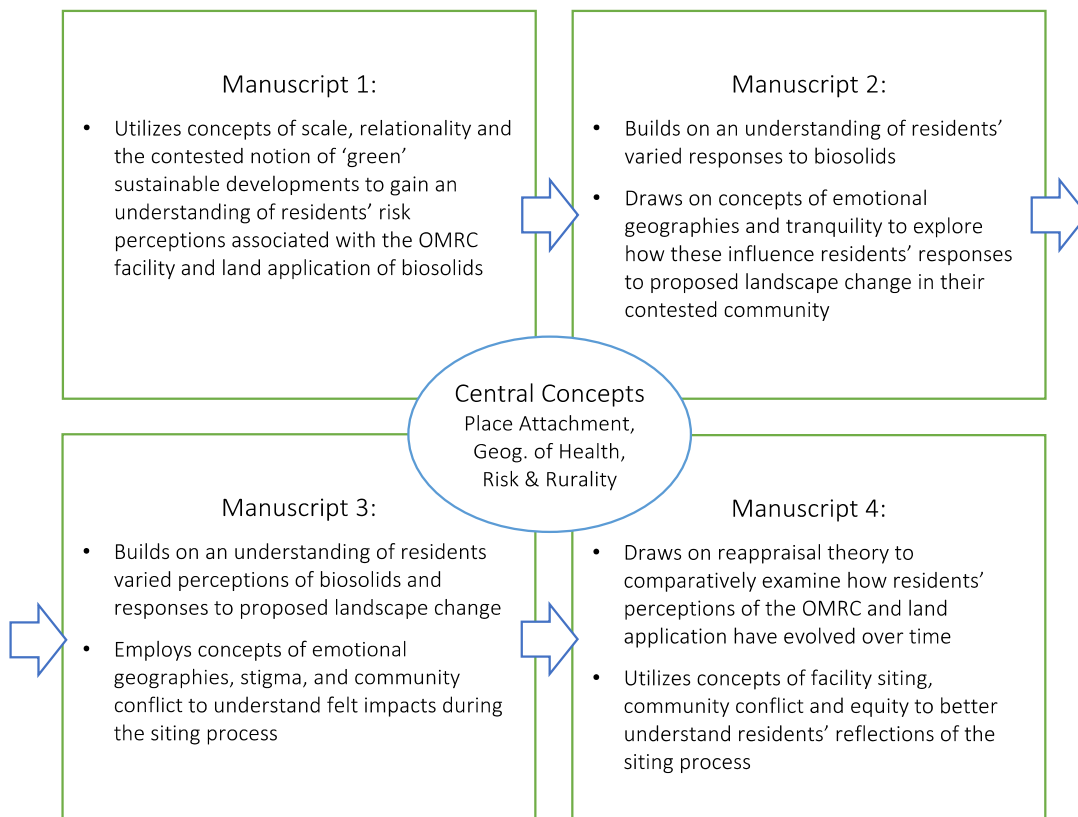
This thesis is comprised of eight chapters, including this, the introductory chapter. Chapter 2 reviews the main literatures which theoretically frame this research: geographies of health, emotional and sensual geographies, and risk society and facility

siting. Chapter 3 provides details of the research design and methods. This begins with a discussion of my researcher positionality and what impact my role as both community member and researcher may have had on the research. Chapter 3 also reviews participant recruitment and data collection through both the siting and operational phases of this research and describes the qualitative data analysis process involving NVivo.

Chapters 4 to 7 consist of four stand-alone manuscripts – journal articles, two of which are published (*Health and Place* and *Journal of Rural and Community Development*) and two under review (*The Canadian Geographer*, and *Journal of Risk Research*). While presented as distinct manuscripts, these four papers represent integrated work examining the community response to and felt impacts of the siting and operations of the OMRC in the Township of Southgate.

The order of the papers relates directly to the objectives and conceptual development of the research rather than the order in which they were accepted for publication. In this sense, they are distinguished by the core concepts explored in each manuscript (Figure 1-2). Chapter 4 relates to objective one and is under review at *The Canadian Geographer*. This chapter explores residents' varied risk perceptions associated with the facility and subsequent end usage of biosolids in their locale. Specifically, this chapter explores how perceived waste or resource properties influences residents' perception of risk and further, how resident's conceptions of scale plays a role in underlying debates of regional processing and beneficial reuse of wastes. This research draws on qualitative interviews conducted with Southgate residents during the uncertain siting process. Previous research has examined the siting of hazardous or non-hazardous waste facilities and examined disputes between community and industry (Baxter et al., 1999a; 1999b; Elliott and McClure, 2009; Elliott et al., 1997; Gallagher et al., 2008; Wolsink 2009 among others), whereas this research extends these concepts onto a new kind of facility siting dispute whereby local, regional and global sustainability benefits (the 'resource') may be advocated for by some, but contested by others who

see biosolids as merely an intrusive waste that needs disposing of. Unlike a conventional landfill or incinerator, which serves to dispose of, destroy, or hide a waste product, the OMRC produces a value-added product that is marketed and sold as an agricultural resource. This research contributes to this emerging area of contested sustainable developments such as waste-to-energy or anaerobic digestion facilities among others.



**Figure 1-2 Conceptual progression and core concepts (bolded) interpretively developed in each manuscript**

The second manuscript (Chapter 5), published in *Health and Place*, addresses Objective One and Two as it builds on an understanding of residents' varied responses to biosolids in their locale and examines how residents' place attachments and feelings of tranquility in their community affects their responses to a proposed potentially noxious facility in their community. This chapter addresses the need to explore the contested nature of

rural landscapes and differential responses to proposed landscape change through the lens of therapeutic landscapes. Research examining the therapeutic encounters with everyday geographies (such as Milligan, 2007; Wakefield and McMullan, 2005; Williams 2007; Smith et al., 2010) as well as responses to environmental change (for example Rose, 2012; Conradson, 2005) is emerging as new areas of inquiry in the field of therapeutic landscapes. However, literature regarding residents' response to anticipated landscape changes, such as techno-industrial facility siting, in the context of everyday experiences with contested or 'unhealthy' places remains negligible. This manuscript contributes to this emerging literature by adding to our understanding of residents' emotional geographies in time and place.

Addressing Objective Two, the third manuscript (Chapter 6), published in the *Journal of Rural and Community Development*, explores residents' responses to and perceived impacts from the proposed OMRC in their rural community, unpacking how rural residents' place attachments and emotions surrounding contentious community issues may contribute to a diversity of perceptions, may be drivers of intra-community conflict and result in differential perceived stigmas. This builds on previous findings of the varied responses to biosolid processing and land application as well as differing attachments to and expectations of the rural landscape to establish a better understanding of how these constructs may drive a wedge in communities previously believed harmonious. This research seeks to add to the relatively little empirical research devoted to how risk perceptions, place attachments and technological stigmas relate to community conflict and the impacts this can have on the community itself. Conflict has been found to be linked to variation in place attachment (Kroll-Smith and Couch 2015; Devine-Wright and Howes 2010; Masuda and Garvin, 2008), with intra-community conflict likewise linked to place based concerns about the distribution of facilities within the community, health, and the distribution of benefits from the facility (e.g., Walker et al., 2014, Baxter 2006). Yet, there is relatively little empirical research devoted to how these relate to community conflict and the impacts this can have on the community itself – which may have an equally serious short and long-term impact.

The fourth manuscript (Chapter 7) is under review at the *Journal of Risk Research*. This manuscript addresses Objective Three by comparatively examining residents' perceptions during the contentious facility siting process and following up during an operational phase to better understand residents' reappraisal process and changing perceptions over time. This manuscript also examines community constructions on the process that brought the facility to their community and contrasts the perceptions of residents with municipal officials. Studies investigating how community perceptions of a facility evolve over time are rare (for exceptions see Luginaah et al., 2002a; 2002b; Wakefield and Elliott, 2000; Elliott et al., 1997), and studies comparing pre- and post-siting perceptions remain uncommon (one notable exception is Elliott and McLure, 2009). This manuscript contributes to this gap in the literature.

The final chapter in this dissertation (Chapter 8) summarizes the findings of this thesis and discusses the contributions of the research. In conclusion, this chapter outlines the limitations of the research, and its practical implications. References, appendices and my curriculum vitae follow.

## Chapter 2

### 2 LITERATURE REVIEW

#### 2.1 Introduction

This chapter sets the theoretical context for the key arguments presented in this dissertation. Three overarching literatures are discussed which have influenced this research: Geographies of Health, Emotional Geographies and Place Attachments and Risk Society and Facility Siting. While relevant theoretical constructs are discussed in each of the four manuscripts, this chapter affords the space to discuss broader theoretical underpinnings of this research in greater detail.

#### 2.2 Geographies of Health

##### 2.2.1 The Emergence of Health Geography

Health geography has evolved to become more inclusive, recognizing the importance of a broad range of social, cultural and environmental factors in influencing health and well-being. Originating from its arguably positivist and reductionist predecessor – medical geography – in the 1980s, health geography was established to be more comprehensive accounting for a broader range of health-related issues rather than concentrating solely on issues directly related to the medical system (Luginaah, 2009; Kearns, 1993). This transition towards a broader examination of health and wellness is reflective of the cultural turn in human geography and of the World Health Organization's more inclusive definition of health: *a complete state of physical, mental and social wellbeing, not merely the absence of disease*. The new geography of health examines the dynamic relationship between health and place. Health geography has arguably undergone three key developments in its history: the emergence and



importance of 'place', the adoption of sociocultural theoretical positions, and the pursuit of a critical geography of health. With these disciplinary movements, health geography has advanced beyond medical geography's dichotomous study of disease ecology or health service accessibility and has moved away from the use of purely positivistic methodologies towards the incorporation of several social and critical approaches to environmental health research.

### 2.2.2 An Emphasis on Place

Kearns and Moon (2002, p. 609) emphasize the emerging importance of place, whereby "place has been seen as an operational 'living' construct which 'matters' as opposed to being a passive 'container' in which things are simply recorded". With this transitioned view of place, it became increasingly acknowledged that effects between the environment and human health are not unidirectional. It is well accepted that the environment both influences and is influenced by human health and well-being (Eyles, 1997). Environments come together to shape the dynamic context within which disease, illness, health, and well-being are contested (Eyles, 1997). This emphasis on place accounts for the variety of influences on health operating across a number of scales and is particularly relevant within the context of Canada's vast landscape (Luginaah, 2009). Additionally, this attention to place highlights the important differences between rural and urban locales as well as conflicting notions of the rural landscape and countryside (Masuda and Garvin, 2008), and calls for the incorporation of place based community research to address this importance of place in rural environment and health research.

Not only is 'place' recognized as a locale of interaction between humans and their environment, but is also acknowledged as a social construction in the new geography of health. This is important for gaining a better understanding of the diverse (and often conflicting) constructions of the rural landscape and how these constructions impact risk perceptions as well as individual health and well-being through a variety of psychosocial

impacts arising from community conflict and stressors. With regards to place, geographies of health consider both the experience of literal places and perceived places in the world (Kearns and Moon, 2002). This emphasis on place and landscapes has also been paramount in gaining a greater understanding of residents' place attachments, evolving sense of place, and expectations of their rural landscape to better conduct community-based research to meet the goals of rural and agricultural communities. Emphasizing concepts of landscape and place attachment can help to better understand conflicts arising within rural areas between rural non-farm community members and the agricultural community. Conflict in these communities is arising over differing ways of life and conflicting notions of what is 'right' or 'natural' within their rural landscape, such as the appropriate scale of agricultural industries. By taking a place-based approach, health geography is able to gain a better understanding of these emotional, stress inducing attachments and move towards increased communication and mitigation strategies. With the increasing rural in-migration, demographic shifts and agricultural changes that are occurring in many rural communities this importance of place, both as an interaction with the environment and as a social construction, is going to remain a vital aspect of health geography research.

This recognition of the importance of place has led to both the development of methodologies examining spatial analysis patterns of disease incidence and more qualitative methodologies and theoretical approaches seeking to gain a more in-depth contextual understanding of individuals' experience of place (Macintyre et al., 2002). Humanistic approaches to geography take these individual intimate emotional, practical and political attachments to place into account and are thus useful for address this aspect of 'place' in health geography (Cloke et al., 1991). Phenomenology, a humanistic approach to geography, is a philosophy examining the ways individuals make sense of the world around them (Cloke et al., 1991). As geographers, we prioritize the importance of place, and its subjective experiences and meanings, as a bridge between the technical concepts of risk and the social, cultural and individual responses to risk (Masuda and Garvin, 2006). Phenomenology aids researchers in understanding

individuals' construction of meanings and thus their motivations for behaviour and action (Bryman and Teevan, 2005). Since many residents reside in rural communities for the locale's perceived proximity to nature, escape from urban stress, and idealistic potential, understanding individuals' emotional and sensual attachments to place is crucial. This improved understanding will bring insight into rural community based research. This is pertinent in the present context of techno-industrial developments, such as wind turbines or beneficial reuse of waste by-products, that are considered forward thinking and sustainable by some regulatory agencies, yet, they are being met with strong opposition and heightened perceptions of risk from other community members.

However, humanistic geographical approaches are often critiqued based on a lack of sufficient connection to broader structural influences on health. Broadly, these place specific methodologies producing 'place-knowledges' are critiqued as being 'place-bound' and thus difficult to generalize across contexts (Kearns and Moon, 2002). However, examining more transferable place-based constructs, such as ways of life, values or place attachments, rather than specific individual differences are an effective means to better understand local conflict and also maintain the transferability of your findings. It is also worth noting that conceptual development and adding depth and nuance are commendable scientific goals. This depth place-based qualitative health research seeks to unveil emergent concepts, such as confrontational stigma, that may be applied to other places or facilities.

### 2.2.3 Theoretical Turn

Traditional environment and health research focused on empirical, policy relevant, evidence-based action (Eyles, 1997). However, as Kearns and Moon (2002) postulate, health geography has become increasingly concerned with theory. Geographers now recognize the social-theoretical context of health and have thus adopted and developed

critical social theories for their research. This emphasis on the social and cultural aspects of health is reflective of progress within the broader discipline of human geography. This 'post-positivist' theoretical approach does not strive to establish universal truths, but instead seeks to consider the researcher's position and partial perspective (Kearns and Moon, 2002). This theoretical turn advanced health and rural geography beyond place specific empirical research towards conceptual theory generation and increased transferability.

Broadly, the socioecological framework of health recognizes the individual nature and the diversity of illness determinants (Luginaah, 2009). Health and well-being are conceptualized as a combination of one's compositional factors, individual characteristics in particular locales, or contextual factors, including the wider environment such as opportunity structures, historical, socio-environmental and socio-cultural features (Macintyre et al., 2002). Giddens' structuration theory is useful for analyzing the social geographies of health accounting for individual and contextual factors at the foundation of the socioecological framework of health. Structuration theory is a subset of interpretivism that acts as a middle ground taking both human agency and the wider social, economic and political structures into consideration (Gatrell and Elliott, 2009). Kearns and Moon (2002, p. 614) suggest that this framework has the "capacity to integrate people and places as well as the local and the global" while incorporating time. While simultaneously accounting for the influences of structure and agency, researchers are able to gain a more comprehensive understanding of the social and structural context at play alongside with the impact of individual differences. This framework recognizes that social practices and actions are shaped by structures, but that such social structures can be created and recreated by these practices and actions (Gatrell and Elliott, 2009). Structurationism also facilitates increased transferability of research findings (Kearns and Moon, 2002). This theory is useful for developing a better understanding of social contexts such as rural residents' experience of living in a stigmatized community (Eyles, 1997). Aitken and Valentine (2006) also discuss structurationism's importance in studying the relationship between

health and place including connections among individual behaviour, institutional influences and community politics. Additionally, the combination of structure and agency factors within inquiry and analysis provides the researcher with a more complete understanding of how these factors are interacting to shape residents' perceptions. For example, when considering individual's perception of a proposed biosolid treatment facility within their rural community, it is important to consider residents' individual values, expectations and ways of life but also their spatial proximity to the facility, their socioeconomic status and class constraints as well as their complex interactions with other community members that may or may not be shaping their perceptions.

#### 2.2.4 Critical Geographies of Health

Geography of health has also arguably taken on a more critical perspective acknowledging unequal and oppressive power relations, focusing on social justice issues as well as the development and application of critical theories. Postmodern critical geographies are concerned with structure and agency in an uncertain, pluralistic and indeterminate manner concerned with cultural influences (Chouinard, 1997). This postmodern critical theory politicizes the social and situates problems within historical and community contexts and supports the notion of multiple interpretations of reality (Clope et al., 1991). This critical geography of health also advocates for an increased utilization of other disciplinary knowledge from elsewhere in geography as well from a range of social sciences such as sociology, psychology and political science among others (Kearns and Moon, 2002).

Scholarship focusing on environmental and health inequities and transformative politics can help rural researchers to better understand community responses to perceived inequities, such as the intrusion of urban developments within their rural landscape. Due to the decreased population density, availability of land and proximity to resources, rural areas are deemed most appropriate for many large-scale industries required to

support urban areas. Examples of these include power generation, aggregate extraction, large-scale farming practice, and waste disposal among others. This perceived inequitable distribution of risks in rural communities heightens risk perceptions; and where differing opinions exist, also may heighten rural intra-community conflict. In addition to perceived level of risk, it is important to consider the inequitable distribution of these risks, which pose a threat to rural residents' health, well-being and environmental quality. Critical geographies of environmental and health inequities has brought insight to rural responses, actions and population health characteristics with regard to these inequitable distribution of risks in the rural landscape.

By adopting geography of health perspectives, which utilize critical and social theories while also emphasizing the importance of place we may further address complex rural health issues to better service these communities to mitigate risks and health effects they may be exposed to. Health geography has not necessarily undergone a 'revolution' but an evolution and combination of new intra-disciplinary insights (Kearns and Moon, 2002). For the relevance and success of health geography broadly and rural and agricultural community geographies of health more specifically, it is paramount that research remains focused on the importance of place, produce policy-relevant results that are theoretically grounded, and examine issues through a critical lens. This will be advantageous for both sub-disciplines and will bring further insight, knowledge, and theory development within these research fields.

This evolved geography of health, recognizing the importance of place and its subjective nature, the social dimensions of health, as well as critical perspectives, suggests the utility for qualitative methods (Kearns and Moon, 2002). Such qualitative methodologies can give individuals a voice as well as more fully characterize the complexities of communities and groups as they allow researchers to gain a more thorough understanding of the role of place in shaping the public's experience in their rural communities (Brown, 2003). These methodologies are flexible, iterative and continuous (Miller and Crabtree, 2004). This allows for a more dynamic and flexible approach to

understand the multiple dimensions and experiences of rurality as well as the complex role that individual differences and socio-cultural context plays. The broader scope of health geography now calls for increased interdisciplinary research to better address rural health, community and agricultural issues.

## 2.3 Sense of Place and Place Attachments

An expanded and enriched focus on place attachments and community context in risk research provides a more comprehensive approach to examining perceptions, responses and broader societal trends surrounding the support for or opposition to techno-industrial developments (Boyd and Paveglio, 2015). I adopt the definition of place attachments as the emotional bond that individuals and/or groups establish with specific settings they inhabit or frequently visit (Altman and Low, 1992).

The concept of place attachments focuses on the emotional bonds between people and their well-known environments, which can often promote community interaction and emotional ties (Manzo and Perkins, 2006; Devine-Wright and Howes, 2010; Altman and Low, 1992). Emotional bonds develop between individuals or groups and the familiar locations they reside in or often visit such as one's home or neighbourhood and frequently involve both social and physical sub-dimensions (Altman and Low, 1992; Tuan, 1974). It is important to consider the inherently emotional nature of place attachments in environments undergoing change, where residents reshape their surroundings through their emotions and in turn their changing environments reshape their everyday life experiences and sense of place (Eyles and Williams, 2008; Davidson and Milligan, 2004). Milligan (2007) argues that an individual's association with place evolves over time, potentially shifting from restorative to risky, in other words, from positive to negative. Residents and users of these locales gain a sense of wellbeing through experiences with and the appreciation of personally relevant landscape attributes. Additionally, Townsend and Pascal (2012) describe how it is residents'

anticipations of spaces that impact the ways such spaces are subjectively experienced. For example, if a rural place is anticipated as tranquil or restorative, with the aesthetic of agriculture and the natural environment valued, such residents have been found to idealize the rolling hills and scattered barns associated with small-scale farming. However, they often oppose the machinery and manure, and accompanying noises and odours, required to sustain these lands (Cadieux, 2005).

In changing rural communities, Parr (2010) characterizes residents' experiences in place as eliciting emotions that draw upon the wide range of senses. Dramatic land use changes have the potential to disrupt not only the biophysical nature of the landscape, but the social interaction of an area as well (Jacquet and Stedman, 2013; Anderson, 2013). Thus, changes, and even uncertain but anticipated changes, to residents' environments, such as facility siting and agricultural application of the biosolid product, can result in a reordering of the ways residents understand and act in place (Parr, 2010) considering that many residents move in to such places do so with idyllic and tranquil expectations (Cadieux and Hurley, 2011). Milligan (2007, p, 257) states "that how people experience places is inextricably linked not only to feelings and emotions *about* these places, but also emotions engendered *by* them". Landscapes are socially constructed and influenced by alterations in residents' daily interactions, thus individuals' place attachments and responses to changes in their community depend on the distinct community context and are unique and dynamic (Rose, 2012; Gesler, 2005; Conradson, 2005). This suggests that it is people's expectations and dynamic relationships with a place that impact their landscape experiences, and thus space and place are experienced subjectively and contextually. Literatures regarding place attachments and residents' sense of place are discussed in greater detail in Chapters Five and Six.



### 2.3.1 Sensuous and Olfactory Geographies

Senses including smell, touch, sight and hearing are integral to our everyday experiences. Porteous (1985) calls for the recognition of the changing role of senses in these everyday experiences, and acknowledges this in the field of sensual geography. Rodaway (1994, p. 26) describes how the “senses gather information but also contribute to the definition of that information, that is, participate in sense making”.

The sensorium and perceptions, are both a cultural and physiological formation that begins with the *social* body, as opposed to the individual body or biological brain (Howes and Classen, 2014). Just as perceptions are culturally mediated (Douglas, 1992), senses are also mediated by culture (Classen et al., 1994) such that there are “culturally-modulated ways of touching, tasting and smelling and culturally-meaningful textures, tastes and smells” (Howes and Classen, 2014, p. 4). Subsequently, smells of a certain concentration may not affect all people in the same manner (Classen et al., 1994). This is relevant to rural areas where the smell of animal manure is culturally mediated such that it intensely bothers some while reminds others of home. Similarly, the same smell may be more accepted in certain areas than in others, such as industrial odours being accepted in industrial locales and not in private space (Classen et al., 1994). Classen et al. (1994) describe this as creating conflict in industrial, agricultural or residential areas. This sensorium strongly develops our sense of space and character of place (Parr, 2010; Atari et al., 2011). The dynamic sensual experiences of a community or place attachment can greatly influence their perceptions of that community and/or a proposed facility.

An important direct impact that the Southgate Organic Material Centre may have on residents and their surrounding sensory environment is olfactory. Keeping in mind the multisensory integration of the senses (Howes and Classen, 2014) this research focuses on not only the impacts and perceptions surrounding facility odours but also on how these odours threaten residents’ broader embodied sense of place. The perception of

smell involves not only the odourous sensation, but the emotions and experiences associated with odours as well (Classen et al., 1994).

Smell can be an emotionally arousing sense that can strongly influence a person's perceptions as well as act as a warning device against contamination (Porteous, 1985; Parr, 2006). However, both ironic and concerning is the nature by which odours, or these warning devices, dissipate while source concentrations persist (Parr, 2006). The nature of odour as a warning device influences residents' risk perceptions related to the severity of emitted odour from the facility. Additionally, the importance of odour as an indirect annoyance mediated mechanism resulting in stress-related symptoms or heightened symptom awareness (Neutra et al., 1991) must be considered. Luginaah et al. (2002a) discuss how odour substantially contributes to lay judgements of environmental quality and health risk, which is linked to odours as warning mechanism discussed previously. Many studies have found that odour exposure is the most important predictor of annoyance and negative perceptions of the immediate environment. Luginaah et al. (2002a) found that higher degrees of odour annoyance was positively associated with heightened risk perceptions, which decreased with increased distance from the facility.

## 2.4 Risk Society and Facility Siting

"In the risk society the unknown and unintended consequences come to be a dominant force in history and society" (Beck, 1992: 22)

The concept of the risk society adds to our understanding of residents' conceptions of contested 'green' developments in the rural landscape by informing our understanding of the subjective nature of risk, uncertainty and the relative weight of risks and benefits. Risks are unavoidable in our modern society. They are a product of our industrialized nature and these risks or dangers no longer are limited in time and space, but continue to affect future generations (Beck, 1992).

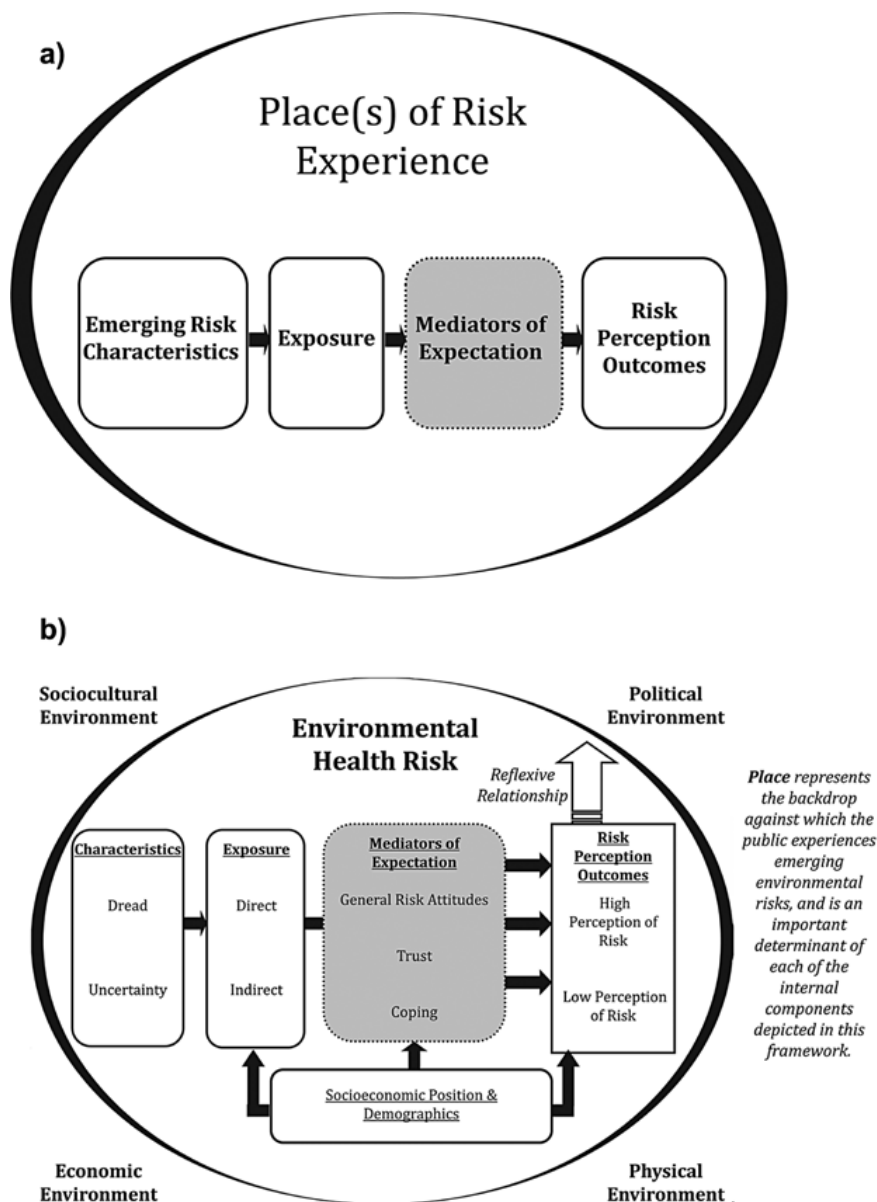
In contrast to risk, risk perceptions are intuitive risk judgments (Slovic, 1987). They are socially constructed and influenced by individuals' histories, beliefs and experiences as well as by one's cultural surroundings. Risks are multidimensional, all-encompassing and often difficult to detect. Whether or not we have an awareness of risks and dangers or their mechanisms of effect, dangers persist in our everyday lives. 'Riskiness' has a greater meaning to the general public than just the 'expected number of fatalities', which is how experts often define risk (Slovic, 1987). Individuals' risk perceptions are intertwined with their socio-cultural context and these risk perceptions influence how individuals evaluate and respond to risk. Thus, gaining a greater understanding of the perceived level of risk is crucial as it is these perceptions that individuals base their actions on rather than on the scientifically defined level of risk.

Social theories of risk involve both contextualist and individualist modes of explanation (Krimsky, 1992). Mary Douglas' cultural theory of risk accounts for judgments of risk and danger being intertwined with one's social context thus considering the role cultural differences have in influencing risk perceptions (Tansey and O'Riordan, 1999). Thus, the key question regarding risk must be: "how safe is safe enough for this particular culture" (Douglas, 1992, p. 41). Individuals are culturally primed with their assumptions and priorities and therefore do not make fully independent choices. Public perceptions of risk must "take account of persons' interactions with one another, their advice to one another, their persuasions and intersubjective mobilizations of belief" (Douglas, 1992, p. 40). Individuals then participate in continuous monitoring of the institution and decide whether to block or enable future action (Douglas, 1992). Risk perceptions are inextricably connected to place and to residents' place attachments. Because of this, each individual, in their own uniquely diverse social context, will perceive risk differently and thus increasing individual's knowledge about risk through risk communication strategies will not necessarily attenuate risk perceptions.

Risks are a product of our industrialized nature and these risks or dangers no longer are limited in time and space, but continue to affect future generations (Beck, 1992). Rural

communities have undergone social and cultural changes, which have altered overall expectations of the rural landscape making rural itself a social construction (Woods, 2005). With technological advancements and increasing demands of expanding urban populations, there have been an increasing number and scale of industrial technologies in these rural areas (Smithers, 2005). With the increasing use of technology, the potential of technologically related risks and hazards increases and due to the perception of human action, rather than natural historical risk (e.g. earthquakes), technological risks in these rural areas are viewed as both less tolerable and less justifiable (Wakefield and Elliott, 2000). Rural residents' differing degrees of risk amplification and acceptance is attributed to differing values and expectations of the rural landscape and increased community interaction within rural areas is also thought to impact residents' social constructions of risk.

Harrington and Elliott (2015) propose a relational framework (Figure 2-1) of risk perceptions combining both individual (e.g., exposure levels, mediators of expectation, dread and uncertainty) and contextual level (e.g., sociocultural, economic, political and physical environments) influences. This research likewise considers both individual and contextual factors to be influential in the formation and reappraisal of residents' risk perceptions and response to proposed and operational facilities. While this framework is linear and does not account for the mediating role place attachments play, I seek to contribute to it by accounting for the importance of residents' place attachments and feedback loops such as relational experiences and reappraisal that may be relevant.



**Figure 2-1 Harrington and Elliott's (2015) (a) structural and (b) relational frameworks of risk perception accounting for individual and contextual level influences.**

The study of risk perceptions within the rural context is a strong example of the ultimate ineffectiveness of risk communication strategies. Baxter (2006, p. 340) discusses how rural communities are especially tailored to the “direct spatially proximate interactions that facilitate face-to-face socially constructed meaning”. Notably, risk managers often assume that a community is one undifferentiated unit (Baxter, 2006). However it is

widely recognized that rural areas are comprised of a diverse mixture of residents with differing expectations of their community and desires for their way of life. This has resulted in intra-community conflict between blue-collar oldtimers and white-collar newcomers (Baxter, 2006), and between residents with conflicting ways of life (Baxter, 2006; Masuda and Garvin, 2006), or between groups with differing levels of place attachment (Devine-Wright and Howes, 2010). Increasingly diverse rural landholders generally possess different perspectives on the rural landscape, values, ways of life and political ideologies than multigenerational farmers (Cooke and Lane, 2015; Cadieux and Hurley, 2011; Soini et al., 2012), which has been found to influence cliques and defined social patterns within close-knit rural community structures (Jaquet and Stedman, 2013). If these residents have competing views and expectations for their community, no amount of risk communication is going to alleviate all concerns. Individuals are likely to put more weight on information regarding potential environmental and health risks and feel that these risks outweigh the benefits. Disseminating technical information does not account for the underlying social and cultural differences that influence the ways residents are evaluating the riskiness of the facility and biosolids in their community. Similarly, risk managers can adopt strategies of public participation and increase two-way communication. However, with heightened intra-community conflict and opposing expectations of the rural community, it is extremely difficult to address all stakeholders' concerns and accommodate such polarized views to mitigate negative risk perceptions.

Community opposition to stigmatized facilities is a challenge to new sustainable techno-industrial developments (Edelstein, 2004). While the emerging light cast on facility siting in rural places has historically and pejoratively been equated with the Not-In-My-Back-Yard (NIMBY) syndrome, NIMBY has been exposed in the literature as largely a political concept meant to undermine those opposing proposed developments (Wolsink, 2000). In general risk perception, facility siting and planning research has criticized NIMBY as being overly simplistic, which too easily glosses over the multifaceted nature of risk perceptions and the complexities of opposition (Wolsink, 2006; Devine-Wright, 2009;

McClymont and O'hare, 2008). While much attention has been paid to Locally Unwanted Land Uses (LULUs) or opposition towards facilities motivated by the 'Not In My BackYard' syndrome (NIMBYism), far less attention has been given to the proponents of such projects or the 'Yes, In Your BackYarders' (YIMBYs) or Yes, In My BackYard (YIMBYs) (Edelstein, 2004). Within the field of contested green developments research on support for renewable energy development, such as wind turbines (Walker et al., 2014) and waste to energy facilities (Baxter et al., 2016) is emerging. However these contested sustainable developments remain relatively underexplored. In response, this research contributes to an understanding not only of those who oppose this biosolid waste to fertilizer processing facility, but also those who fought for this facility in their community and the ways these polarized coalitions interact. The inherent dualism associated with contested green developments acts as a contextual backdrop of this facility siting debate.

#### 2.4.1 Risk Constructs

Risk perceptions are influenced by a number of social constructs: trust, equity, dread, familiarity and voluntariness. These five primary constructs will be discussed in greater detail. Additional characteristics influencing risk perceptions include catastrophic potential, and stigma of the risk, the gender and worldview of the individual, and the degree of public participation throughout the risk assessment. Slovic (1999) asserts that although these all have the potential to influence risk perceptions, no one characteristic is essential.

Which sources of information individuals choose to internalize and base their perceptions upon is strongly dependent upon their level of trust in each source (Frewer, 2003). Trust in risk managers is multi-dimensional, including concepts of 'honesty' and 'competence' (Frewer, 2003) and is influenced by a complex interplay of political, social and psychological factors (Kasperson et al., 2003). Failure to acknowledge the

importance of trust and its multidimensional nature can lead to rapid degradation of trust, heightened risk perceptions and increased public activism (Kasperson et al., 2003; Slovic 1999). Robinson et al. (2012) believe that trust is one of the most important factors influencing individuals' risk perception and responses to risk communication. Slovic (1999, p. 699) asserts: "There is no doubt that technical analysis is vital for making risk decisions better informed, more consistent and more accountable. However, value conflicts and pervasive distrust in risk management cannot easily be reduced by technical analysis". Hence, constructs, such as trust, influencing perceived risk must be realized and addressed throughout the siting process, in addition to 'scientifically defined risks', as it is these value-based perceptions that will influence public action (Halstead and Whitcomb, 2004; Robinson et al., 2012). Additionally, distrust tends to inhibit personal communication and interaction necessary to overcome distrust. This lack of trust can lead to the avoidance of others whose actions or motivations we distrust, which can in turn prevent individuals from getting to see if these 'distrustful' people are competent, well-meaning and trustworthy (Slovic, 2000). Regardless of the utilization of improved risk communication strategies, if stakeholders are distrustful of the individuals disseminating the information and attempting to facilitate two-way communication, risk communication efforts will be ineffective.

Just as equity is a social construct influencing risk constructions, interpretations of what 'equitable' means are also socially constructed. Baxter et al. (1999a) show how differential definitions of equity among expert and lay people is a point of conflict as one side may feel they are choosing the most equitable location for waste processing industries (such as located in agricultural communities benefitting from the end product) however the opposing coalition may have a different definition of what is equitable all together (whereby wastes should be processed in the urban region they are produced and not transported to rural locales). Prioritizing inter- or intra-regional equity over the other can also heighten conflict if opposition groups choose to emphasize the opposite. Beck (1992) places primacy on social context as he acknowledges that the distribution of risk contributes to heightened perceptions and



social conflicts. Similarly, Gregory et al. (2000) comment that concerns about the equitable distribution of risk can contribute to heightened stigma and risk perceptions. The production of food and energy for urban populations and the processing of urban wastes in rural areas highlights notions of rural environmental injustices that are often overlooked (Kelly-Reif and Wing, 2016). Traditional risk communication does not account for the subjective equitable distribution of risks and the role this plays in individuals' risk perceptions. Baxter et al. (1999a) additionally show that when issues of equity were present, public participation efforts acted to increase conflict and opposition as it created a forum for the opposition group to communicate and disseminate their heightened negative risk perceptions.

Dread risk is, "the extent to which the consequences of risk provoke fear" (Taylor-Gooby and Zinn, 2006, p. 400) and is characterized by its perceived lack of control, fatal consequences, catastrophic potential and dread (Slovic, 1987). Risks with high levels of dread can quickly propagate heightened risk perceptions through the heightened media coverage and large secondary and tertiary effects of these accidents and risks. Since this form of risk is often very rare, there are for example many assumptions and estimations made while calculating the risk of a nuclear explosion. The emotion provoking constructs of catastrophe and fatalities related to dread risk make heightened risk perceptions more inevitable and traditional risk communication strategies less effective.

In contrast to dread, familiarity describes the extent to which risks are seen as uncertain, unknown, novel or controllable (Taylor-Gooby and Zinn, 2006). Risk communication is difficult surrounding such uncertain or novel risks and similarly, it is difficult to confidently communicate risk when it is uncontrollable. Risks related to chemical technologies have higher unfamiliarity and thus evoke higher levels of perceived risk regardless of risk communication efforts in comparison to risks with greater familiarity (Slovic, 1987).

Slovic (1987, p. 282) states that "the public will accept risks from voluntary activities... that are roughly 1000 times as great as it would tolerate from involuntary hazards... that

provide the same level of benefits” to effectively demonstrate how voluntariness is a key mediator of risk acceptance. However, Douglas (1966) views pollution as a different source of danger and feels that the distinction between voluntary and involuntary is irrelevant. This is reflected in Douglas’ (1992) more recent work where she discusses the influential difference between the acceptability of taking risks and the unacceptability of exposing others to risk. Although two-way communication and increased public participation may be utilized to their full extent, if residents feel that they are being involuntarily exposed to the hazard or risk in question increased risk communication strategies are likely not to improve residents’ heightened risk perceptions.

#### 2.4.2 Risk Communication

Risk communication is a mechanism stakeholders, such as regulators, policy makers and proponents among others, use to attempt to communicate the actual risk of something. Experts utilize risk communication as an effort to ‘close the gap’ between themselves and the lay public. Experts generally believe that it is their increased knowledge specific to the risk in question that results in this gap between expert and lay assessment of risk and if they can just communicate this risk knowledge they will be able to reduce the public’s ‘irrational’ concerns.

This describes a knowledge-deficit model of risk or behaviour change, which assumes residents who perceive a higher level of risk than regulations suggest are lacking in adequate knowledge. However, recent research (e.g., Baxter et al., 2016, Walker et al., 2014; Baxter, 2006) has shown the most concerned people can also be the most informed. However, concerned residents often base their perceptions of risk on an alternate set of value claims, such as peace and quiet versus economic growth. While experts often use discourses to suggest that prediction of death rates is the only rational way to look at the world, a loss of faith in experts to assess rational decisions in inherently uncertain systems emerges.

This notion of flooding the public with information to increase their knowledge and subsequently decrease their heightened perceptions of risk is all too ideal. Just as risks are multidimensional so too are risk perceptions. Risks are socially constructed and are context dependent and risk communication efforts often fail to account for these contextual factors (Kasperson et al., 2003). Recent developments in risk communication are certainly an improvement towards addressing residents' concerns. However, these remain inadequate. Risk communication traditionally involved a paternalistic approach utilizing one-way 'monologues' of information, based on the above-mentioned knowledge-deficit model, and reinforcement of the certainty of risk assessments from experts to the lay public to better align lay understandings of risk with that of the experts. This has now been widely recognized to be fairly ineffective, although it is still adopted by a number of risk managers. More recently, risk communication strategies have evolved to recognize the importance of two-way communication and increased public participation (Bennet et al., 2010). These more 'negotiated' methods of risk communication have been argued to stimulate less controversy and disproportionate concern as well as be more effective in communicating risk (Bennet et al., 2010). To be effective, it is paramount that public participation begins simultaneously at the early planning stages of a project rather than nearing its completion (Kirkman and Voulvoulis, 2016). Robinson et al. (2012) comment that due to the nature of biosolids and wastewater management, community stakeholders expect early involvement in a public participation process and agree that consultation later on in the siting process is insufficient. This is described in Beecher et al.'s (2005) discussion of the ineffectiveness of the DAD (decide, announce, defend) approach to biosolid facility siting, whereby they commented that true public participation and earlier involvement of stakeholders were crucial to maintain trust and attempt to mitigate negative risk perceptions. Effective two-way communication and public participation strategies allows stakeholders to become empowered and for all sides to equally represent their opinions and concerns in an open manner (Bennet et al., 2010). Masuda and Garvin (2006, p. 437) comment that "risk communication then becomes a juxtaposition of contested ways of making sense

of the world. Different “sense-making” is inherently cultural, as each group seeks to advocate a view of risk that conforms to its way of seeing the world”. Thus, it is crucial to gain a better understanding of people’s differing values, worldviews and expectations for their community in order to attempt to address heightened risk perceptions, as it is these social dimensions of infrastructure siting decisions more often become key agents generating conflict, rather than the direct environmental impact of a proposed facility fueling conflict (Wolsink, 2009). There are a number of risk constructs, which influence risk perceptions, that are often inadequately addressed by improved risk communication. It is important to note that risk is a social construct, which is actively constructed in place. These combined further complicate and diversify individuals’ risk perceptions.

### 2.4.3 Differing notions of ‘Acceptable’ Risk

The uncertain and incomplete nature of scientific evidence allows the definition of what is an ‘acceptable’ level of risk to be contested thus contributing to differing risk perceptions. Mary Douglas (1992) notes that it is not about the reality of the dangers but how they are politicized and perceived. For example, Masuda and Gavin (2006, p. 451; 438) found that risks are “socially constructed according to a complex array of localized factors specific to cultural places” and are “situated within the social experience and interactions of individuals, groups, and institutions”. A viable model of perceived risk must account for culturally distinct attitudes to authority and social order. One-dimensional risk analysis is accused of crippling cultural bias (Douglas, 1992). Both Slovic (1987) and Douglas (1992) note that increased education and evidence, as well as better communication, are insufficient to improve negative risk perceptions and unlikely to reconcile differing opinions about risk.

Environmental issues are becoming increasingly complex and thus scientists must make predictions based on a greater level of uncertainty (Garvin and Eyles, 1997). This

concept of uncertainty is now at the core of science among the urgent environmental and technological decisions that must be made on a global scale (von Schomberg, 1993) and the same uncertainties persist throughout risk assessments. Thus, there is a persistent state of uncertainty and flux in the available knowledge defining risk probabilities. Given this, the limits of science leave room for results to be subjectively interpreted. Beyond the limits of science, policy making and risk assessments become claims-making activities (Aronson, 1984). This results in varying levels of confidence in the reliability of measurements and the ability to predict future risk, which subsequently leads to differently defined 'safe' or acceptable levels. Risk managers are often forced to draw a line between what is safe and unsafe, regardless of whether science can define the absolute risk. It is also worth noting that science is biased towards showing no effect through the scientific model of hypothesis testing, however the precautionary principle would assume no effect. This often results in heightened conflict and distrust since public perceptions of risk and its acceptable levels are 'collective constructs' (Hannigan, 2006). In this state of scientific uncertainty and interpretable results simply communicating that risks are well below regulated levels is not sufficient to alleviate individuals' concerns or mitigate their heightened risk perceptions. Without confronting these social and cultural constructs, risk communicators fail to address the underlying tensions and influences that determine one's perceived level of risk.

Societies are risk averse and if people experience risks as real, the consequences are real (e.g., actions of concerned citizen groups) whether or not they are objectively definable and measurable (Beck, 1992). This persistent risk aversion results in various publics acting on the presumption of lower levels of 'acceptable' risk than experts and statistical calculations might technically support. This arises from differing value-laden priorities and risk judgments and the embodied personal impacts of illness: "But our children... are not getting sick from the average value" (Beck, 1992, p. 61). Risk managers often communicate acceptable levels based on the average effects of a particular hazard, however parents are generally more concerned about the effects of the maximum levels on the most vulnerable members of society. Due to the perception of human action,

rather than natural historical risk (e.g., earthquakes etc.), technological risks are viewed as both less tolerable and less justifiable (Wakefield and Elliott, 2000). It can be difficult for individuals to accept an expert's assessment that there is no observed causality because there were not enough deaths or high enough rates of cancer to establish a well-defined causal relationship between a chemical exposure and their family's illness. This lack of acceptance is not irrational or unjustified. This can result in individuals feeling that no amount of chemical exposure is safe, regardless of what the regulatory agencies are saying. Similarly, Douglas (1992) agrees that there is a difference between agreeing on the technical questions and probabilities of risk and disagreeing on the acceptable margins of risk. Differing risk management paradigms, arising from socio-cultural differences, can result in very different definitions of the 'acceptable' level of risk or exposure.

Differing notions of what is an acceptable level of risk, within the context of persistent uncertainty, relates back to the differing place attachments and ways of life discussed earlier. Risk communication strategies have progressed beyond the traditional paternalistic model involving the one-way dissemination of risk information towards a more inclusive and empowering paradigm involving two-way communication and increased public participation. However, all concerns are still not being, and arguably cannot be, alleviated. Concepts of risk and thus formations of risk perceptions are social and cultural constructs.

## 2.5 Conclusion

The strong emotional attachments to, expectations of and interactions with rural areas better informs researchers of how rural residents form risk perceptions within this rural context, however knowledge gaps remain regarding an understanding of residents' diverse place attachments, perceived stigmas and the important influence of relational experiences in the rural landscape. The study of risk perceptions within the rural context

is a strong example of how risks and place are socially constructed. These influential place attachments and community interactions contribute to our understanding of the social construction of risk by emphasizing the importance individual differences and community and cultural context plays. However, what is less understood is how the social construction of risk and place interacts and influences community level interactions in diverse and evolving rural communities facing proposed techno-industrial developments. This research further extends the risk and facility siting literature beyond the study of hazardous and non-hazardous techno-industrial processing and waste facilities to contentious green developments perceived as sustainable and beneficial by some. Additionally, much attention has been paid to environmental and health risks, impacts and perceptions in the risk society and facility siting literature, however less research has been conducted examining the potential for sustained social impacts to community cohesion. Last, there is a relatively minimal body of literature comparing pre- and post-siting facility perceptions and experiences examining residents' reappraisal of contentious facilities. This research contributes to these gaps.

## Chapter 3

### 3 METHODS

This chapter provides a detailed description of the study methods to elaborate on the relatively brief individual methods sections included in each of the integrated manuscripts that make up the thesis. Similar to the research context, much methodological detail, in particular my role in the research, has been left out of these articles. Further, while the four following chapters are presented as separate entities they were certainly part of a larger research process. Thus, the goal of this chapter is twofold: first it allows for a reflection of my researcher positionality and the impact my dual role as both community member and researcher had on this research; and second, to provide a more depth discussion of the methods underpinning the research, including participant recruitment, data collection and data analysis, to provide the reader with a more holistic understanding of the research methods.

#### 3.1 Researcher Positionality

I was born and raised in Southgate – the case study community in this thesis - and apart from moving away for university, I had lived the first 23 years of my life in the community. This adds a unique dimension to my research as I was an “insider”, being both a community member and a researcher. As a member of the Southgate community my role as a researcher required bracketing and persistent awareness of my position and influence in the research. My role as a community member has had its impacts on both my research and myself, and this is discussed in depth in Mason et al. (2016).

I began this research as I watched my community become torn with conflict and I became disheartened by how residents who I personally knew came to publicly argue



with each other, in person and through the media, over their feelings towards the proposed biosolids facility, the municipal council and each other. This research has been an opportunity to better understand what was and is happening in this tightly knit community so that other communities and planners alike could learn from Southgate's experiences and the seemingly unanticipated level of conflict that arose while contributing to an understanding of the underlying contributing factors and issues which resulted. I have drawn on open reflection, bracketing and notably a recognition of and respect for the legitimacy of residents' felt concerns (something I embodied from the onset of this research) and the importance of better understanding such contentious situations. As a means of transparent reflexivity, this section continues with somewhat of an autobiographical reflection on my own positionality and the impact my role as both researcher and community member may have had on the research. Autobiographies are recommended to enhance researcher reflexivity and a self-awareness of bias throughout the research process.

I hesitate to write an autobiography, wary that some community members reading this thesis may misinterpret or misunderstand my views as written in stone and unchangeable. As we learn and experience new things, we cannot help but evolve our opinions alongside. I will admit that I began this research valuing the diversity of perceptions and importance of sociocultural context, but without a doubt my appreciation and the weight I place on this subjective experience of risk has increased as I come to better understand the experiences of my community and continue my research in the social sciences more broadly. Although I may not share the opinions of everyone in the community or with all participants, which are seemingly impossible given the intra-community conflict, this does not mean that I do not understand, respect and empathize with their feelings surrounding the changes in the community.

As an academic and someone with training in biology, I cannot help but value research and scientific findings. I accept that there is uncertainty in all science and that as we answer one question we uncover ten more. A part of continual learning is uncovering

more 'holes' in your knowledge and as we develop better testing and monitoring technologies we uncover more that we were previously unaware of. As a young person, I care for the future of our environment as well as my (and my future community's) long-term health. With our increasing population, we need to deal with waste in a more sustainable manner, helping to deal with the continual accumulation of waste products that we have experienced in the past. If we can move towards recycling and closed-loop practices, we will leave future generations less burdened with our past mistakes and volumes of waste. However, recognizing scientific uncertainty, it is not always possible to move forward with 100% safety guarantee. Given this, I do not believe that the answer to uncertainty is 'no' or calls for all out moratoriums. However I also do not believe that we should plough through and plan to clean up and fix our mistakes later when they arise. A degree of hesitation and precaution has its value in protecting our future environment and health, yet it is this 'precaution' that is often used by both sides.

As a young person, there is concern for quality job opportunities and economic viability for youth to remain in their communities, rather than continuously migrating to urban centres where much of the current opportunities exist. Without economic viability, communities are unlikely to sustain themselves or may become havens to wealthy commuters or retirees with outside sources of income. In accordance with the 'triple bottom line' framework. However, if a community does not maintain its environmental or social sustainability it is similarly unlikely to sustain itself. Most rural residents do not want to live in these communities for the economics alone, but often for the lifestyle and sense of community these locales offer. Given this, achieving economic gain at the expense of residents' quality of life and sense of place is not the answer either. The social strengths and sense of community are particularly important in a rural community where many residents often choose to reside in such an area valuing this at the expense of many amenities and economic opportunities. The desire for residents to protect their local landscape while others advocate for local industry and job opportunities must both be respected and risks and benefits balanced.

Throughout this research I have been reflexive of the ways my positionalities both about the OMRC and the community as a whole have evolved. In many ways, I have been just as impacted by the many changes that have occurred as others have as this was my community too. Early in the research process, I was involved with a Public Liason Committee as a community volunteer (joined before beginning my graduate studies). While my thesis advisory committee had discussed my role in this as a non-issue, later perceived conflict from some opposition community members led me to withdraw my involvement from this committee. Similarly, once the research process began, I did not publicly express my opinion about the changes occurring in the community to avoid perceived bias among potential participants. While this was certainly a disadvantage from a personal and community perspective, this was seen as best for the research process. I do not believe that anyone can be involved in such depth research without having their personal opinions and emotions. However, I agree that it is important to attempt to keep these as separate from the research process as possible. I hope that my self-awareness and ongoing reflection of personal biases has helped to minimize the impact this may have had on the research process and outcomes.

### 3.2 What Impact has my role as both community member and researcher had on the research?

While the previous section openly outlined my experiences and described my positionalities relevant to this research, this section discusses debates regarding insider research and describes advantages and disadvantages as they relate to my research.

Insiders, or emics, have been defined as members of specific groups or collective social statuses (Merton, 1972), “individuals’ who possess *a priori* intimate knowledge of the community and its members” (Hellawell, 2006) as well as a shared identity, language and experiential base with participants (Asselin, 2003). Recently, insider research, whereby the researcher shares insights or “common wounds”, may be viewed as both

more desirable and legitimate, whereas previously outsider, objective, research was privileged (Gair, 2012).

As an emic researcher, my insider status led to many advantages that strengthened my research and resembled many of the strengths discussed in the literature. As a researcher, having an insider role commonly allows researchers more rapid and complete acceptance into the community (Taylor, 2011; Dwyer and Buckle, 2009; Innes, 2009; DeLyser, 2001). The commonalities that researchers share with their participants can provide access into groups, where these individuals may be more willing to share their experiences based on assumptions of understanding and shared distinctiveness (Dwyer and Buckle, 2009). Similar to Dwyer and Buckle (2009), I had participants state they would not have discussed their feelings with me had they not had some familiarity with me. This is also described as the increased disclosure and reduced inhibition of the participants (DeLyser, 2001).

An insider's commitment and personal responsibility to the community can create complex issues involving both advantages and disadvantages. This can be seen as a positive aspect of qualitative work, but can also result in the research becoming deeply entangled in your personal life (DeLyser, 2001). When there is an active relationship with the community, there is never a question of doing "hit and run" fieldwork (DeLyser, 2001). However, the complexities of feeling personally responsible to every participant and trying to represent all views can be overwhelming. Taylor (2011, p. 14) speaks to this: "I have, at times, found it difficult to manage the delicate balancing act of academic credibility and friend/community accountability". One participant lamented on the personal responsibility I must feel in representing individuals' views and opinions in a truthful manner because *I am the one who has to return to the community and live with these people*. This increased his trust towards me as a researcher, eventually leading to his decision to participate, and I feel it has increased my accountability and the credibility of the research as well. While at times this has felt like somewhat of a burden as I found myself lamenting over the small details and nuances as I attempted to

communicate the findings of this research within the space constraints of the typical journal publication, this has ultimately led me to continuously reflect upon the accuracy that my research outputs represent. However, rather than decreasing the rigor, the accountability in knowing that you will often remain friends with your interviewees and they will read the published results and see how they are represented is a strong point of insider research (DeLyser, 2001).

Insiders possess a contextual understanding of their study community that outsiders do not have (Innes, 2009). Taylor (2011) describes how the researcher is cognizant to undocumented historical knowledge pertaining to both the people and cultural phenomenon being examined. These contextual insights allow the researcher to develop better research questions challenging preconceived outside notions, however others critique this as having 'blindness' whereby the researcher may be less likely to challenge local norms (Innes, 2009). However, insider scholars challenge outsider research for its propensity to ignore, silence or diminish insider or local perspectives in a colonial manner (Innes, 2009). Witcher (2010) also describes the benefits during the transcription process as an insider, since you are knowledgeable, because of your contextual experience, of the local language including unique terms and phrases that may be used. This in his mind improved the rigor of his study by avoiding misinterpretation or misrepresentations of phrases with nonstandard meaning (Witcher, 2010). Now that I have had the opportunity to participate in additional research projects where I was an outsider, I appreciate the benefits that accompany an insider's increased contextual understanding of the community.

Insider research has been critiqued on the grounds that insider's closeness to their study community can cloud their views leading to biased results and questions of validity (Innes, 2009). When considering objectivity, there is a great deal of debate as to whether this is even a desirable characteristic. Innes (2009, p. 446) believes that "insider researchers reject notions that research can be objective and bias-free, that they have to distance themselves from the research groups". When the local context is well known

to the researcher, issues regarding objectivity may arise, whereby a researcher's past experiences, expectations, beliefs and emotions can impede the detachment that is necessary for objective data analysis (Asselin, 2003). However, I would argue that if objectivity is never the goal of the research nor is it claimed in the findings then the lack of distance is less of an issue. I question how any graduate researcher can devote this much time and energy into a project if they truly have no interest in contributing to a better understanding of and knowledge regarding their field of inquiry. The important aspect is to maintain an awareness and reflexivity of your positionalities throughout this process. Asselin (2003, p. 100) cautions: "bias and issues unique to insider research can occur that put the trustworthiness or validity of the study at risk". However, Native American researchers disagree that insider status weakens the validity of their findings and view the closeness in their insider-based research as an enhancement (Innes, 2009).

The advantages of insider research are juxtaposed with a number of disadvantages that can arise throughout the research process. Issues of validity, trustworthiness and objectivity arise as well as assumptions about culture, issues surrounding participant perceptions and expectations, role confusion, and difficulties with the interpretation and analysis process. While some residents, both in favour of and opposing the facility, welcomed the opportunity to share their experiences and feelings, some others did not throughout the siting process. There was an existing pervasive distrust of research and regulatory agencies among some members of the community, particularly among those opposing the facility, throughout the siting process and this was projected towards my research as well both by some activists abstaining from participating in interviews for fear of subpoenaed interview transcripts in their ongoing legal case against the municipality (Mason et al., 2016).

It is worth noting that during the second stage of my data collection, I did not experience the same degree of hesitation to participate among residents. With the facility now being operational and with all legal cases settled this may have alleviated some residents' concerns that 'confidential' research transcripts could be subpoenaed

for legal purposes etc. as some expressed during the first stage of data collection. While a few residents, most notably those who attempted to censor my research initially, still refrained from participating, I feel that I was able to speak with other residents who expressed similar concerns and so those views are not entirely missing from the findings presented in this research.

### 3.3 Participant Recruitment and Data Collection

The complex and dynamic nature of residents' emotional responses to their changing environments and place attachments calls for in-depth data collection. This research used in-depth interviews with adult Southgate residents to examine residents' experiences with the facility in question as well as in the community more broadly both during the siting of the facility (2012) as well as three years after the facility became operational (2015-2016) to compare how community experiences had evolved. As suggested by Baxter and Eyles (1999), this method allows for a better understanding of the multiple meanings of risk in the context of residents' everyday lives, rather than a focus on the hazard characteristic alone. Semi-structured dialogue extends beyond expressed concern, helping to uncover deeper issues of contested ways of life and community expectations and values (Baxter and Eyles, 1999).

The first stage of interviews was conducted during the summer of 2012, between June and August, during the very contentious facility siting process. This allowed me to investigate residents' perceptions in a state of uncertainty, rather than their perceptions of an established facility as has commonly been done before. Purposive snowball sampling was used and sampling continued until saturation was reached (Strauss and Cobin, 1990). Key informants purposively contacted to begin this 'snowball' process included a local farmer, who had publicly supported the facility and expressed interest in the product, a local municipal official, a leader involved in the opposition movement against the facility, as well as a local business person, who had expressed both concerns

and support for the facility. This was done to ensure a diversity of participants. Respondents were then asked to refer an individual who has an opinion on the topic, but may not necessarily feel the same as they do.

Each interview began with an overview of the letter of information, a discussion of broader research goals to alleviate any concerns participants may have had. I was solely responsible for contacting potential participants as well as conducting each interview. A semi-structured interview guide (Appendix B) was used to examine residents' environment and health risk perceptions, community attachments and expectations, and the ways their landscape was perceived to (positively or negatively) impact their wellbeing. While similar topics were discussed in each interview, the semi-structured reflexive process as well as my increasing comfort in conducting qualitative interviews and familiarity with the interview guide allowed for a more conversational style of interview guided by participants' focus on the topics being discussed. Residents were typically interviewed at their homes (n=19) or in private meeting places of their choosing (n=4). Discussions ranged in duration from 14 minutes to two hours and on average interviews lasted 42 min.

Of the first cohort of participants, nine opposed the facility, seven were in favour and seven expressed both benefits and concerns – I label this group as 'undecided'. With the heightened community conflict and an ongoing legal case between the municipality and this group, some members of the opposition group abstained from participating due to pervasive distrust in the broader research process and confidentiality (described both above and in detail in Mason et al., 2016). Participant characteristics are presented in Table 3-1.

Following facility approval the OMRC became operational in the spring of 2013. The second phase of this comparative research similarly involved semi-structured qualitative in-depth interviews (n=16; Interview guide included in Appendix C) with community members to examine residents' experiences with community change and living with the OMRC as well as reflections on the siting process itself and any residual impacts that



may have followed. These follow up interviews were conducted between November 2015 and February 2016, nearly three years after the facility had become operational and fertilizer product was being applied to local agricultural land.

**Table 3-1 Participant characteristics by interview phase and general opinions of the OMRC.**

Characteristic	Siting Phase (2012) (n=23)			Operational Phase (2015 – 2016) (n=16)		
	Opposed	Supportive	Undecided	Opposed	Supportive	Undecided
<b>Sample size</b>	<b>9</b>	<b>7</b>	<b>7</b>	<b>2</b>	<b>12</b>	<b>2</b>
Changed Opinion Since Siting Phase (Previously Uncertain; Previously Opposed)				0	5 (4;1)	2 (0;2)
Females	5	4	3	1	4	1
Dundalk residents	7	1	2	2	4	2
Involved with local agriculture	1	7	3	0	9	0
Age						
18 – 35	2	2	0	0	2	1
35 – 50	3	1	5	0	4	1
50 +	4	4	2	2	6	0
Mean number of years in community (moved in last 25 years)	23.2 (6)	33.1 (2)	37.8 (1)	37.5 (0)	38.5 (3)	26.5 (1)
Lived whole life in community	1	4	2	0	6	1
Education						
Some/completed high school	3	0	1	1	3	0
College/trade school	4	5	3	0	5	1
University	2	2	3	1	4	1

Similar to the first round of data collection, purposive snowball sampling was used until saturation was reached. Key informants with a range of views were purposefully selected such as opposition leaders, farmers who have used the product and residents involved in the siting process. Again, these residents were asked to refer other interested residents who may have different views or experiences. During the second round of interviews I aimed for a sample that included both participants that took part in the 2012 study (n=4) and new participants (n=12). This was done to check for possible over-reporting from the previous participants as they may have been well-informed or already sensitized given they had been asked several questions related to the facility in the first round. Further, this allowed for the investigation of farmers' experiences using the product, a participant group that was less represented in the first stage of data collection. Follow up interviews lasted an average of 64 min.

During the second stage of interviews, participants were mainly (n=12) supportive of the facility, however five expressed being either previously opposed or uncertain of the facility. Two participants remained opposed and another two who previously opposed the facility are somewhat uncertain due to long-term concerns.

No new residents who had moved into the community after the OMRC became operational were interviewed. While this may be seen as a limitation, the objective of this research was to compare community experiences with and opinions of the facility both during the facility siting and operational phases and to better understand residents' reflections on the siting process, and thus I do not make claims about how new residents perceive the operational OMRC. Also, newcomer residents may be less socially connected in their new community and thus may not have emerged in a snowball sampling network<sup>1</sup>.

It is worth noting that one resident interviewed in the first round did not want to participate in the follow up stage of this research as he did not want to discuss the OMRC. He commented that they are stuck with the facility and its potential long-term impacts now and it only stresses him out to think about it so he tries not to. This could be seen as another limitation to this research that residents fail to see a benefit to their participation and so pull back from the process as well as from surrounding community members who support the existing facility.

### 3.4 Data Analysis

Throughout both data collection periods, I transcribed interview audio recordings and field notes verbatim, examined them for accuracy, and conducted preliminary analyses to ensure familiarity with the data. Interviews were transcribed as they were completed

---

<sup>1</sup> The 2016 census of Canada indicates a 2.3% population increase in the Township of Southgate between 2011 and 2016. However, at the time of publication migration data was not yet released to determine overall in- and out-migration in Southgate.

and then read such that early interviews informed later ones and allowed for further investigation of emergent themes.

Analysis was informed by Guest et. al.'s (2012) inductive applied thematic analysis, which is rooted in phenomenology and grounded theory. Computer assisted qualitative data analysis (CAQDA) was conducted using QSR NVIVO for Mac 10 (herein after referred to as NVIVO) qualitative analysis software. The analytical process was not reliant on auto-coding tools and other mechanisms critiqued with CAQDA; NVIVO was merely used as an organization and recall tool to assist with the management of a large dataset. Transcripts were analytically coded in vivo using NVIVO and key themes were identified following exploratory analysis. NVIVO aided in the organization of codes and nodes and assessment and further analysis of key themes. Data was coded both systematically when questions from the interview guide were answered to allow for quick recall of similar responses across participants, as well as thematically as guided by applied thematic analysis. Data was coded to multiple nodes if multiple themes were addressed simultaneously. Nodes and child nodes were reviewed to ensure similar concepts were coded in the same thematic category. Direct quotations from the interview transcripts demonstrate key themes, serve to contextualize responses, and act to maintain respondents' voices in the interpretations. To enhance analytic rigor (Baxter and Eyles, 1997), researcher triangulation, long-term field exposure, and ongoing researcher reflexivity were utilized. To protect anonymity of the respondents in this community, pseudonyms were utilized.

## Chapter 4

Conceptualizing Waste as a Resource: Urban Biosolid Processing in the Rural Landscape

Sarah Mason-Renton<sup>1\*</sup>, Isaac Luginaah<sup>1</sup>

1. Department of Geography, The University of Western Ontario

\*Doctoral Candidate

Under Review: *The Canadian Geographer*

## 4 Conceptualizing Waste as a Resource: Urban Biosolid Processing in the Rural Landscape

There is conflict in rural communities between those who view 'rural' as a resource, equating it with food, agriculture, and primary production, while others view the 'rural' as pastoral countryside, a place of tranquility and an escape from the urban. Yet, with increasing urbanization, the treatment and disposal of municipal sewage or biosolids is emerging as another area of controversy in the global waste management conundrum. Using in-depth interviews (n=23), this paper examines narratives around the 'waste' versus 'resource' debate in relation to urban biosolids in rural Southgate, Ontario. The research reveals the importance of residents' conception of biosolids with the positive perception of its resource properties clashing with the negative perceptions of biosolids as nothing more than a nuisance and a waste product imported from elsewhere. Overall, residents' scalar conception of place as either relational or as a container emerged as a key factor in the dualism of residents' views of biosolid land application. These differing perspectives propagated community conflict that seems to be impacting overall community wellbeing.

### 4.1 Introduction

With population growth, urbanization and improved living standards, urban regions globally are increasingly producing more waste, including municipal solid waste, organic food waste, and wastewater and sewage sludge by-products. These waste products are often stigmatized as nothing more than a waste that needs disposing of. However, with the drive towards a circular economy, the beneficial reuse of waste, for example sewage biosolids, as resources or inputs for other processes, have been recognized globally as a paradigmatic change towards 'treatment for reuse' and nutrient and energy recovery (Drechsel et al., 2015). This call for a paradigm shift, where sewage sludge is no longer seen as a waste but a resource, has been increasing over the last 30 years (Morales and

Oberg, 2012). Recently the increasing amount of sewage sludge products from urban areas has resulted in confrontational debate regarding how to handle this waste. For instance, the EU, USA and Canada combined produced approximately 16 million dry metric tons of sewage sludge annually and this volume continues to increase (Sagasta et al., 2014). Consequently, the basic land application of sewage sludge is no longer considered to be a sustainable disposal option. However, with proper treatment and processing, biosolids (processed sewage sludge), rich in nutrients and organic matter, are considered a valuable fertilizer product for agricultural use (Joo et al., 2015; OMAFRA, 2010). In fact, in the context of increasingly stringent regulations, Tyagi and Lo (2013) discussed the value of the high energy and nutrient content of biosolids and how some stakeholders are changing their standpoints to consider sludge a viable resource instead of a waste. Concomitantly, the need to examine better ways to safely reuse or extract nutrients from sewage sludges has been increasing in the context of rising fertilizer and 'peak phosphate' prices, whereby the price of mineral phosphate (a primary nutrient in biosolids) increased ten-fold in 2007 – 2008 (Gregson et al., 2015). Invariably, scientists now suggest we have reached a 'soil crisis' (Koch et al., 2013), and the organic carbon present in biosolids is a valuable resource for revitalizing soil health and improving its resiliency (Youngquist et al., 2015). These emerging challenges inflamed Peccia and Westerhoff's (2015, p. 8275) call to "demand more of sewage sludge".

While there is a general consensus among the wastewater treatment experts worldwide that sewage sludge is a good source of valuable resources (Tyagi and Lo, 2013), not everyone is as accepting of the treatment and reuse of these 'waste products' on their land or in their community (Beecher et al., 2004; Jones, 2011; Lowman et al., 2013; Peccia and Westerhoff, 2015; Dijkema et al., 2000; Beecher et al., 2005; Robinson et al., 2012).

For decades, biosolids have been applied on farm lands in Ontario, Canada (OMAFRA, 2010). Yet, public acceptance and social feasibility remain major issues for the

implementation of sewage sludge processing technologies, which are often touted as green and sustainable (Tyagi and Lo, 2013). This research examines residents' responses to the treatment of urban biosolids in rural places for reuse as fertilizer on agricultural lands. Previous studies have examined the risk perceptions surrounding biosolid disposal and the land application of lesser quality products (Robinson et al., 2012; Goven and Langer, 2009; Beecher et al., 2004; 2005). What has not been fully examined is the marketing, sale and use of biosolids as a transformed fertilizer resource rather than merely the disposal of a waste product. Thus, this research contributes to this gap in the literature by showing the impact on community dynamics, as well as how communities conceptualized geographic scale as it relates to whether biosolids are a waste or a resource.

This research moves beyond the traditional risk perception literature to examine residents' responses to regional biosolid processing facility within their locale. Through a case study of a proposed biosolid to fertilizer processing facility in the Township of Southgate (herein after referred to as Southgate) in rural southwestern Ontario this research investigates (1) the waste and resource narratives respondents utilize to describe biosolids and (2) the role of relationality and scale in the underlying debates surrounding biosolid recycling, rural sustainability and rural distributive justice.

In developed countries, rural communities have undergone social and cultural changes, which have altered overall expectations of the rural landscape making rural itself a social construction with various conceptions in the eyes of the beholder (Woods, 2005; Richmond et al., 2000). Rural and urban spaces are entangled in complex and largely unequal processes often overlooked in environmental justice studies (Pellow, 2016). Further, the inevitable dependencies between these seemingly distant rural communities and their urban regional neighbours may have implications for how community members react to the perceived inequitable intrusion of risks from urban areas (Paquette and Domon, 2003; Richmond et. al., 2000). The changing demographics and changing expectations of the rural landscape may also be resulting in negative

perceptions and increasing opposition towards urban and regional biosolid processing and use in rural landscapes (Goven and Langer, 2009). This may be impacting the overall rural response to biosolids and an increasing awareness by non-agricultural rural publics. While we are often aware of the ways the flows of goods and commodities connect people and places, wastes and its by-products arguably link these as well, however the latter is often overlooked or forgotten (Moore, 2011). Newcomers to rural landscapes are often less tolerant of intrusive industrial activities as they seek to escape the 'urban problems' they migrated away from (Masuda and Garvin, 2008). Consequently, the siting of a biosolids facility, the Southgate Organic Material Recovery Centre (OMRC) in Southgate Township (Fig 1) in rural Ontario has resulted in an intense debate among lay community members, local municipal officials, industry, and regulatory bodies and this research draws on concepts of political ecology and scale to examine how these diverse rural communities are responding to and valuing (or not) biosolids as a resource.

#### 4.1.1 Theoretical Underpinnings of Waste as a Resource

A political ecological lens helps us to examine the intrinsically political and scalar nature of a problem, such as biosolids management, that has environmental, economic and social influences with no clearly defined solution, yet is dependent upon different perspectives and social constructions and operative across various scales.

Environmental and social changes are a result of the interaction of environmental and political forces as well as the actions of various social actors operating across different scales. The collective and individual experiences of biosolid processing and land application as a fertilizer resource are dependent upon core values, experiences and expectations with local and regional political dynamics. Rural residents' differing degrees of risk amplification and acceptance is attributed to differing values and expectations of the rural landscape, local and regional political influences, and increased community interaction within rural areas (Mason and Luginaah, 2016; Baxter and



Greenlaw, 2005). This notion of biosolids as a beneficial resource contrasts much of the public's responses to biosolids as a waste that is intrusive or out of place. Wastes are often viewed as something largely external to society and through the lens of wastes as a hazard, the uneven distribution and disposal of these materials becomes political and frequently at the forefront of debate (Moore, 2012). Morales et al. (2014) describe how people feel it is their right to expect disassociation from their waste to the point of its invisibility – “one expects one's involvement with one's shit to end with the flush of the toilet, eliminating waste from one's life” (Morales et al., 2014: 2828).

According to Parizeau (2015), the desire for physical and mental distancing from one's filth and its management has led to the undervaluation of potentially recoverable waste materials such as contested organic food wastes. This has implications for the ability of any industry dealing with biosolids to emphasize the resource properties of this waste. This duality of biosolids as both a waste and resource highlights the political, economical and socially constructed nature of individuals' responses. We examine the narratives surrounding this seemingly stark dichotomy and the influence this has on participants' responses to biosolid management and recycling within a local context.

#### 4.1.1.1 Regional Waste Processing and Politics of Scale

When examining the local effects of extra-local processes and their by-products, the issue of scale “as a way of knowing the world” and its associated politics becomes unavoidable (Kurtz, 2003: 893). To some, place refers to the local container and is rooted in an inward-looking history and to others place represents a grounded yet relational site of local-global interaction (Harvey 1993; Dirlik, 1996; Biersack, 2006; Massey, 1994). Differing constructions of scale can be used as a tool to examine community struggle over noxious facility siting (Kurtz, 2003). Scalar narratives of place are socially constructed, contested and historically contingent, which reveals the complex and interconnected social, institutional and ecological scales resource

management policies and processes operate within (Chambers and Sandberg, 2007; Zulu, 2009). The political and social constructions of scale and place help to explain conflicting perceptions and responses to proposed developments that are interconnected with residents' values, place attachments, and views of their community.

Themes of industrial intrusion and rapid large-scale change more broadly give insight into why some residents are experiencing impacts, depending on their attachment to place and sense of their locale, and thus are eliciting strong emotional reactions (Devine-Wright and Howes, 2010). Just as identities and place attachments are relational constructs, so too are space and place (Massey, 2004). Regions are no longer considered fixed geographic scales but as relational and political constructs (Jonas, 2006) and this research examines this locality debate surrounding residents' subjective conception of place as a container or as relational and thus what is a part of or intruding into their locale.

With technological advancements and increasing demands of expanding urban populations, there has been an increasing number and scale of industrial technologies in rural areas leaving many residents to feel that they are at the mercy of one noxious development after another, which are there serving to benefit surrounding urban regions while concentrating risk (such as pollutant exposure) within these rural communities (Smithers et al., 2005). This rural lens in environmental justice literature has been largely overlooked, however has been recently regarded as a vital area of emerging scholarship because "the integrity and future of rural spaces has never been at greater risk" (Pellow, 2016, p. 382). Rather than the traditional focus of environmental justice literature centred around impoverished and racially marginalized populations, this distributive lens of the material relationality and contested disproportionate burdens of urban wastes is important and timely (Ashwood and MacTavish, 2016). However, what is interesting in this research is the disputed nature of

processed biosolid fertilizers not as intruding wastes but as resources which belong in the rural landscape.

The preceding theoretical constructs are used to explore Southgate residents' conceptions of biosolids as a waste or resource and the utility of residents' conception of scale and relationality for explaining these responses. This research contributes to an emerging body of literature on the contested nature of green developments as well as conceptions of rural environmental injustices and relationalities.

#### 4.1.2 Biosolid Recycling in Ontario, Canada

In Ontario, Canada, biosolid management is regulated by the Ontario Provincial Government under the Environmental Protection Act (EPA) and the Nutrient Management Act (NMA), while the sale of fertilizers is regulated federally by the Canadian Food Inspection Agency (CFIA). The EPA governs non-agricultural aspects of biosolid management that occur following treatment at waste-water treatment plants such as incineration, hauling, storage, landfill and application to non-agricultural land. As biosolid land application is a form of nutrient management it is governed under the NMA as a non-agricultural source material (NASM) with prohibitions, separation distances and crop waiting periods. The key properties assessed by biosolids analyses include total solids, the pH, pathogens, nutrient content, and 11 trace elements (for a more detailed description of these properties as well as maximum acceptable concentrations see OMAFRA, 2010). Other contaminants of concern in biosolid products include the potential for dioxins, PCBs, pharmaceuticals and detergents, however according to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) these are found to be at very low concentrations, which are further diluted following low rate, controlled agricultural land application (OMAFRA, 2010).

Supporting the paradigm shift towards beneficial reuse and nutrient recovery (Morales and Oberg, 2012; Drechsel et al., 2015) OMAFRA (2010) argues that biosolids, or by-

products of food consumption, should be returned to rural lands for nutrient recycling as the landfill and incinerator are viewed as a 'dead-end' for these valuable organic nutrients. Furthermore, as other disposal alternatives, such as dumping septic sewage in to oceans and waterways, are deemed unacceptable and urban wastewater treatment facilities are tasked as populations rise globally and the notion of beneficial re-use and biosolid recycling, rather than simple disposal, is encouraged. This is particularly relevant in the Canadian context whereby rural agricultural land is abundant, urbanization is intensifying and the demand for production of higher yield, more nutrient demanding cash crops is increasing. In this context, OMAFRA is advocating for the land application of these valuable organic nutrients and the proportion of land-applied biosolids is increasing. This application of urban biosolids onto agricultural land results in this product being transported mainly from urban areas to rural spaces for further processing and disposal. While seen as beneficial re-use by some, this practice has not been without its controversies at the local and regional levels.

The OMRC, a regional biosolid processing facility, recently went through a very contentious siting process (2011-2012). This facility accepts sewage biosolids from municipalities across Southern Ontario, including Toronto, and then processes this waste into an agricultural fertilizer product that is sold locally. The intent of this facility was not to treat the rural community of Southgate's waste, but to operate and process regional waste by-products and market the fertilizer to Southgate farmers and those in surrounding municipalities. The OMRC was initially proposed in June 2011 and became operational in the spring of 2013 after a great deal of opposition and intra-community conflict (for a timeline of the siting of this facility as well as an in-depth discussion of community characteristics see sections 1.3 and 1.4 above).

The end product examined in this research, produced at the Southgate OMRC, has been approved by the CFIA, under the Fertilizers Act, as a fertilizer that can be sold based on the quality of its nutrient and organic properties (Lystek, 2015). The CFIA certification allows the facility to market and sell this product as a soil fertilizer amendment rather

than dispose of it as a NASM waste product. This has resulted in heightened debate in the community about when these biosolid 'waste' products truly become a resource, as is examined in the results.

## 4.2 Methodology

The complexity of the perceived risk and social processes calls for in-depth qualitative exploration and analysis of community perceptions. Therefore, this research utilized in-depth interviews (n=23), which were completed between June and August 2012. This qualitative methodology allowed for an in-depth understanding of how residents' respond to and perceive risks surrounding the processing and land application of biosolids within their locale; and to explore more deeply the associations between biosolids as a waste or resource and residents' overall perceptions as well as how residents are dealing with uncertainty regarding the health and environmental impacts of biosolids. This research was conducted during the OMRC's facility siting process to investigate residents' initial perceptions based on historical experience and a proposed facility, rather than residents' perceptions of an established facility, as is commonly examined.

Snowball sampling was utilized and sampling continued until saturation was reached (Strauss and Cobin, 1990). To ensure a diversity of participants, one local farmer supportive of the facility, one local municipal official, one leader in the opposition movement, as well as one local business person who had expressed both concerns and support for the facility were purposively contacted to take part in the study. Typically, residents were interviewed at their homes or in private meeting places of their choosing and interviews lasted 42 min on average. Participants included nine who opposed the facility, seven who supported it and seven who expressed both benefits and concerns – I label this group as 'undecided'. With the heightened community conflict and ongoing legal case against the municipality, some members of the opposition group abstained

from participating (described in detail in Mason et al., 2016). Interviews and field notes were transcribed verbatim, examined for accuracy, and emerging themes were analyzed using NVIVO qualitative analysis software. Interviews were transcribed as completed such that early interviews informed later ones and emerging themes were further examined. To enhance analytic rigor researcher triangulation, long-term field exposure, and ongoing researcher reflexivity were utilized. Direct quotations from the interview transcripts substantiate key themes, contextualize responses, and maintain respondents' voices in the interpretations. To protect anonymity of the respondents, pseudonyms are utilized and additional descriptors are omitted. Length of residence is expressed as either long-term or shorter-term being greater or less than 25 years, as many participants described 'newcomers' as having lived in the community for 25 years or less.

## 4.3 Results

This results section presents the emerging themes of biosolids as an *uncertain waste product*, a *fertilizer resource*, and concludes with the residents' scalar conceptions of place and conceptions of *relationalities and what belongs*.

### 4.3.1 Biosolids – A Waste Product with Uncertain Risks

Participants with generally negative perceptions commonly referred to the effects of biosolids overall as uncertain. The uncertainty surrounding the short-term and long-term impacts of biosolids originated primarily as a result of the dynamic nature of sewage sludge slurries where everything that is flushed, dumped or poured down residential, commercial and municipal drains is combined. In the comment below, Emily's concern originates from the unknown composition of biosolids given her concern for what is being flushed, including drugs and other potentially hazardous

materials, which resulted in feelings of uncertainty about the effects of these by-products.

*Emily* – I have no problem with human waste, no problem at all, but the one concern that I have environmentally is the unknown of what people could put in their toilets and stuff. It's a big city [Toronto], people might be putting drugs down there, I'd like to know what standards are in place for what the end product is like if people are putting down their unused hormones. (non-farm rural, long-term resident)

Similarly, residents such as Claire (organic agricultural, short-term resident) expressed discomfort with land application of biosolids by indicating we do not “know enough about the long-term effects of this waste product to feel confident about putting it on the land”.

Issues of uncertainty regarding the composition and potential health effects of biosolids also contributed to most other concerns such as residents' worries about water contamination and health and environmental risks despite assurances of new process techniques and the CFIA's federal designation of the processed product as a fertilizer. In fact, the consistent dimension of residents' worries was that contaminants may eventually end up in our food crops.

*Pam* – Are these contaminants going to go into the soil and affect what is growing or what animals are eating it, that we're going to eventually consume whether those contaminants will get into our water table? (short-term Dundalk resident, non-agricultural)

Framing biosolids as a waste product, Peter discusses his concerns for potential negative impacts and the need to 'just get rid of it':

*Peter* – What is going into our ground, into our water, into our food chain... I am concerned about the watershed... the animals grazing on it... because of the environment... I don't know. I'm concerned... I believe there are other ways... they're trying a cheap cop out, a cheap place to get rid of it... there should be other ways or just get rid of it. (Dundalk, short term resident, non-agricultural)

Additionally, the regulation of only a subset of heavy metals and pathogens in biosolids was a concern for residents such as Peter “I'm not happy with the chemicals that are in

the sludge, that are left behind, that they're not testing for" (Dundalk, short-term resident, non-agricultural). Furthermore, emerging contaminants, such as pharmaceuticals and personal care products, are increasingly causing concern as residents discuss the potential health and environmental implications and the uncertainty surrounding these waste products.

Despite the strong negative perceptions and concerns regarding uncertainties surrounding health and environmental impacts by some, other participants referred to biosolids as a fertilizer resource containing valuable nutrients.

#### 4.3.2 Biosolids – A Valuable Fertilizer Resource

The resource and economic value of processed sewage biosolids emerged from the fertilizer designation. Proponents of biosolid processing and recycling focused on the valuable nutrient and resource properties of biosolids in addition to its waste properties.

Many residents, such as John (lifelong agricultural), referred to biosolids as "an organic source of nutrients and micronutrients" and others such as Bill (lifelong agricultural) mentioned "to the people in the city it's a waste, but once it's processed to the farmer it's a nutrient". Continuing with the theme of recycling, residents described the nutrient 'cycle' or 'closed-loop nutrient recycling' associated with land applied biosolids.

*Ben* - Biosolids in the simplest form is just a manure waste... By spreading the manure back on fields you are just recycling the organic matter that was pulled out of the soil, incorporated into plant life... ingested and... excreted... then you are just putting it back into the ground... it's a cycle. (long-time agricultural)

Biosolid fertilizer end products were also commonly referred to as natural and economic fertilizers.

*Rebecca* - It's a natural fertilizer high in components that would be a natural fertilizer and good for the land. (rural non-agricultural, short-term resident)



*Luke* – For the farmers that see a cheap source of nutrition for their crops, it helps the business plan of their farm operation. (lifelong agricultural)

However, it is worth noting that one farmer thought the nutrient value of biosolids would be so high that the demand for this fertilizer would drive the pricing up.

*John* – It is an organic source of nutrients and micronutrients... These biosolids are not going to be a cheap way to be able to produce a product [crops] for less... biosolids are going to become a commodity and whoever can pay the most is going to get them. (lifelong agricultural)

Note the dynamic between residents concerned for their health and so adamantly opposed to this intruding 'waste' while others such as John go as far as to say that this product is so valuable the farmers will attempt to out-bid each other.

### 4.3.3 The Waste Versus Resource Debate

The public's conception of biosolids as a waste was dominant during the interviews. Participants frequently referred to biosolids as "human waste, it's animal waste. It's waste of whatever kind" (Anna, non-agricultural, short-term resident). In fact, while discussing biosolids the term 'waste' was mentioned 328 times by 22 of 23 participants. Therefore, an overwhelming majority of participants, including those in favour, opposed, and unsure about biosolids in their community all referred to biosolids as a waste. As seen in the previous section, many favourable perceptions of biosolids were referenced alongside its waste properties.

In contrast to biosolids as a waste, the resource or fertilizer nutrient properties of biosolids were exclusively discussed in a positive manner and were seemingly not acknowledged by those opposing biosolid processing and land application who did not endorse these resource properties. Nevertheless, farmers fought for access to this 'resource' for use on farmland while others vocally lobbied against the intrusion of this 'urban waste' into their pastoral landscape. Both sides argued on the basis of being

stewards of the land, fighting for what is best for their surrounding environment. However, the notion of biosolids as a resource or not is largely impacting how the available evidence is perceived and how residents weigh the risks and benefits.

#### 4.3.4 Relationalities and What Belongs?

How residents are using geographic scale to frame their definitions of sustainability was found to impact their perceptions of regional biosolid processing and land application within their community. A dichotomy between residents who view biosolids management as a global and relational issue and those who view biosolids locally in the context of their community emerged in this research. Residents with this global or relational mindset seem to view biosolid recycling as positive and sustainable, drawing on the idea of closed-loop nutrient recycling as discussed previously.

*John* - You see bumper stickers 'farmers feed cities', cities buy food... Being an hour and a half from Toronto, we have to get the circle of life going and... keep it spinning. So, if Toronto and people need to eat and if we can bring the nutrients back to safely produce that food and keep it going around it is a symbiotic relationship and everybody wins. It is sustainable. (30s, lifelong agricultural)

Residents supporting the land application of biosolids discussed how we should be keeping the cycle going in order to return the nutrients (that came from agricultural soils) back to the soil. In this sense, they view this waste or nutrient product as coming from and belonging in their region. A view that they have both a choice and a right to return these nutrients to their land – what originated from the land should be returned to the land – in a sustainable way. Supporters of biosolids invoked the notion of sustainability in the context of global waste management challenges to emphasize the benefit of sewage recycling over disposal.

In contrast, opposing residents seemed to view their place in the biosolids debate as a container without any biosolid management through the lens of a disconnected and isolated local scale whereby their community is viewed as their 'local' and surrounding

regions are viewed remotely. Residents such as Ryan (20s, lifelong non-agricultural resident) discussed how the issue with this externality or seemingly intrusive product was that “the biggest thing [is], I think, it’s not even our own, if it was our own problem and we needed to do it, we would accept it”. This resulted in negative perceptions of regional biosolid management in Southgate as unsustainable and an inequitable intrusion of urban waste or somebody else’s problem.

Julie - You know if it’s Toronto’s waste that they want to do something with do it in Toronto, or if it’s Orangeville’s waste do it in Orangeville, if it’s ours then we have to put up with it but not everybody else’s in the world, you know what I mean right sometimes you have to put up with some things... but not with other people’s... I don’t agree with that. (40s, non-agricultural, short term resident)

It is notable how this lens of biosolids as waste or hazard led residents to emphasize the spatial distribution and (in)equities regarding regional waste processing.

Participants opposed to biosolid processing in Southgate had a shorter average length of residence (23.2 years compared with 33.1 years for supportive residents) in the community having moved in more recently. When asked why they chose to move to Southgate, some of these opposed residents, such as Julie, also spoke of their motivations for moving to Southgate to get away from the city: “To relocate... a place to raise the kids and a quiet community not in the city” (Julie). Not all residents that chose to move to Southgate did so to escape the city, however this theme in particular helps to explain residents’ aversion to the ‘intruding’ by-products from the very urban areas they thought they had left behind. Others discussed the rural community as close to nature, a great place to retire or a safe place to raise their children; land applied biosolids do not necessarily fit with these rural ideals either.

Opposed residents envisioned this intrusive waste product as being forced on them from outside political and industrial power sources and saw this regional processing as largely beyond their control.

Don – It won't matter what we say. What they say out there that's where it's going. That'll be it. I will prove my point by saying about the windmill situation, you can fight it all you want, but the provincial government said 'sorry about your luck... your municipality doesn't have a say anymore'. They fixed that problem. That's pretty scary. We're close to getting right into that spot right now, if not already there. (Dundalk, long-term resident)

Further compounding this issue is the lack of trust some of these residents have for these outside 'city people' using the rural community as a 'dumping ground for their waste':

Ben – [Rural people] just maybe don't have an innate trust of what they might perceive as snobby highly educated city people coming in here and trying to use our pristine area as a dumping ground for their waste... that they're trying to take advantage of a wide open, not highly densely populated area and spread their waste on it as sort of a dumping ground. (long-time agricultural)

This highlights the perceived power dynamic and larger political influence perceived to be at play by those opposing the facility. The local focus also meant that the local municipal government was seen as being in bed with industry for tax and other benefits. This reinforced distrust between local residents and municipal officials as well as regional proponents, who were acting to site this seemingly intrusive and inequitable processing facility within the community.

## 4.4 Discussion

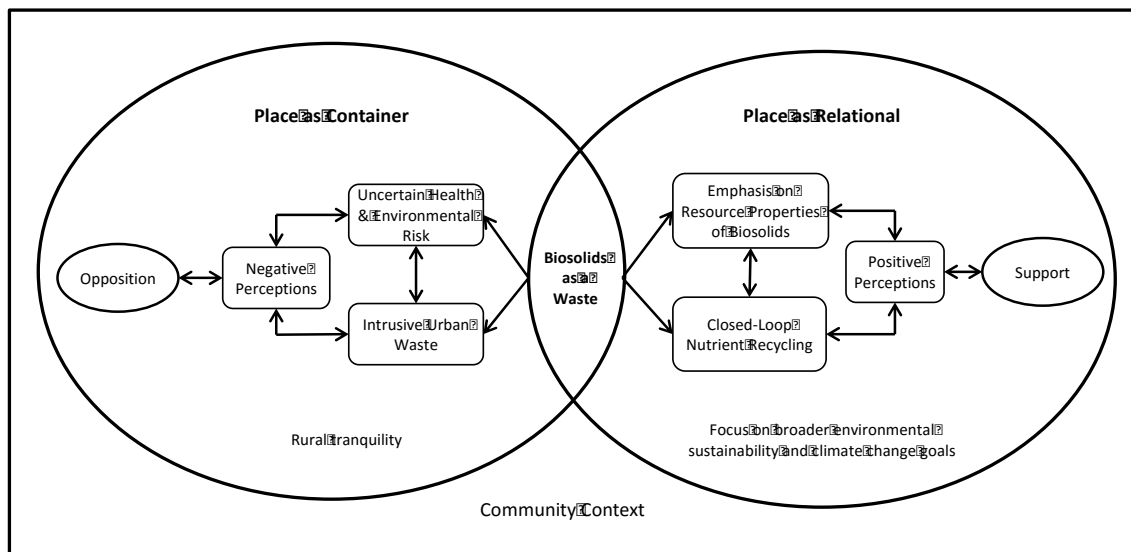
This research highlights rural residents' contestations of processed biosolid fertilizers and reuse for agricultural production as both an intruding waste product with potential uncertain effects and a valuable fertilizer resource for crop production. In the context of rising challenges with how to deal with urban sewage, this study explains how heterogeneous rural residents are responding to the relationalities of urban sewage-waste and nutrient management into their rural community. For those who see it as a resource, the final product is a low-cost source of organic nutrients for agricultural land. In contrast, others who perceive biosolids as a waste the uncertainty in its composition

or potential uptake through the ecological food chain represent a dangerous process with uncertain health outcomes that are inequitably distributed in their locale.

I extend literature surrounding the political ecology of waste (such as Pickren, 2014) to contested waste products with duality as both hazard and resource. This is particularly relevant in the context of regional and national goals to move towards sustainable waste management and beneficial reuse in the global context of increasing populations and climate change. The binary positionality of community members strongly links the emerging disposal conundrum to the political and economic factors that are getting increasingly intertwined in waste management debates. Consequently, there is no doubt that the farmers who are using the processed biosolids to improve crop yields are benefiting from a low cost yet effective nutrient product to the extent that some farmers are beginning to worry about the increasing demand for the product and its associated price increases as more farmers use this fertilizer. This transition is already being observed in Moncton, New Brunswick, Canada where the Greater Moncton Sewerage Commission is unable to produce enough biosolid products to meet local demand (LeBlanc et al., 2008). With the increasing push towards resource recovery as a means to achieve sustainable sewage management while creating net-positive values for communities (Oberg et al., 2014), it is important to understand the local responses to these regionally and globally driven processes. In the meantime, scientific uncertainty also creates room for fear among those who oppose biosolid processing and application within the vicinity of their community. Garvin (2001) concludes that while shared definitions can exist between scientists, policy makers and the public, the public may have quite different forms of rationality drawing on differing, albeit legitimate, evidence and knowledges. Findings here are consistent with Garvin's (2001) conclusions as the complexities and uncertainties inherent to biosolid processing and beneficial reuse allow for the public to call on this uncertainty of environment and health effects and draw on other forms of cultural, historical and experiential knowledges and thus science's hegemony may be undermined (Mason et al., 2015). Consistent with Parizeau (2015) the persistent views of these waste-by-products as a hazard leaves some

residents seeking physical and mental distancing and undervaluing the potential resource properties.

Findings contribute to literature on the circular economy and beneficial reuse of contested waste products and is consistent with Kama's (2015, p. 19) conclusion on electronic waste recycling that "waste continues to be 'hazard' even after its reincarnation as 'resource'". This research also shows that although positive perceptions were associated with the nutrient resource designation of biosolids even though its classification as originating from a waste product seemingly remained. Value in the resource properties may be acting as a contextually based mediating factor influencing residents' risk attenuation or amplification (Masuda and Garvin, 2006; Pidgeon et al., 2003) (Fig. 4-1). Similar to Douglas' (2003) notion of dirt as "out of place", the intrusion of this urban biosolid fertilizer 'resource' has resulted in opposition among many residents based on conceptions of the fertilizer as a waste product and a drive within the industry to combat this waste designation. The duality of biosolids as either a waste or a resource continues to be a precipitating source of intra-community exchanges (Mason-Renton et al., 2016). While emphasis on biosolids' nutrient properties seemingly acted to attenuate risk, conceptions of biosolids as an intruding and inequitable urban risk with uncertain health effects became a surrogate for environmental concern (Burger, 1990; Garvin, 2001) and acted to amplify risk perceptions.



**Figure 4-1 A conceptual diagram showing biosolids as a waste or a resource and the impact of residents' perceptions of scale on their response towards local biosolids processing.**

Residents' scalar construction of place also emerged as an important contextual factor in the biosolid recycling debate. Residents' used varied lenses to contextualize what belongs in their community and view the intruding sewage sludge as a nuisance with negative health effects. As expected, opposing residents do not see the intrusion of urban waste into the local environment in relational terms – that is the local, regional, and global interconnectedness between Southgate, Toronto and the rest of Ontario. Viewing place as a container provides a lens with which residents view and comprehend the process of 'someone else's' sewage in their community. The inherent interdependencies, relationality and contested local-global interactions as described by Massey (2004) is relevant to the mobility of urban biosolid fertilizer products contested in the rural landscape as both 'a beneficial resource' and an 'intruding inequitable risk'. Figure 4-1 demonstrates the contextual influence residents' scalar conception of place, the environment and relationality has on their support or opposition towards the treatment and land application of regional biosolids in their community. This is consistent with Jonas' (2006) notion of how different sizes and scopes of scales and

their properties can influence the ways groups act upon changes to their local context. Yet, if the notion of environmental sustainability and climate change adaptation were brought into the waste management dialogue more effectively, residents would have to consider their views of biosolids in relational terms. This becomes even more relevant when such changes are considered as potentially hazardous intrusions and perceived political and economic powers are at play. Gaining a more contextual understanding of residents' conception of the relationality or isolation from surrounding urban areas as well as the regional power dynamics can help to elucidate why some residents view land applied biosolids as sustainable recycling and others view it as an intrusion of urban wastes. Signaling broader scale sustainability benefits and larger socio-political paradigms in waste management will become increasingly relevant as urban waste production increases globally and these waste by-products are transported to surrounding regions for processing and beneficial reuse elsewhere.

Consistent with Baxter and Greenlaw (2005), we found that residents who do not view Southgate in relation to its surrounding urban regions, generally viewed the processing of regional wastes in their locale as inequitable and unjust. This also has implications for stigma as a regional dumping ground (Mason-Renton et al., 2016). In the context of broader waste-management goals we show felt injustices as residents' express feelings that regional urban wastes are being brought to their rural locale (by a means which is out of their control) to meet the needs of regional policies and externalized urban waste management strategies. This extends Moore's (2012) research whereby when wastes are viewed through the lens of hazard the uneven distribution and disposal of these by-products and the political forces at play are brought to the forefront of debate.

Considering residents' scalar and relational constructions of place helps to recognize the various time-space scales of environmental and social change occurring as techno-industrial developments locate in these rural communities. Further, having a better understanding of what is conceptualized as intruding or belonging in a locale will help to better understand contested felt distributive injustices between rural and urban regions while other residents fight for access to these beneficial 'resources' thought to benefit



circular economies and belong in the rural landscape. Contestations around wastes as resources which are intruding or belonging in the rural locale, further complicates notions of rural environmental injustice which delineates clear 'parasitic' relationships between urban and rural regions (Kelly-Reif and Wing, 2016).

This dominant conception of biosolids as a waste is clashing with the provincial and federal regulators' views of it as a beneficial resource. As such, any progress with public acceptance of processed biosolids as a transformed resource will need to be grounded in the local, where potential risks are embodied, while actively engaging the relational level to move beyond communication benefits as local nutrient agricultural value but also drawing on the broader environmental sustainability and climate change goals. Merely focusing on benefits to local agriculture does not resonate with all rural residents as rural communities become increasingly diverse.

Proponents in the industry spend a great deal of time and energy trying to combat biosolids' waste designation and shed this negative label with the hopes of increasing acceptance by residents. Contributing to risk communication and trust literature (Beecher et al., 2005; Frewer, 2003; Slovic, 2000), we wonder if proponents and risk communicators alike would be better to acknowledge this waste characteristic communicating the waste to resource processes and the advantages in the context of regional resource recovery, climate change and sustainability. The challenges with risk communication related to biosolids seem to reflect the inherent difficulties with traditional risk communication strategies between the global and public awareness and concern for climate changes issues. It may be useful to recast risk communication in contested cases such as these that seek to contribute to climate change adaptation and environmental sustainability goals, yet are considered uncertain and risky by some. Emphasis on such a relational dimension is likely to bring more public outside of the local container scope of the biosolid management problem and help to communicate the broader environmental sustainability goals inherent to the circular economy and the beneficial reuse of processed biosolid products.

## 4.5 Conclusion

This research examines the contestations of processed urban biosolid fertilizers as waste or resource in a rural Ontario community. Unlike typical waste management debates, the contested 'greenness' surrounding narratives of waste as a resource and these by-products belonging or intruding into residents' locale touches on core principles of communities processing other communities' waste and the valuation goes to signal a deeper level of social, political and emotional evaluation and the notion of fairness and equity. This research contributes to an emerging field of rural environmental justice (Pellow, 2016; Ashwood and MacTavish, 2016) showing the contested felt injustices related to urban biosolid management in the rural landscape. Further, this study contributes to the risk-society literature as this industrial development has not only pitted residents against big industry, but instead has turned community members against each other as some residents fight for access to this resource while others passionately oppose the intrusion of this waste product in their tranquil environment. In the context of growing populations, increasing production of waste products, costs of management and disposal, and a desire for more sustainable processing and recycling options, we also contribute to the understanding of a growing field that aims to transform and market waste products as resources. Gaining a greater understanding of residents' associations with and conceptions of place and relationality will allow industries and regulatory agencies to better understand and anticipate residents' and communities' response towards these forms of regional waste processing and transitions towards marketable resources. This better understanding of residents' values and expectations of their landscape will help waste management industries to move beyond the stigma of 'hazard' or 'waste' to a more open conversation of valuable resource properties and global sustainable waste management on a broader scale.

## 4.6 References

- Ashwood, L., and MacTavish, K. (2016). Tyranny of the majority and rural environmental injustice. *Journal of Rural Studies*, 47, 271-277.
- Baxter, J., and Greenlaw, K. (2005). Explaining perceptions of a technological environmental hazard using comparative analysis. *The Canadian Geographer*, 49(1), 61-80.
- Beecher, N., Connell, B., Epstein, E., Goldstein, N., and Lono, M., (2004). Public Perception of Biosolids Recycling: Developing Public Participation and Earning Trust. (No. 00-PUM-5) Water Environment Research Foundation (IWA Publishing, London; Virginia)
- Beecher, N., Harrison, E., Goldstein, N., McDaniel, M., Field, P., and Susskind, L., (2005). Risk perception, risk communication, and stakeholder involvement for biosolids management and research. *Journal of Environmental Quality*, 34, 122-128.
- Biersack, A., (2006). Reimagining political ecology: culture/power/history/nature, In A. Biersack, and J. B. Greenberg (Eds.) *Reimagining Political Ecology*. Duke University Press, Durham; London, pp 3-40.
- Burger, E. J. J. (1990). Health as a surrogate for the environment. *Deadalus*, 114, 133-153.
- Chambers, C. and Sandberg, L. A., (2007). Pits, peripheralization and the politics of scale: struggles over locating extractive industries in the Town of Caledon, Ontario, Canada. *Regional Studies*, 41(3), 327-338.
- Devine-Wright, P. and Howes, Y., (2010). Disruption to place attachment and the protection of restorative environments: a wind energy case study. *Journal of Environmental Psychology*, 30, 271-280.
- Dijkema, G. P. J., Reuter, M. A., and Verhoef, E. V., (2000). A new paradigm for waste management. *Waste Management*, 20, 633-638.
- Dirlik, A. (1996). The global in the local. In R. Wilson and W. Dissanayake (Eds.) *Global-Local: Cultural Production and the Transnational Imaginary* pp. 21-45. Durham: Duke University Press.

- Douglas, M., (2003). *Purity and Danger An Analysis of Concepts of Pollution and Taboo*. Routledge, London; New York.
- Drechsel, P., Qadir, M. and Wichelns, D., (Eds.). (2015). *Wastewater Economic Asset in an Urbanizing World*. Springer: New York, London.
- Frewer, L. J. (2003). Trust, transparency and social context: implications for social amplification of risk. In N. Pidgeon, R. E. Kasperson and P. Slovic (Eds.) *The Social Amplification of Risk* pp. 123-137. Cambridge University Press, Cambridge.
- Garvin, T. (2001). Analytical paradigms: the epistemological distances between scientists, policy makers and the public. *Risk Analysis*, 21, 443-455.
- Goven, J., Langer, E. R., (2009). The potential of public engagement in sustainable waste management: designing the future for biosolids in New Zealand. *Journal of Environmental Management*, 90, 921-930.
- Gregson, N., Crang, M., Fuller, S. and Holmes, H. (2015). Interrogating the circular economy: the moral economy of resource recovery in the EU. *Economy and Society*, 44(2), doi:10.1080/03085147.2015.1013353.
- Harvey, D. (1993). From space to place and back again: reflections on the condition of postmodernity. In J. Bird, B. Curtis, T. Putnam and L. Tickner (Eds.) *Mapping the Futures: Local Cultures, Global Change*, pp. 3-29. London and New York: Routledge.
- Jonas, A. E. G. (2006). Pro scale: further reflections on the 'scale debate' in human geography. *Transactions of the Institute of British Geographers*, 31, 399-406.
- Jones, C. C., (2011). Environmental justice in rural context: land-application of biosolids in Central Virginia. *Environmental Justice* 4(1), 1-15. doi: 10.1089/env.2009.0034.
- Joo, S. H., Monaco, F. D., Antmann, E., and Chorath, P. (2015). Sustainable approaches for minimizing biosolids production and maximizing reuse options in sludge management: a review. *Journal of Environmental Management*, 158, 133-145.
- Kama, K. (2015). Circling the economy: resource-making and marketization in the EU electronic waste policy. *Area*, 47(1), 16-23.

- Kelly-Reif, K. and Wing, S. (2016). Urban-rural exploitation: an underappreciated dimension of environmental injustice. *Journal of Rural Studies*, 47, 350-358.
- Koch, A., McBratney, A., Adams, M., Field, D., Hill, R., Crawford, J., Manasny, B., Lal, R., et al. (2013). Soil security: solving the global soil crisis. *Global Policy*, 4, 434-441.
- Kurtz, H. E. (2003). Scale frames and counter-scale frames: constructing the problem of environmental injustice. *Political Geography*, 22, 887-916.  
doi:10.1016/j.polgeo.2003.09.001.
- LeBlanc, R. J., Allain, C. J. and Laughton, P. J. (2008). Wastewater biosolids as an environmentally sustainable resource: keys to success. *Water Practice and Technology*, 3(1), doi:10.2166/WPT.2008009.
- Lowman, A., McDonald, M. A., Wing, S. and Muhammad, N. (2013). Land application of treated sewage sludge: community health and environmental justice. *Environmental Health Perspectives*, 121(5), 537-542.
- Lystek, (2015). Lystegro Biofertilizer, <http://lystek.com/solutions/lystegro-biofertilizer/>.
- Mason, S. A., Dixon, J., Mambulu, F., Rishworth, A., Mkandawire, P., and Luginaah, I. (2015). Management challenges of urban biosolids: narratives around facility siting in rural Ontario. *Environmental Planning and Management*, 58(8), 1363-1383.
- Mason, S.A., Walker, C., Baxter, J., and Luginaah, I. (2016). Ethics and activism in environment and health research. In N. E. Fenton and J. Baxter (Eds.) *Practicing Qualitative Methods in Health Geographies*, (pp. 54-72). Routledge.
- Mason-Renton, S. and Luginaah, I. (2016). Interfering with therapeutic tranquility: debates surrounding biosolid waste processing in rural Ontario. *Health and Place*, 41, 42-49.
- Mason-Renton, S., Luginaah, I., and Baxter, J. (2016). Community Divide as more Detrimental than the Plant Itself: Confrontational Stigma and Community Responses to Rural Facility Siting. *Journal of Rural and Community Development*, 11(2), 22-44.
- Massey, D. (2004). Geographies of responsibility. *Geografiska Annaler*, 86B(1), 5-18.

- Massey, D. (1994). *Space, Place, and Gender*. Minneapolis, MN: University of Minnesota Press.
- Masterman-Smith, H., Rafferty, J., Dunphy, J., and Laird, S. G. (2016). The emerging field of rural environmental justice studies in Australia: reflections from an environmental community engagement program. *Journal of Rural Studies*, 47, 359-368.
- Masuda, J. R. and Garvin, T. (2006). Place, culture, and the social amplification of risk. *Risk Analysis*, 26(2), 437-454.
- Masuda, J. R., and Garvin, T. (2008). Whose heartland? The politics of place in a rural-urban interface. *Journal of Rural Studies*, 24, 112-123.
- Moore, S. A., 2011. Global garbage: Waste, trash trading, and local garbage politics. In R. Peet, P. Robbins and M. Watts (Eds.) *Global Political Ecology* (pp 133-144). Routledge, Abingdon.
- Moore, S. A., (2012). Garbage matters: concepts in new geographies of waste. *Progress in Human Geography*, 36(6), 780-799.
- Morales, M. and Oberg, G., (2012). The Idea of Sewage as a Resource. Program on Water Governance, Vancouver, B.C.
- Morales, M., Harris, L. and Oberg, G., (2014). Citizenshit: the right to flush and the urban sanitation imaginary. *Environment and Planning A*, 46, 2816-2833.
- Oberg, G., Merlinsky, M. G., LaValie, A., Morales, M. and Tobias, M. M., (2014). The notion of sewage as a waste: as study of infrastructure change and institutional inertia in Buenos Aires, Argentina and Vancouver, Canada. *Ecology and Society*, 19(2), 19-26.
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). (2010). *Best Management Practices: Application of Municipal Sewage Biosolids to Cropland*. Queens Printer for Ontario, Toronto.
- Paquette, S. and Domon, G. (2003). Changing ruralities, changing landscapes: exploring social recomposition using a multi-scale approach. *Journal of Rural Studies*, 19, 425-444.

- Parizeau, K., (2015). Urban political ecologies of informal recyclers' health in Buenos Aires, Argentina. *Health and Place*, 33, 67-74.
- Peccia, J. and Westerhoff, P., (2015). We should expect more out of our sewage sludge. *Environmental Science and Technology*, 49, 8271-8276.
- Pellow, D. N. (2016). Environmental justice and rural studies: a critical conversation and invitation to collaboration. *Journal of Rural Studies*, 47, 381-386.
- Pidgeon, N., Kasperson, R. E. and Slovic, P., (Eds.). (2003). *The Social Amplification of Risk*. Cambridge University Press, Cambridge.
- Pickren, G., (2014). Political ecologies of electronic waste: uncertainty and legitimacy in the governance of e-waste geographies. *Environment and Planning A*, 46, 26-45.
- Richmond, L. A., Filson, G. C., Paine, C., Pfeiffer, W. C., Taylor, J. R., (2000). Non-farm rural Ontario residents' perceived quality of life. *Social Indicators Research*, 50(2), 159-186.
- Robinson, K. G., Robinson, C. H., Raup, L. A. and Markum, T. R., (2012). Public attitudes and risk perception toward land application of biosolids within the south-eastern United States. *Journal of Environmental Management*, 98, 29-36.
- Slovic, P., (Ed.) (2000). *The Perception of Risk*. Earthscan Publications Ltd., Sterling, VA.
- Smithers, J., Joseph, A. E. and Armstrong, M., (2005). Across the divide (?): reconciling farm and town views of agriculture-community linkages. *Journal of Rural Studies*, 21, 281-295.
- Strauss, A. and Cobin, J., (1990). *Basics of Qualitative Research Grounded Theory Procedures and Techniques*. Sage, California.
- Tyagi, V. K. and Lo, S. L. (2013). Sludge: A waste or renewable source for energy and resource recovery? *Renewable and Sustainable Energy Reviews*, 25, 708-728.
- Woods, M. (2005). *Rural Geography: Processes, Responses and Experiences in Rural Restructuring*. Sage, London; Thousand Oaks, California.
- Youngquist, C. P., Goldberger, J. R., Doyle, J. and Jones, S. S. (2015). Public involvement in waste management research and decision-making: a case study. *Policy and Practice*, 7(3), 141-161.

Zulu, L. C. (2009). Politics of scale and community-based forest management in southern Malawi. *Geoforum*, 40, 686-699.



## Chapter 5

Interfering with Therapeutic Tranquility: Debates Surrounding Biosolid Waste Processing  
in Rural Ontario

Sarah Mason-Renton<sup>1\*</sup>, Isaac Luginaah<sup>1</sup>

1. Department of Geography, The University of Western Ontario

\*Doctoral Candidate

Published: *Health and Place* (2016), 41, 42-49.

## 5 INTERFERING WITH THERAPEUTIC TRANQUILITY: DEBATES SURROUNDING BIOSOLID WASTE PROCESSING IN RURAL ONTARIO

Uncertainty surrounding potential health effects of techno-industrial facilities continues to result in heightened debate about what are the *best* and *safest* options for future generations in rural places regarded by residents for their therapeutic tranquility. This research examines how a proposed biosolid processing facility in rural Ontario producing agricultural fertilizer from primarily urban sewage has in some residents elicited particularly strong concerns about potential health impacts, which are accompanied by perceptions that the tranquil and pastoral nature of their landscape is being altered. However, fueling community conflict between friends and relatives is the contested nature of the landscape's restorative qualities and the facility's disruption of this tranquil place.

### 5.1 Introduction

Rural communities are increasingly dynamic and heterogeneous places (Woods, 2005). Although several rural residents in a continuation of family tradition remain in such rural places to live off the land through agriculture, extractive, or primary production industries, other people escaping urban areas migrate with their families to these rural spaces for tranquility (Hay, 1992). This is altering the ways old and new rural residents perceive and respond to their environments and react to each other. Differing expectations can result in intra-community conflict between residents who differentially prioritize development and economic opportunities and those who seek to protect the perceived pastoral nature of these places. This research examines the siting of a biosolid (sewage sludge) to agricultural fertilizer processing facility, the Southgate Organic Material Recovery Centre (OMRC), to examine how residents' sense of place and

feelings of tranquility in their community affects their responses to this proposed facility.

Biosolid processing and agricultural land application as a fertilizer amendment has been occurring globally for decades. In Ontario, sewage sludge and biosolids have been applied to agricultural soils for over thirty years (OMAFRA, 2010). In and around farming communities there have been many anecdotal ill-health reports. However, the evidence showing health risks associated with this practice remains equivocal (Robinson et al., 2012; Jenkins, 2007; Beecher et al., 2004). Further complicating the ability to examine and quantify this risk is the multisource and heterogeneous nature – what is flushed or sent down residential, municipal, and industrial drains – of biosolids, which has made it almost impossible to test for every diluted trace element or contaminant that may be in the slurry. Experts from regulatory agencies monitor key elements and pathogens frequently and maintain that the remaining potential contaminants are at such low concentrations – particularly when further diluted as they are spread over the land – they are negligible. While some residents accept experts' collective risk assessment of biosolids, many do not, rather preferring a precautionary approach when it comes to the management of their surrounding rural environment (Mason et al., 2015). Given this, there has been a recent increase in debate towards the land application of biosolids, which mostly originates from distant urban places (Goven et al., 2012; Krogmann, Gibson, Chess 2001). Consequently regulatory bodies and associated management policies have come under increasing scrutiny particularly among new rural publics (Lowman et al., 2013; Jones 2011; Beecher et al., 2004).

We draw on the emotional geographies and therapeutic landscapes literature to better understand how techno-industrial developments, landscape change, and residents' strong-felt attachments to their surroundings are impacting their perceived health and wellbeing. There is a close relationship between these emotional geographical and therapeutic landscape constructs (Milligan, 2007). The notion of therapeutic landscapes convey individuals' place meanings and attachments, as well as their overall sense of

place, as beneficial to wellbeing and overall good health (Andrews, 2004). Developed nearly 25 years ago by Gesler (1992), the concept of therapeutic landscapes sheds light on the benefits certain physical places can have on individuals' health and wellbeing. Recent research has extended this concept to examine the everyday lives of residents' of a contaminated landscape (Smith et al., 2010) as well as the role these therapeutic 'places' play in residents' relaxation and restoration through activities such as gardening (Milligan et al., 2004) or access to 'common places' of nature (Milligan, 2007). This exploration of residents' everyday experiences with therapeutic landscapes in common places has emerged over the last decade (Wakefield and McMullan, 2005; Williams, 2007, Smith et al., 2012; Milligan, 2007), however still remains relatively under explored compared to foundational research examining 'sacred' places of healing. Examples of the therapeutic benefits of extraordinary places include the healing properties of Roman baths (Gesler 1998) or American Indian sacred landscapes (Dobbs, 1997), and those designed as specific spaces of care and healing such as psychiatric hospital design (Wood et al., 2015) and respite centres (Conradson, 2005), among others.

Despite the extensive application of therapeutic landscape theoretical constructs in research, the notion that a place may be naturally therapeutic in its own right is contested in the literature (Williams, 2007). The main argument is places are no longer believed to be intrinsically therapeutic, rather spaces are differentially experienced subjectively and contextually and individuals develop a sense of wellbeing through diverse phenomena, which are personally relevant, within a particular space and time (Bell et al., 2015; Masuda and Crabtree, 2010; Williams, 2007; Gesler 2005; Conradson 2005). As insightfully pointed out, Milligan (2007) argues that an individual's association with place evolves over time, potentially shifting from restorative to risky or positive to negative. Residents and users of these locales gain a sense of wellbeing through experiences with and the appreciation of personally relevant landscape attributes. It's recently been shown that these therapeutic qualities are less about a place's specific features than the types of experiences sought out in these places (Bell et al., 2015; Masuda and Crabtree, 2010). Further, Wakefield and McMullan (2005) reveal the

contested and contingent nature of therapeutic landscapes as health-affirming and health denying places co-exist and are dependent on residents' local experiences in place. This contested therapeutic experience in place is further examined by Smith et al. (2010), in the context of First Nation communities' therapeutic connection with Mother Earth in a contaminated landscape. The effects of landscapes and the experienced therapeutic benefits of these environments are differentially experienced and variable (Rose, 2012; Conradson, 2005). Given rural residents' varied senses of place, we seek to examine how the therapeutic nature of their landscape is contested with the proposal of a waste processing facility.

According to Hartig et al. (2003), many urban dwellers running away from the crowded nature of urban places expect to experience a relative solitude and tranquility in their chosen rural settings. On arrival and after some time, these residents become closely attached to their environment such that these landscapes become therapeutic in their own right (Kearns and Collins, 2012). Further, Stedman (2006) and Soini et al. (2012) found that short-term residents tend to base their attachments to place on environmental quality. Access to green-spaces and untainted nature has become fundamental to these individuals' conceptions of health and wellbeing (Wakefield and McMullan, 2005; deVries et al., 2003; Gesler, 1993). This attachment or sense of place helps determine how these residents respond to changes in their surroundings. Yet, the literature surrounding sense of place and place attachments (Devine-Wright and Howes, 2010; Parr, 2010; Davidson and Milligan, 2004; Simmons and Walker, 2004; Altman and Lowe, 1992) is less often drawn on when examining these place-based impacts on residents' health and wellbeing (for an exception see Eyles and Williams, 2008). It is important to consider the inherently emotional nature of place attachments in environments undergoing change, where residents reshape their surroundings through their emotions and in turn their changing environments reshape their everyday life experiences and sense of place (Eyles and Williams, 2008; Davidson and Milligan, 2004). Additionally, Townsend and Pascal (2012) describe how it is residents' anticipations of spaces that impact the ways such spaces are subjectively experienced. Thus, changes,

and even uncertain but anticipated changes, to residents' environments, such as facility siting and agricultural application of the biosolid product, can result in a cognitive and cultural reordering of the ways residents apprehend and act in place (Parr, 2010) considering that most residents move in to such places with idyllic and tranquil expectations. Milligan (2007, p, 257) states "that how people experience places is inextricably linked not only to feelings and emotions *about* these places, but also emotions engendered *by* them". Landscapes are socially constructed and influenced by alterations in residents' daily interactions, thus individuals' place attachments and responses to changes in their community depend on the distinct community context and are unique and dynamic (Rose, 2012; Gesler, 2005; Conradson, 2005). This suggests that it is people's expectations and dynamic relationships with a place that impact their landscape experiences and thus space and place are experienced subjectively and contextually. This research looks to further examine the role residents' emotional attachments to place has on their response to a potentially noxious facility in their community.

Research examining therapeutic encounters with everyday geographies, the contested nature of therapeutic landscapes, as well as residents' responses to environmental change is emerging as new areas of inquiry in the field of therapeutic landscapes. However, literature regarding residents' response to anticipated landscape changes, such as techno-industrial facility siting, in the context of everyday experiences with contaminated or 'unhealthy' places remains relatively negligible. We seek to contribute to this emerging literature by examining the contested nature of rural landscapes and differential responses to proposed landscape change due to a proposed techno-industrial development through the lens of therapeutic landscapes. The synergistic nature of the theoretical constructs of therapeutic landscapes and sense of place within emotional geographies are particularly relevant in these rural communities where, as Devine Wright and Howes (2010) point out, many consider nature and landscape a place for psychological restoration and emotional- and self- regulation. The paper investigates

residents' feelings of wellbeing and safety in their environment in the context of the biosolid facility siting process.

## 5.2 Method

### 5.2.1 Community Context

The Township of Southgate (population: 7 100; Statistics Canada, 2012) is located in Southern Grey County in rural southwestern Ontario (Fig. 1) and is characterized as a small middle class rural municipality (median household income of \$56,480 compared with the provincial median household income of \$66,358 (Statistics Canada, 2013)) with a high proportion of owned private dwellings (90%). Dundalk is the only sizable village within the municipality (population 1 900; Statistics Canada, 2012; for a full description of sociodemographic community characteristics see Mason et al., 2015). Southgate is characterized by a recent high turnover of population and rapidly increasing income – likely due to influx of relatively wealthy exurbanites. While Southgate's net population has not changed recently (net growth of 18 residents between 2006 and 2011), they have experienced substantial in- and out-migration (about 21.5% of current residents moved in to the community over this time period with similar rates of outmigration) resulting in population demographic and socio-cultural changes and influencing overall expectations of Southgate (Mason et al., 2015). However, between 1996 and 2006, when the median household family income almost doubled (\$30,803 to \$56,480 respectively), Southgate experienced a net population growth of 11% with the majority of these residents residing in the village of Dundalk. This suggests that newer residents (less than 20 years of residence) have higher incomes than long-time residents do. These residents likely fall in to the growing commuter population living in the village, whereby more than half of the population now commutes elsewhere, mostly to distant urban centres, to work (Mason et al., 2015). This has implications for residents' sense of place as a locale for refuge and restoration from their daily work rather than a place of

work and production. As we observe, this can have implications for reactions towards community development.

In 2011 the OMRC, a regional biosolid to agricultural fertilizer processing facility, was proposed to be located in Southgate in an industrial “Ecopark” adjacent to Dundalk. The community went through a very contentious siting process lasting over a year resulting in the approvals being granted in the fall of 2012 and the facility becoming operational in the spring of 2013. Throughout the siting process community conflict escalated and the social and emotional impacts of this siting process became evident through increased challenges to local governance, hostile public debate through news media and visible fracture within the community. With the proximity of the facility being located on the periphery of the village and adjacent to the kindergarten to grade three elementary school property many town residents became very concerned for their health and the health of their children. This pitted many town residents against rural agricultural residents who were not living in close proximity to the facility, and thus less susceptible to potential risks from the facility, and who also stood to gain from this affordable nutrient resource. This created feelings of inequity among many residents. This case study was chosen to investigate impacts of facility siting process as the community was experiencing a great deal of community conflict, emotional turmoil, and heightened environmental and health risk perceptions in response to the siting process.

### 5.2.2 Study Sample and Procedure

The complex and dynamic nature of residents’ emotional responses to their changing environments and place attachments calls for in-depth data to provide an understanding. Hence, we used in-depth interviews (n=23) to examine residents’ health risk perceptions, place attachments, and the ways their landscape was perceived to (positively or negatively) impact their wellbeing. Interviews were conducted during the summer of 2012, between June and August, during the very contentious facility siting



process. This allowed us to investigate residents' perceptions in a state of uncertainty, rather than their perceptions of an established facility as has commonly been done before. Nine participants opposed the facility, seven were in favour and seven expressed both benefits and concerns – we label this group as 'undecided'. With the heightened community conflict and an ongoing legal case between the municipality and this group, some members of the opposition group abstained from participating (described in detail in Mason et al., 2016). Participant characteristics are presented in Table 5-1.

**Table 5-1 Participant characteristics segregated by general opinions of the OMRC.**

Opinion of Biosolids in Southgate	Number of Participants	Number of Dundalk Residents	Age (n)	Average Length of Residence (Moved in last 20 years)	Involved with Local Agriculture	Education (n)
Opposed	9	7	18 – 35 (2) 35 – 50 (3) 50 + (4)	23.2 years (6)	1 of 9	Some High School (1); High School (2) College/Trade School (4); University (2)
In Favour	7	1	18 – 35 (2) 35 – 50 (1) 50 + (4)	33.1 years (2)	7 of 7	College/Trade School (5); University (2)
Uncertain	7	2	18 – 35 (0) 35 – 50: (5) 50 + (2)	37.8 years (1)	3 of 7	High School (1); College/Trade School (3); University (3)

Purposive snowball sampling was used and sampling continued until saturation was reached (Strauss and Cobin, 1990). Residents were typically interviewed at their homes or in private meeting places of their choosing. Interviews and field notes were transcribed verbatim, examined for accuracy, and analysed. Analysis was informed by Guest et al's (2012) inductive applied thematic analysis, which is rooted in phenomenology and grounded theory. Transcripts were analytically coded in vivo using NVIVO qualitative analysis software and key themes were identified following exploratory analysis. NVIVO aided in the organization of codes and nodes and assessment and further analysis of key themes. Interviews were transcribed as they were completed and then read such that early interviews informed later ones and emerging themes were examined. Direct quotations from the interview transcripts

demonstrate key themes, serve to contextualize responses, and act to maintain respondents' voices in the interpretations. To protect anonymity of the respondents in this community, pseudonyms are utilized.

## 5.3 Results

This manuscript reflects emerging themes surrounding residents' concerns for children's safety, the location of the facility, as well as the contested nature of their community as a restorative landscape. These were prominent embodied concerns among opposed residents. These key themes were a product of a larger study examining residents' responses to and perceptions of the proposed OMRC in Southgate.

### 5.3.1 Community Values and Challenges to Ways of Life

Participants' general discussions of what they value and like in their community sheds light on residents' preferred way of life. Many residents described the Township of Southgate as a typical small rural town that is beautiful, natural, friendly, close knit and family oriented. This depicts a quaint, beautiful rural community ideal for raising a family. These values and preferred ways of life give insight into residents' sense of place and expectations for their surrounding landscape.

Consequently, many residents expressed concern for the changes occurring in the community that appeared to threaten what was considered a healthy, safe community. These concerns were manifest in comparisons with unhealthier urban centres such as Toronto, and residents' desire to remain in their home but willingness to move to protect both their own and their children's health.

*Ryan* - You know whatever happens in the environment... that's environmental, but it's going to affect people's health as well. I'm asthmatic so I'm a little more sensitive to things in the air. You go to Toronto and I feel like the pressure in my

chest has changed ... I'd like to think that what they say [in reference to safety of OMRC emissions] is right... but still, it can't be good for us. (20s, lifetime non-farm rural resident, opposed)

*Andrea* - We love this place. We've been here you know and raised our kids here, we don't want to move but health is more important... the health of our children is more important than this place. (30s, non-farm rural resident, 14 years, opposed)

These values surrounding the community's family friendly nature and suitability for raising children have clashed with the perceived risk to children's health and safety from the proposed biosolid processing facility. It is understandable that residents are both concerned for the immediate impacts of this facility on their short-term health as well as the potential long-term chronic impacts environment and health exposures can have. Given the value residents placed on their community being a safe place it is easily foreseeable how these anticipated risks impact both their sense of place and the therapeutic nature of their surrounding landscapes.

### 5.3.2 Worrying about Core Values: Child Safety

Invoking core values, worry for children's health and safety was a primary concern for a number of residents and they communicated how these concerns changed the security they felt in their environments. This was manifest both in the way residents spoke of risks of the facility and potential health effects, as well as residents' expressed concern for the vulnerability of children to these perceived increased risks and effects.

One resident spoke of her personal concern for her children's and her future grandchildren's health due to potential air pollution and their right to their home as a safe place:

*Julie* - Child safety, yep, it's just what is it going to do to the whole town, like whose going to want to live in this town really?... What's that going to be when my grandchildren are born 2, 3 years down the road and he's got asthma, my daughter has asthma, who's to say it's not going to make her asthma worse

when she visits and comes home... Right like this is their home. (40s, Dundalk resident 17 years, opposed)

*Peter* - 'Oh it's safe don't worry about it' well that's not good enough, you know like kids, a lot of kids, are being born now with asthma, really bad asthma. Like why that's because of the environment and all of a sudden you're shoving something like this into your environment too on top of that like holy cow give us a break. Like air borne pollen molecules they're gonna kill us. (50s, Dundalk resident 17 years, opposed)

Additionally, residents such as Peter expressed their concern for long-term chronic illnesses, the uncertainty surrounding health effects and the inequities of community contamination. How will they seek justice for their child's illness when causal relationships are unclear?

*Peter* - I'd rather it not even be here, not even be in the community or on our land, then we're guaranteed to be safe... boy these golden years are coming up and if I'm sick in bed or dead by the time I get there because of something that is going on in our community. To me that's unfair.... What if one of my children get sick or ends up with cancer or something because of it or whatever then who do you go after you know... who bears the responsibility? (50s, Dundalk resident 17 years, opposed)

### 5.3.3 Location, Location, Location

Further amplifying some residents' concern for their children's health and safety was the proximity of the OMRC to the Proton Community School, a kindergarten to grade three elementary public school, whose property and recess yard is adjacent to the facility property. Other residents describe their concern for the vulnerability of children both to potential environmental discharges and increased truck traffic.

*Luke* - There will be some discharge... around the school and it's not just an elementary school there. There's a nursery school as well. These are our youngest most vulnerable people... in close proximity. (50s, lifelong agricultural, undecided)

*Don* - The scary part is the [trucks driving] down by the school... those kids don't stay on the sidewalk... There will be a fatality some day. It just has to be... it's a matter of time. You just pray to god that you aren't around when it happens and it's not my grandchildren I hope. But when you look up there and you watch them [the trucks] go down there you just know that something is going to happen someday. (60s, Dundalk resident, 40 years, opposed)

Many residents emphasized their value in the community as a safe and beneficial place to raise their children. This increased perceived risk for children's health and safety is crucial to better understanding how the siting of this processing facility is altering the safety residents' feel in their community and is resulting in opposition. Previous to the industrial rezoning of this land, this property was a mix of forest and swampland offering local residents' proximity to nature and a place to explore. The concern for the loss of this place of recreation, perceived safe and beneficial to one's wellbeing, emphasized many residents' concern for their own children, but also their consternation for all children attending the school both today and in the future. As Luke above referred these people as our "youngest, most vulnerable people... in close proximity".

*Ryan* - I'm concerned so close to where I went to public school. I remember snow shoeing back in there and looking at tadpoles when I was a kid. I mean where it is geographically located is a bonehead move. (20s, lifetime non-farm rural resident, opposed)

*Andrea* - It's a way too close, it shouldn't exist at all as far as I'm concerned, but for it to be where it is just outrageous to me. It's three hundred meters from my little kids school. (30s, non-farm rural resident, 14 years, opposed)

Memories of childhood experiences in natural landscapes and concerns for children in the years to come emphasizes the potential generational effects of this facility. This exemplifies the influence of residents' personal place histories and the role these memories play in shaping the therapeutic potential perceived in different locales. The OMRC was represented as out of place and intrusive in many respondents' emotional narratives and this was amplified by the facility's proximity to the public school.

*Don* - If the whole facility was being built on the farm down the highway it would be a non-issue... Certainly some people down that way may not like it, but in terms with the issue with the school, with the day care and the closeness and the trucks that go up and down it wouldn't be a consideration... 4 or 5 miles away wouldn't be an issue then, but right under your nose yes right under your nose... you bet that's a problem. (60s, Dundalk resident, 40 years, opposed)

While not all residents challenged this, issues with the OMRC's location and proximity were prominent in many of the interviews. Residents described how the facility and its location were just not right for the community and some residents felt the risks outweighed the benefits. Many felt the proximity to the facility interfered with the safety they felt in the town and further opposed the loss of proximate wilderness. Participants lamented on the potential impacts on the school children and more broadly the town of Dundalk and surrounding residents. The location of the facility became a key rallying point for residents opposing the development.

#### 5.3.4 Contested Nature of the Community as a Restorative Landscape

Many residents described the enjoyment they receive from being able to sit outdoors and enjoy their natural surroundings. However, many of these residents described their concern for the loss of this place of relaxation and refuge. In the comment below, Pam expresses the ways odour can alter her surrounding landscape as well as the strong impact potential odour would have on her quality of life and wellbeing in a very emotional manner showing the depth of her concern and the importance of this issue to her personally.

*Pam* - You know the smell. You can see where the breeze is coming in on my house and the [compost] plant... when they turn, it is absolutely hideous, we have to close the windows, we have to close the doors. It wouldn't matter how hot it was, we don't have air conditioning and the smell, it is encompassing... Again, I don't get a lot of enjoyment out of life right now. I like to sit in my backyard... I have a huge concern over smell. It truly will take away from my enjoyment of life. I don't have a lot of it left and I don't want to spend it hold up in a house where I can't go outside... That is a huge concern for us. It's not just

safety it is honestly the enjoyment of life. (40s, Dundalk resident 20 years, opposed)

Additionally, residents such as Julie discussed the enjoyment she gets out of gardening and the ways she anticipates the facility and its potential odours would impact that: "I'm a gardener as you can see. I wouldn't want to do that anymore because I'm not going to come out in the smell" (*Julie, 40s, Dundalk resident 17 years, opposed*). These residents described feelings of being trapped indoors and fears for the alteration of their surrounding environment. While not all residents felt this way and some even described these odours as just a part of rural life, the anticipation of intrusive odours and a noxious facility were enough to transition these previously restorative environments to a perceived negative and risky place in which they can no longer receive enjoyment and restoration in.

In stark contrast, James emphasized the benefits of the facility saying that it contributes to a "sounder business community" supplying the needs of the community, which "makes the community a stronger place plus a better place to live" He also spoke of other risks in the community that he feels far outweigh the risks of the biosolid processing plant to his grandchildren as he expressed his disbelief of potential impacts.

*James* - I have grandchildren that go to the school. If anything, I think that there's a lot of other things in Dundalk... that pose a whole lot more health risks than what this plant does. Ya I have no problem, there's bigger chance of them... having an accident on the school bus than there is them having troubles from where the facility is located... sure it'd be nicer if it was on the other side of Tim Buck Too, but in today's world wherever it did go somebody else would complain. (lifelong agricultural, 50s, supportive)

The uncertainty surrounding the impacts of biosolid processing and land application in these residents' locale contributes to a polarizing debate whereby some residents fear for both their own and their children's health in this changing environment while others believe there are worse risks in the community and this facility does not impact the level of safety or restoration they experience in their locale. This differentially perceived threat acted to propagate community conflict and divisions further contributing to the

felt impacts' on residents' wellbeing and daily social relationships. Whether or not this landscape was seen as therapeutic and beneficial to one's wellbeing in the first place influenced the ways residents perceived and responded to the changes in their locale.

Residents discussed how whether or not there are direct effects from the facility and its by-products, the changing land use is altering the ways residents perceive their surroundings. Residents' worries about the impacts are enough to alter the therapeutic benefits of the natural environment around them to a place of perceived contamination and health risk. Perceptions that can have negative impacts on residents' overall wellbeing.

*Luke* - It's the fact that people are worrying about it that's a problem and it can affect their health... I'm not challenging the process as much as I'm challenging the location. It's just not the right place... the proximity to the Grand River headwaters and the school and to the residential areas. To me it's not the right place... I think I'm becoming more accepting of the fact that if somebody thinks an issue is an issue, it's an issue... if they smell it and then that starts their minds thinking about well if I can smell it then what else is in it and is it good for me and is it gonna harm me? Then at that point then it's affected the person. It's harmed the person. (50s, lifelong agricultural, undecided)

Luke described how what was once seen as a safe place to live is now being perceived as a health risk and whether or not the risks are 'real' the impacts are being felt among community members. The beneficial therapeutic nature of their landscape is being contested with the siting of this facility, which is impacting residents' experiences of safety and wellbeing in their community. While in contrast residents such as James did not see this area of the community as naturally therapeutic, but as a place for production, and thus in their eyes the safety of the community has not been impacted. Residents' responses to the location of the facility and the changing land use provide insight into residents' perceived level of disruption to the landscape. Further, residents discuss the subjective nature of the level of impact odours can have and how these new smells can alter the surrounding landscape.



## 5.4 Discussion and Conclusions

Our case study highlights the importance rural residents' conceptions of their environment as a tranquil place to live with their children and future generations and how such therapeutic tranquility can be turned upside down with the intrusion of urban waste such as biosolids. This study contributes to the emerging literature on contested therapeutic landscapes (Milligan, 2007, Smith et al., 2010; Wakefield and McMullan, 2005) and relational change in rural landscapes (Conradson, 2005). The current study extends this literature by revealing how therapeutic contestations and selectivities (Smith et al., 2010) can be influenced by the imaginary geographies of uncertainties in ordinary rural landscapes when there are unwanted intrusions of urban by-products and processes. Under such situations, landscapes that were considered to be therapeutic (by some) may now become non-therapeutic when noxious developments take place. The anticipated disruption to residents' place of refuge and their imaginary geographies of uncertainty as a result of what is considered by some as an urban overrun leads to strong and passionate opposition towards this proposed facility. This calls for consideration beyond the traditional risk society literature and facility siting credo to a more inclusive framework accounting for the nature of the hazard, the complex community context and residents' varying senses of place given that landscapes are experienced variably and these experiences may evolve over time.

Southgate residents initially considered their community a safe and relaxing place to live. Residents viewed the siting of the biosolids facility in the community as a disruption to the healthy, restorative and tranquil nature of their pastoral landscape. Many residents described how they had migrated to or chose to remain in the community because of its closeness to nature as well as for the clean air and healthy environment. For relatively new arrivals, their attraction to rural place was because of its pastoral nature with minimal urban interferences and development. Long-standing residents were already attached to the landscape as both a place of tranquility and a place of production. Yet within the

context of a neoliberal economy, some local residents and the municipal government view what was seen as a pastoral and therapeutic landscape by some as an underutilized field, affectionately named “EcoPark”, and a landscape for industrial development. This resulted in a contested everyday landscape that some policy makers would not consider an ‘extraordinary’ place and therefore has no therapeutic benefits to personal wellbeing (such as American Indian sacred landscapes (Dobs, 1997)).

Besides the disruption of the therapeutic tranquility of the landscape, emerging from this study was another layer of contestation whereby residents embodied concern of being exposed to unpalatable odours and emerging contaminants due to biosolid processing in the community. The anticipation of landscape change from refuge to risky elicited strong feelings of stress, fear and anxiety among these concerned residents. Additionally, residents’ embodied concern for the potential of being trapped indoors and having to give up restorative hobbies outdoors further reinforced emotional responses and confrontations among residents and with municipal leaders. This research contributes to literature surrounding therapeutic landscapes by examining the impact of anticipated degradation of a place’s therapeutic properties on their everyday experiences in their community.

However, residents who saw this proposed facility as a benign part of the landscape and thus did not see this development as disruptive to their sense of place or as degrading the safe or therapeutic nature of their surroundings, did not oppose the siting of this facility. This contributes to an understanding of individuals’ differential and subjective experiences in space (Bell et al., 2015; Townsend and Pascal, 2012; Williams, 2007; Gesler 2005; Rose, 2012). Further, we highlight the ways these differential place attachments influence residents’ perceived level of disruption to the therapeutic qualities of their surroundings and influences their responses to proposed techno-industrial facilities. This corroborates findings by Wakefield and McMullan (2005) showing that health-

affirming and health-denying place-based attributes can be experienced in the same locale. Thus, it is important for developers and local officials alike to better understand residents' differential attachments to place and the therapeutic benefits they may (or may not be) experiencing in a locale where a development is proposed.

This research shows that relatively newer residents, who are unlikely to be farmers, generally opposed the development of the biosolids facility. These participants overwhelmingly resided within the village of Dundalk and were not involved in agriculture or production industries demonstrating their disassociation and independence from these ways of life. This distribution of concerned residents may be due to their proximity to the perceived therapeutic landscape and potential site of risk and degradation, however we side with previous research which suggests these differences have less to do with proximity and more with residents value differences and place attachments (Devine-Wright and Howes, 2010; Baxter, 2006). These residents were more strongly attached to the natural amenities in the community and aspects that contributed to their relaxation and refuge which had positive benefits to their quality of life. This is aligned with findings by Soini et al. (2012) and Stedman (2006) who similarly found that shorter-term residents were more strongly attached to the environmental attributes of their community, whereas longer-term residents based their place attachments on their social relations in the community. The conflict not only between primarily shorter-term and longer-term residents but also how the place in question may be used for production is influenced by the core difference between those who view 'rural' landscapes as a resource, equating it with food, agriculture and primary production, and those more inclined to emphasize the pastoral rural countryside as a place of relaxation and refuge. This is consistent with work by Devine-Wright (2012) who found distinct varieties in residents' place attachments as influenced by themes of rurality and the perceived urbanisation or disruption to the naturalness of place. Furthermore, Masuda and Crabtree (2010) revealed the politicized and contested narratives of the therapeutic benefits among transient residents and stakeholders

within a neighbourhood in inner city Vancouver. Such contested landscapes is also evident in our findings and points to the multidimensional health and wellbeing impacts in changing landscapes. These invariable contestations can be reinforced by the frequent draw to the defense of core values and ways of life by both the 'new' and 'old' in conflictual environments. This reaffirms the coexistence of both the healing and non-healing aspects of specific context.

Opposing residents' concern for core values such as their personal and children's health is well documented in the literature (Walker et al., 2014; Atari et al., 2011; Baxter and Greenlaw, 2005; Luginaah et al., 2002). The location of the facility and proximity to these 'vulnerable populations' became a rallying point among opposed residents, continuously citing the facility's proximity to the school as their main source of concern. However, it is important to mention that not all residents shared this concern. These differences in both perceived risk and community disruption help to elucidate residents' differing and complex senses of place and responses to noxious facility siting. It is not that residents supporting this development do not care for their children's or grandchildren's health, but that this proposed facility did not change the level of risk they feel residents are subjected to in the community. This substantiates individuals' differential and relational experiences of landscape change (Conradson, 2005). This perceived change by residents instigated opposition to the facility siting process to protect their environment. As DeMiglio and Williams (2008, p, 27) suggest, "the act of protecting place (e.g., from environmental hazards) might be considered a method of protecting self and thus a method of sustaining personal well-being". Residents act to protect their own wellbeing by defending the community features, which they perceive to have therapeutic benefits and have developed strong emotional ties to, embodying these characteristics as crucial to the beneficial nature of their community. This is a safe place to raise their children or a relaxing place to seek refuge or enjoy and entertain outside.

Such inherent differences in community opinion, rarely seen in waste management situations, can only increase emotions among residents hence the community conflict that resulted in congregation members sitting on different sides of the pews in their local community church depending on their stance on the issue. The instability of emotions in the community as propagated by this community conflict and opposition is notable. As residents so passionately oppose this development for fear of both their own and their children's health, it can be disturbing to these individuals that others in their community are rallying for this development. The differences in belief surrounding what is best for future generations or a risk to children's health show how individuals analyze benefits for the community's future and inherent therapeutic qualities differently, whether that is through prioritizing the natural restorative elements or the economic and development aspects of the community. This is particularly relevant in increasingly dynamic and heterogeneous rural communities where differing notions of rural are impacting how residents see the 'best' direction for community growth. Residents of Southgate are looking to live good lives in and see the community prosper, and this is manifest in their opposition or support towards proposed developments such as the OMRC. This signals an emerging dilemma whereby a community's therapeutic nature is contested both between community residents' as well as over time as these landscapes change. To some residents, this techno-industrial development disrupted the therapeutic nature of their surroundings and resulted in psychosocial distress, while for others this restorative and therapeutic nature was contested from the onset and never valued to the extent of local production and economies in their community. This highlights the nuances of a landscape's perceived therapeutic qualities and residents' attachments to and expectations of place.

This paper adds to the therapeutic landscapes literature and discussions of sense of place by drawing on residents' dynamic perceptions of the uncertainty surrounding potential health effects of a facility and how this has impacted emotional attachments to their community and the therapeutic feelings of safety and restoration they experience (e.g., Smith et al., 2010). We further contribute to an understanding of how

residents' perceptions of their surroundings as therapeutic may be evolving over time (Milligan, 2007; Wakefield and McMullin, 2005) as a result of proposed techno-industrial development and environmental change. While not all residents agreed that the OMRC was a threat to their own or their children's health, those who did were very passionate and concerned about this. Whether these residents were the minority or majority is less important; concerned residents experienced psychosocial impacts manifested through stress for their families' wellbeing and concern for having to relocate if the facility becomes operational. Taking such strong action as leaving the place they call home to protect their health emphasizes the weight they place on their wellbeing. We contribute to the literature on place attachments and therapeutic landscapes as we demonstrate how residents' sense of place is transformed as the 'safe place they call home' is (or is not) altered to a place that is stressful or anxiety provoking (Milligan, 2007) due to the proposed development of potentially noxious facilities in these rural residents' landscape. While much of the emotional geography literature surrounding therapeutic landscapes focuses on the positive affective bonds, we show how differentially perceived threats initiate concern and stress among residents and fuels facility opposition and community conflict within these contested landscapes. Going forward, further research should be conducted into how facility siting processes may variably impact residents' feelings of safety and security in their community to elucidate differences between residents in these increasingly heterogeneous and dynamic communities.

## 5.5 References

- Altman, I. and Low, S. M. (1992). *Place Attachment*. New York and London, Plenum Press.
- Andrews, G. J. (2004). (Re)thinking the dynamics between healthcare and place: therapeutic geographies in treatment and care practices. *Area*, 36(3), 307-318.

- Atari, D. O., Luginaah, I. and Baxter, J. (2011). "This is the mess that we are living in": residents' everyday life experiences of living in a stigmatized community. *GeoJournal*, 76, 483-500. Doi:10.1007/s10708-010-9365-7
- Baxter, J. (2006). A case study of intra-community conflict as facility impact. *Journal of Environmental Planning and Management*, 49(3), 337–360.
- Baxter, J., and Greenlaw, K. (2005). Explaining perceptions of a technological environmental hazard using comparative analysis. *The Canadian Geographer*, 49(1), 61-80.
- Beecher, N., Connell, B., Epstein, E., Filtz, J., Goldstein, N. and Lono, M. (2004). *Public Perception of Biosolids Recycling: Developing Public Participation and Earning Trust Final Report* (No. 00-PUM-5). London: Water Environment Research Foundation, IWA Publishing.
- Bell, S. L., Phoenix, C., Lovell, R. and Wheeler, B. W. (2015). Seeking everyday wellbeing: the coast as a therapeutic landscape. *Social Science and Medicine*, 142, 56-67.
- Conradson, D. (2005). Landscape, care and the relational self: therapeutic encounters in rural England. *Health and Place*, 11, 337-348.
- Davidson, J. and Milligan, C. (2004). Embodying emotion sensing space: Introducing emotional geographies. *Social and Cultural Geography*, 5(4), 523-532. Doi:10.1080/1464936042000317677
- DeMiglio, L. and Williams, A. (2008). A sense of place, a sense of well-being. In J. Eyles and A. Williams (Eds.), *Sense of Place, Health and Quality of Life* (pp 15-30). Ashgate, Hampshire, England.
- Devine-Wright, P. and Howes, Y. (2010). Disruption to place attachment and the protection of restorative environments: A wind energy case study. *Journal of Environmental Psychology*, 30, 271-280.
- De Vries, S., Verheij, R. A., Groenewegen, P. and Spreeuwenberg, P. (2003). Natural environments—healthy environments? An exploratory analysis of the relationship between greenspace and health. *Environment and Planning A*, 35, 1717-1731.

- Dobbs, G. R. (1997). Interpreting the Navajo sacred geography as a landscape of healing. *Pennsylvania Geography*, 35, 136-150.
- Eyles, J. and Williams, A. (Eds.) (2008). *Sense of Place, Health and Quality of Life*. Ashgate, Hampshire, England.
- Gesler, W. (1992). Therapeutic landscapes: medical issues in light of the new cultural geography. *Social Science and Medicine*, 34, 735-736.
- Gesler, W. (1993). Therapeutic landscapes: theory and a case study of Epidauros, Greece. *Environment and Planning D: Society and Space*, 11, 171-189.
- Gesler, W. (1998). Baths reputation as a healing place. In R. A. Kearns and W. Gesler (Eds.), *Putting Health into Place*, pp. 17-35. Syracuse University Press, Syracuse.
- Gesler, W. (2005). Therapeutic landscapes: an evolving theme. *Health and Place*, 11, 295-297.
- Goven, J., Langer, L., Baker, V., Ataria, J. and Leckie, A. (2012). Community engagement in the management of biosolids: lessons from four New Zealand studies. *Journal of Environmental Management*, 103, 154-164.
- Hartig, T., Ecan, G. W., Jamner, L. D., Davis, D. S. and Garling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, 23, 109-123.
- Hay, D. A. (1992). Rural Canada in transition: trends and developments. In D. A. Hay and G. S. Barson (Eds.), *Rural Sociology in Canada* pp. 4-15. Toronto; Oxford; New York: Oxford University Press.
- Jenkins, S. R., Armstrong, C. W. and Monti, M. M. (November 2007). "Health Effects of Biosolids Applied to Land: Available Scientific Evidence." Accessed June 1, 2012. [http://www.virginiabiosolids.com/pdf/Biosolids\\_Available\\_Evidence\\_1107.pdf](http://www.virginiabiosolids.com/pdf/Biosolids_Available_Evidence_1107.pdf)
- Jones, C. C. (2011). Environmental justice in rural context: land-application of biosolids in Central Virginia. *Environmental Justice*, 4(1), 1-15.
- Kearns, R. and Collins, D. (2012). Feeling for the coast: the place of emotion in resistance to residential development. *Social and Cultural Geography*, 13(8), 937-955.



- Krogmann, U., Gibson, V. and Chess, C. (2001). Land application of sewage sludge: perceptions of New Jersey vegetable farmers. *Waste Management and Research*, 19, 115-125.
- Lowman, A., McDonald, M. A., Wing, S. and Muhammad, N. (2013). Land application of treated sewage sludge: community health and environmental justice. *Environmental Health Perspectives*, 121(5), 537-542.
- Luginaah, I. N., Taylor, S. M., Elliott, S. J. and Eyles, J. D. (2002). Community reappraisal of the perceived health effects of a petroleum refinery. *Social Science and Medicine*, 55, 47-61.
- Mason, S. A., Dixon, J., Mambulu, F., Rishworth, A., Mkandawire, P. and Luginaah, I. (2015). Management challenges of urban biosolids: narratives around facility siting in rural Ontario. *Environmental Planning and Management*, 58(8), 1363-1383.
- Mason, S.A., Walker, C., Baxter, J. and Luginaah, I. (2016). Ethics and activism in environment and health research. In N. E. Fenton and J. Baxter (Eds.) *Practicing Qualitative Methods in Health Geographies* (pp. 54-72). Routledge.
- Massey, D. (2011). A counterhegemonic relationality of place. In E. McCann and K. Ward (Eds.) *Mobile Urbanism Cities and Policymaking in the Global Age* (pp. 1-14). University of Minnesota Press: Minneapolis; London.
- Masuda, J. R. and Crabtree, A. (2010). Environmental justice in the therapeutic inner city. *Health and Place*, 16, 656-665.
- Milligan, C. (2007). Restoration or risk? Exploring the place of the common place. In A. Williams (Ed), *Therapeutic Landscapes* (pp. 255-271). Ashgate, Hampshire.
- Milligan, C., Gatrell, A. and Bingley, A. (2004). Cultivating health: therapeutic landscapes and older people in Northern England. *Social Science and Medicine*, 58, 1781-1793.
- (OMAFRA) Ontario Ministry of Agriculture, Food and Rural Affairs. (2010). *Best Management Practices: Application of Municipal Sewage Biosolids to Cropland*; Queens Printer for Ontario: Toronto.
- Parr, J. (2010). *Sensing Changes*. Vancouver and Toronto: UBC Press.

- Robinson, K. G., Robinson, C. H., Raup, L. A. and Markum, T. R. (2012). Public attitudes and risk perceptions toward land application of biosolids within the South-Eastern United States. *Journal of Environmental Management*, 98, 29-36.
- Rose, E. (2012). Encountering place: a psychoanalytic approach for understanding how therapeutic landscapes benefit health and wellbeing. *Health and Place*, 18, 1381-1387.
- Simmons, P. and Walker, G. (2004). Technological risk and sense of place: industrial encroachment on place values. In A. Boholm and R. Löfstedt (Eds), *Facility Siting: Risk, Power and Identity in Land Use Planning*, pp. 136-155. Earthscan, London; Sterling, VA.
- Smith, K., Luginaah, I. and Lockridge, A. (2010). 'Contaminated' therapeutic landscape: the case of the Aamjiwnaang First Nation in Ontario, Canada. *Geography Research Forum*, 30, 83 – 102.
- Strauss A. and Cobin J. (1990). *Basics of Qualitative Research Grounded Theory Procedures and Techniques*. Sage, California.
- Townsend, R. A. and Pascal, J. (2012). Therapeutic landscapes: understanding migration to Australian regional and rural communities. *Rural Society*, 22(1), 59-66.
- Walker, C., Baxter, J. and Ouellette, D. (2014). Adding insult to injury: the development of psychosocial stress in Ontario wind turbine communities. *Social Science and Medicine*, 133, 358-365.
- Wakefield, S. and McMullan, C. (2005). Healing in places of decline: (re)imagining everyday landscapes in Hamilton, Ontario. *Health and Place*, 11, 299-312.
- Williams, A. (2007). Introduction: the continuing maturation of the therapeutic landscape concept. In A. Williams (Eds), *Therapeutic Landscapes*, pp. 1-12. Ashgate, Surrey.
- Wood, V. J. Gesler, W., Curtis, S. E. Spences, I. H., Close, H. J., Mason, J. and Reily, J. G. (2015). 'Therapeutic Landscapes' and the importance of nostalgia, solastalgia, salvage and abandonment for psychiatric hospital design. *Health and Place*, 33, 83-89.

Woods, M. (2005). *Rural geography: processes, responses and experiences in rural restructuring*. London; Thousand Oaks, California: Sage.

## Chapter 6

The Community Divide is more Detrimental than the Plant Itself: Confrontational Stigma  
and Community Responses to Rural Facility Siting

Sarah Mason-Renton<sup>1\*</sup>, Isaac Luginaah<sup>1</sup>, Jamie Baxter<sup>1</sup>

1. Department of Geography, The University of Western Ontario

\*Doctoral Candidate

Published: *Journal of Rural and Community Development* (2016), 11(2), 22-44

## 6 THE COMMUNITY DIVIDE IS MORE DETRIMENTAL THAN THE PLANT ITSELF: CONFRONTATIONAL STIGMA AND COMMUNITY RESPONSES TO RURAL FACILITY SITING

Rural communities are changing as exurban residents in-migrate with differing expectations than long-time residents of the surrounding agricultural community. The implications come into focus when techno-industrial developments are introduced in rural landscapes – potentially affecting residents' place attachment. In the Township of Southgate, Ontario, a proposed biosolid (sewage sludge) processing facility resulted in hostile community conflict and emotional impacts that have driven a wedge between friends and family members. Utilizing in-depth interviews (n=23), this paper examines narratives of community in Southgate Township and the emotional impacts residents experienced during the facility siting process. The results suggest that divergent responses to facility development and landscape change has stimulated particularly strong intra-community conflict and emotions, altering the ways rural residents initially perceive their landscape and community as a safe tranquil place with a strong sense of community. Emerging from this analysis is the notion of confrontational stigma whereby residents worried the polarizing conflict that emerged in the community between those who oppose the facility versus those who support it for economic and agricultural purposes is leading to outsiders viewing their community negatively. Residents described how this depth of conflict could be more detrimental to the community than the effects of the facility itself. These findings suggest greater attention to community-level impacts of facility siting in rural areas in particular. This study makes recommendations for a facility siting process in rural communities that is more attentive to the diversity of rural residents, their range of place attachments and the potential for lasting social and emotional impacts within these diverse rural communities.

Keywords: biosolids, community conflict, place attachment, community dynamics

## 6.1 Introduction

Rural communities are evolving socioculturally and demographically as urban residents migrate for an often idealized notion of rural life and an escape from urban environments (Hay, 1992). These new rural landholders often possess different perspectives on the rural landscape than farmers (Cooke and Lane, 2015; Cadieux and Hurley, 2011), which may result in increasing pressure on rural lands (Abrams, Bliss and Gosnell, 2013). However, as Hiner (2014) points out, this difference may have less to do with length of residence *per se* and more with residents' political ideologies and place expectations. This influx of new residents may be welcomed and seen as bringing positive change to rural communities (Hoggart, 1997). However, this is not always the case as in some instances intra-community conflict over contentious developments may intensify following such amenity migration (Batel et al., 2015; Baxter, 2006). Small towns are known for their defined social patterns and close knit structures (Jacquet and Stedman, 2013). It is in this context that the notion of old-timer and new-comer is meaningful as cliques are easily formed along these lines, with a tendency to alter internal relationships as "the power of shared histories declines" (Jacquet and Stedman, 2013, p. 1290). While this view has been critiqued as too simplistic (Wilkinson et al., 1982) as well as for failing to account for the importance of residents' values and ways of life (Baxter, 2006; Smith and Krannich, 2000), keeping this dynamic in mind is useful when examining the well-being impacts of proposed new development.

Whether full-time or part-time residents, visitors or newcomers, individuals have differing expectations regarding what is right for the rural landscape (Soini et al., 2012). Hence emerging change, such as techno-industrial development, can result in disagreement and conflict (Devine-Wright, 2009; Baxter, 2006; Vorkinn and Riess, 2001; Walker, 1995). For example, while both farmers and non-farmers may support limited local population growth (Smith and Krannich, 2000), farmers traditionally value the agricultural way of life while non-farming rural country residents seem more likely to establish their place attachments and community expectations based on natural

amenities (Hiner, 2014; Masuda and Garvin, 2008). With the importance placed on what residents' value and what they are attached to in their community, it is important to understand the nuanced expectations across community groups, rather than base assumptions on simplistic dichotomies.

With technological advancements, there are more manufacturing and extractive industries which are being increasingly sited in rural spaces due to the availability of cheaper land. The intrusion of these technologies triggers fears of potential technologically related risks and hazards (Baxter, 2006; Baxter et al., 1999; Pigeon et al., 2003; Kunreuther et al., 1993; Krinsky and Golding, 1992; Beck, 1992). For example, Devine-Wright and Howes (2010) found place attachments and individual's view of place played the strongest role in predicting opposition to an offshore wind energy development. For the purposes of this paper, we define place attachment as the emotional bond that individuals and/or groups establish with specific settings they inhabit or frequently visit (Altman and Low, 1992). This conception of place is particularly important when the landscape and nature are considered by many to be a place for emotional- and self-regulation as well as psychological restoration (Devine-Wright and Howes, 2010).

As residents experience relatively dramatic changes to rural landscapes, greater attention may be paid to stigmas (e.g., dirty, noisy, unhealthy) associated with the technologies involved (e.g., wind turbines, waste facilities) which can have a spiraling impact on spoiled identity as environmental assessment processes take hold and facilities get built (Parkhill et al., 2014; Peters et al., 2004; Gregory et al., 1995). The emerging light cast on facility siting in rural places has historically and pejoratively been equated with the Not-In-My-Back-Yard (NIMBY) syndrome. Yet, NIMBY has been exposed in the literature as largely a political concept generally meant to undermine those opposed to new developments (Wolsink, 2000). In general planning, risk perception, and facility siting researchers have criticized NIMBY as overly simplistic, something that too easily glosses over the multifaceted nature of risk perception and

the complexities of opposition (Wolsink, 2006; Devine-Wright, 2009; McClymont and O'hare, 2008).

Although some existing research has examined facility siting from the perspective of individuals' place attachments, risk perceptions, and technological stigma in the context of communities facing new facilities (for example Atari et al., 2011), such perspectives remain under explored. Devine-Wright and Howes (2010) show how conflict may be linked to variation in place attachment (see also Kroll-Smith and Couch 2015), while intra-community conflict may likewise be linked to place based concerns about the distribution of facilities within the community, health, and the distribution of benefits from the facility (e.g., Walker et al., 2014, Baxter 2006). Yet, there is relatively little empirical research devoted to how these relate to community conflict and the impacts this can have on the community itself – which may have an equally serious short and long-term impact. This research aims to address this gap in the literature. Specifically, the study explores residents' responses to and perceived impacts from a proposed regional biosolid (sewage sludge) to fertilizer processing facility in the rural community of the Township of Southgate, and if any stigma (facility or community) was perceived. This research unpacks how rural residents' place attachments and emotions surrounding contentious community issues may contribute to a diversity of perceptions and may be drivers of intra-community conflict.

### 6.1.1 Place Attachments in Changing Rural Communities

This research aims to draw connections between place attachment, risk perceptions and technological stigma within rural landscapes. An expanded and enriched focus on place attachments and community context in risk research provides a more comprehensive approach to examining perceptions, responses and broader societal trends surrounding the support for or opposition to techno-industrial developments (Boyd and Paveglio, 2015).



In changing rural communities, Parr (2010) characterizes residents' experiences in place as eliciting emotions that draw upon the wide range of senses. For instance, the concept of place attachments focuses on the emotional bonds between people and their well-known environments, which can often promote community interaction and emotional ties (Manzo and Perkins, 2006; Devine-Wright and Howes, 2010; Altman and Low, 1992). Emotional bonds develop between individuals or groups and the familiar locations they reside in or often visit such as one's home or neighbourhood and frequently involve both social and physical sub-dimensions (Altman and Low, 1992; Tuan, 1974). Dramatic land use changes have the potential to disrupt not only the biophysical nature of the landscape, but the social interaction of an area as well (Jacquet and Stedman, 2013; Anderson, 2013).

This important concept of place attachment is nested within the overarching construct of sense of place. Within environmental psychology literature (Jorgensen and Stedman, 2001; and Stedman, 2002), sense of place describes specific place relationship and includes place dependence, place identity and place attachment. Alternatively, sense of place is often more generally described as a multidisciplinary and complex construct involving core elements such as rootedness, belonging, place identity, meaningfulness, place satisfaction and emotional attachment in humanistic geography (Demiglio and Williams, 2008). While in some instances (for example Altman and Low, 1992) place attachment and sense of place are used interchangeably (Patterson and Williams, 2005), we acknowledge the differences in these terms and adopt the notion of sense of place as an overarching construct as described above. These affective bonds between person and place have been examined in the realms of environmental psychology (Jorgensen and Stedman, 2001; Stedman, 2002; Hummon, 1986) and humanistic geography (Eyles, 1985; Relph, 1976; Tuan, 1980; Butz and Eyles, 1997) among other social science disciplines including anthropology and sociology. As health geographers, Williams et al. (2010) describe how some inquiries into sense of place are less place-based, but rather focus on the psychological components; whereas the geographical understanding of sense of place, and other place-based constructs such as place attachment, pay

attention to geographical understanding and context. We similarly adopt a geographical definition of place attachment (defined above as the emotional bond that individuals and/or groups establish with specific settings they inhabit or frequently visit) placing primacy on the place-based setting in which these bonds form, and simultaneously referring to geographical place, social community/environment, and emotive bonds (Williams et al., 2010).

While, place attachments are not completely unique to each individual, differences in daily experiences and practices, biography, and place specific social relationships impact each individual's attachment to place in unique ways (Simmons and Walker, 2004; Demiglio and Williams, 2008). This sheds light on the consequences of idealized notions of rural life, when they confront development and the changing realities in the rural landscapes. Furthermore, strength of place attachment has been found to influence opposition (Vorkinn and Riese, 2001). However more recent research has highlighted the importance of whether a proposed development fits with residents' attachments or not for predicting facility opposition. For example, Devine-Wright and Howes (2010) found that public opposition to large-scale renewable energy projects was associated with strong place attachments to the community as a restorative environment. However, strong place attachments are not always linked to opposition, especially when developments are seen as improving or complementing a locale that may be viewed as languishing economically (Devine-Wright, 2012; Mason-Renton and Luginaah, 2016). Devine-Wright and Devin-Wright (2009) emphasize the nuanced and complex nature of individual's place attachments and symbolic meanings associated with techno-industrial developments such as large-scale electricity transmission towers, which can in turn impact residents' differing affective or behavioural responses. Thus, changes to places are not necessarily always disruptive to place attachments and such changes can have either negative or positive impacts for people (Manzo, 2014). It is how these changes to place are interpreted that is important for residents' response and community dynamics (Batel, 2015; McLauchlan, 2009; Devine-Wright and Devine-Wright, 2009).

Rural residents' strong felt, and often differing, place attachments can heighten intra-community conflict as they influence the ways in which residents perceive and respond to risk. While this diversity of responses to place change has been shown (Devine-Wright and Howes 2010; Vorkinn and Riese, 2001) what remains to be discovered is how divergent responses due to residents' varied attachments to place within heterogeneous rural communities is experienced and how this may be altering community dynamics. We extend this concept further by examining the interactions between these potentially divergent groups and any social or emotional impacts this may have.

### 6.1.2 Felt Impacts of Facility Siting Processes – Community Conflict and Stigma

Just as place attachments are variously constructed and context-dependent, so too are technological risk and stigma. Here we connect two forms of stigma – technological stigma and place (community) stigma – with facility siting and conflict to develop the idea of *confrontational stigma* that emerged from our results. Internal conflict can lead to a 'corrosive community' characterized by stressful chronic interactions between individuals and groups within a community as well as with outsiders (Freudenberg, 1997; Picou et al., 2004). Facility siting processes may instigate or reinforce group differences thus propagating intergroup conflict regarding current or potential environmental contamination (Batel et al., 2015; Anderson, 2013). These intergroup divisions and conflict may arise based on differing ways of life or length of residence. This conflict may be experienced as an individual impact, regardless of position towards proposed developments, as well as a barrier to facility siting and development (Baxter et al., 2013; Baxter, 2006).

Although there has been a lot of work on conflict between opposing communities and industrial developers, research that focuses on intra-community conflict related to

industrial development is relatively lacking. This is seen in foundational environmental contamination and conflict literature such as that surrounding the Love Canal injustices (Fletcher, 2002). Walker et al. (2015) examined intra-community conflict and psychosocial impacts of wind developments in rural Ontario, and focused less on residents' attachments to place or the interaction between these conflicting groups. Further, while much of the environmental hazard research regarding community conflict has focused on the nature of the hazard itself, Baxter (2006) and Devine-Wright and Howes (2010) calls for greater attention to community context. The effects of conflict in these seemingly close-knit rural communities is rarely unpacked in relation to facility siting – despite the weight rural residents place on community social interactions and thus the propensity for felt impact from community disruption.

A focus on residents' place attachments will deepen our understanding of how techno-industrial developments and risks impact individuals' feelings regarding their community and associated place values (Simmons and Walker, 2004). Place attachments are dependent on symbolic meanings as we attribute meaning to specific landscapes and subsequently become attached to such meanings (Stedman, 2002). The desire to maintain a positive community identity has a notable effect on the community's response to a hazard (Baxter and Lee, 2004) and emotions are reinforced by any perceived or lingering stigma as a result of a noxious facility (Goffman 2009, Hummon 1986). Issues surrounding stigma engage place attachment and overarching sense of place and place value concerns to examine residents' responses to place change and perceived impacts (Gregory et al., 1995). In regard to the environment, the emergence of stigma is often accompanied by increasing societal concerns about ecological and human health risks of technologies (Gregory and Satterfield, 2002). These stigmatized places often share the common feature of eliciting high perceptions of risk, fuelling opposition and a violation of what people perceive to fit with or be right for their community (Goffman, 2009; Atari et al., 2011). Technological stigma often goes beyond conceptions of perceived risk to something that is shunned because it overturns a previously favoured condition, which is directly related to individuals' multidimensional

place attachments (Gregory and Satterfield, 2002; Wester-Herber, 2004). Further, due to residents' varied expectations of the landscape, technological stigma may not be felt if techno-industrial developments are seen as being part of the local landscape (Parkhill et al., 2014). Opposition towards landscape or community change can be an expression of the motive to preserve community places, spaces and interactions that these residents' value (Devine-Wright, 2009).

This paper uses the preceding theoretical constructs to examine how (if at all) this facility siting process has (1) impacted residents' place attachments and fueled intra-community conflict (2) how residents perceive their community to be stigmatized as a result of this process. This paper proceeds with a description of the facility siting context, the methods utilized in this research, a discussion of key themes which emerged, and a final discussion and conclusion. It is worth noting the temporal arrangement of conceptualization as this study did not set out to conceptually develop notions of stigma. The study initially set out to understand rural residents' experiences of change in their community during the facility siting process. However, the idea of confrontational stigma emerged in the interview analysis as a way to connect concepts of rural community place attachments, facility siting and stigma.

### 6.1.3 Biosolid Facility Siting in Southgate, ON

The Township of Southgate is located in rural southwestern Ontario and is a small middle class rural municipality characterized by a recent high turnover of population and rapidly increasing income – likely due to influx of relatively wealthy exurbanites. Southgate (population: 7 100; Statistics Canada, 2013) has a median household income of \$56,480 compared with the provincial median household income of \$66,358 (Statistics Canada, 2013) (for a full description of sociodemographic community characteristics see Mason et al., 2015). The Village of Dundalk (population 1 900; Statistics Canada, 2013) is the only sizable village within the municipality. While

Southgate's has experienced substantial in- and out-migration (about 21.5% of current residents have moved in to the community during this time period with similar rates of outmigration) resulting in population demographic and socio-cultural changes including a rising income associated with newer residents who likely fall into the growing commuter population (Mason and Luginaah, 2016). This growing commuter population has implications for residents' attachment to place as a locale for refuge and restoration from their daily work rather than a place of work and consumption. As we observe, this can have implications for reactions towards community development and cohesion.

In 2011 a regional biosolid (processed sewage sludge) to agricultural fertilizer processing facility, the Southgate Organic Material Recovery Centre (OMRC), was proposed to be located in an industrial "EcoPark" adjacent to the village of Dundalk in the Township of Southgate. The siting process that followed was very contentious lasting over a year until approvals were granted in the fall of 2012 and the facility becoming operational in the spring of 2013. Throughout the siting process community conflict escalated and the social and emotional impacts of this siting process became evident through increased challenges to local governance, hostile public debate through news media and visible fracture within the community. The local and regional newspapers, for example became a battleground, as the following excerpts suggest:

As a ratepayer of Southgate Township who has been watching the events unfold in the last few weeks... I am very angry and dismayed... people [are] using very aggressive bullying tactics and holding our township hostage. (Cheeseman, 2012)

I too am very angry and dismayed... our 'small' group is neither aggressive or bully-like... we are peaceful and we are there to protect the land... who wants to live in a town where the only industry is waste related? Not me. Who are the bullies here anyway? (Mainprize, 2012)

This media battle, traced in greater detail in Mason et al. (2015), signaled community members taking each other to task publicly, which warranted further exploration.

Conducting this research at the height of the uncertainty in the facility siting process

provides an opportunity to understand the impacts of facility siting and the extent and determinants of the breakdown of community relationships.

While studies of this sort tend to focus on the impacts as defined by the facility and siting process (Luginaah et al., 2002; Wakefield and Elliott, 2000) social interaction also plays a key role (Devine-Wright and Howes, 2010). We contribute to this literature by exploring the differential interplay between residents in favour of the facility versus those who are opposed and how the social interplay between these polarized groups is important, for better understanding the impact diverse values have on social and emotional outcomes – well-being – during and after the facility siting process.

## 6.2 Method

To add depth of understanding about the interconnections between residents' place attachments and risk perceptions, we adopted an exploratory and inductive qualitative methodology involving in-depth interviews (n=23). As suggested by Baxter and Eyles (1999), this method allows for a better understanding of the multiple meanings of risk in the context of residents' everyday lives, rather than a focus on the hazard characteristic alone. Semi-structured dialogue extends beyond expressed concern, helping to uncover deeper issues of contested ways of life and community expectations and values (Baxter and Eyles, 1999). The primary author conducted these interviews in the summer of 2012 while the facility was still in the siting process. This allowed us to investigate residents' perceptions in a state of uncertainty, rather than their perceptions of an established facility, as is frequently the case. Nine participants opposed the facility, seven were in favour and seven expressed both benefits and concerns – we label this group as 'undecided'. With the heightened community conflict and ongoing legal case against the municipality, some members of the opposition group abstained from participating (described in detail in Mason et al., 2016).

Purposive snowball sampling was utilized, which allowed for the examination of a wide range of perceptions. Using this methodology, sampling continued until saturation was reached (Strauss and Cobin, 1990). Key informants purposively contacted to begin this 'snowball' process included a local farmer who had publicly supported the facility and expressed interest in the product, a local municipal official, a leader involved in the opposition movement against the facility, as well as a local business person who had expressed both concerns and support for the facility. This was done to ensure a diversity of participants. Respondents were then asked to refer an individual who has an opinion on the topic, but may not necessarily feel the same as they do. Informed written consent was obtained prior to beginning any interviews and a semi-structured interview guide was used to examine residents' community attachments and expectations and opinions of the proposed facility and subsequent agricultural land application in their community including environment and health risk perceptions. Residents were typically interviewed at their homes or in private meeting places of their choosing and interviews lasted 42 minutes on average. The interviews and field notes were transcribed verbatim, examined for accuracy, and analysed using NVIVO qualitative analysis software for further thematic analysis. The primary author transcribed interviews as they were completed such that early interviews informed later ones and emerging themes were examined further. To enhance analytic rigor researcher triangulation, long-term field exposure throughout the siting process, expert checking and ongoing researcher reflexivity were utilized. Direct quotations from the interview transcripts demonstrate key themes, serve to contextualize responses, and act to maintain respondents' voices in the interpretations. To protect anonymity of the respondents, pseudonyms are utilized. Length of residence is described as either short-term or long-term being less than or greater than 25 years; a time period described by participants to indicate 'newcomers'.



## 6.3 Results

### 6.3.1 Differences in Individual Values and Place Attachments

Residents described Southgate as a *typical small rural town, beautiful, natural, friendly, close knit, family oriented, agriculturally based, economically struggling, bedroom community* (Mason and Luginaah, 2016). Yet, amid these shared values are evidence of fractures whereby long-time farmer James (*lifelong agricultural, 50s, supportive*) highlights that the rural community as “A town [with] a commuter based population... then the rural community is basically agriculture based”, setting the town as a somewhat separate “bedroom community”. Emily further highlights the commuter properties of the community, while emphasizing its positive qualities for raising a family.

*Emily* - I would describe it as a rural community, um kind of a community where a lot of people live but work elsewhere, bedroom community, um fairly not poor but kind of a lower income community... but I think it's a nice place to raise your kids a rural setting. (30s, non-farm rural, lifelong resident, undecided)

The description of the community as both agriculturally based and an economically struggling bedroom community suggests a duality between residents making a living off the land and others who commute elsewhere to work. These residents have also described this as primarily a duality between town and country residents. Further, there seems to be a faction of residents that associates Southgate with a place to live, work and play and others who commute elsewhere to work and see Southgate as their ‘escape’:

*Emma* - From our experience, most of the people who are, lets say over 60, have been here for a long time and their families are here, and most of the people under 60 we have found are people who have moved from the city, usually Toronto, and are looking for an escape from the city and usually a more rural environment. The attitudes between the two are not at all the same (20s, non-farm rural, short-term resident)

The identification of what residents’ value and identify with in their community helped us to better understand how and why (if at all) the proposed facility was disrupting their

place attachments and resulting in emotional impacts. Many residents did not perceive the biosolids facility to be 'right' or 'natural' for their community or to 'fit' with their place attachments. With the confrontation that their environment is not as they knew it to be, residents are undergoing epistemological responses as they are forced to evolve their ways of knowing and potentially change their place attachments. We also must consider the ways farmers' attachment to place and their rural environments are changing. It is important to further examine how their daily agricultural practices and community interactions are altered as they learn to share their space with an evolving community of individuals who arguably value local agriculture, industry and economics less than has historically been the case.

### 6.3.2 Changing Sense of Community and Intra-Community Conflict

Many long-time residents discussed how they feel their community has changed, especially the increasing tension between the agricultural and non-agricultural members in the community. Ben describes how the dynamics of the community are changing particularly as fewer families and young adults are choosing to stay in the community and farm.

*Ben* - It's different from when I grew up... All of my neighbours and most of my friends were growing up on a farm. There were town kids and there were country kids so that's changed a lot over the past decade, two decades or so... I don't think there are as many people who are staying in the community. (50s, long-time agricultural, supportive)

While agriculture continues to thrive in this community, the number of agriculturally based families that are active in the broader community is decreasing. These changes in local agriculture and the tendency of many young adults to leave the community for opportunities in urban areas is altering social and political dynamics in Southgate:

*John* - I am worried about how I see the community changing as far as the demographics of it... I mean that there is starting to be less [agricultural

influence]... within our community we are getting outside influence that is removing itself from the agricultural part of it. (30s, lifelong agricultural, supportive)

The influx of migrants is further altering dynamics in this rural community. These emerging divisions are amplifying community polarization and decreasing perceptions that it is closely-knit: “You know it used to be that you knew everybody and you don’t as much anymore” (Valerie, 50s, lifelong village resident, undecided)

Additionally, residents described how these changes are eroding trust within the community whereby

*Ben* - [new people] are less apt to trust people than maybe some of the... original people. There is a lack of trust that sometimes shows up with some of the newer people who have lived in our community for a fairly long time but they still don’t have that grass roots trust in the people that are here (50s, long-time agricultural, supportive).

Luke underscores how the agricultural-industrial development and the social changes occurring in response have acted to amplify community divisions,

*Luke* - The changes that are happening... I have problems and concerns with the divisions in the community. I dislike that. There are these things that have been happening that are splitting people depending on their views (50s, lifelong agricultural, undecided)

Southgate Township’s biosolid treatment facility and the land application of the fertilizer product that accompanies it represent particularly strong emotional stimuli, altering the way residents perceive their landscape, neighbourhood and other residents, thus amplifying intra-community conflict. Themes of industrial intrusion and rapid large-scale change more broadly give insight into why some residents are experiencing such a changing sense of place, depending on their attachment to place. Many residents expressed their deep discontent in the realization that these changes had occurred over recent time in the community. In the following section the broader emotional and social impacts of the siting process on the community are elaborated.

### 6.3.3 Depth of Community Conflict

The perceived threat to divergent community values and ways of life and contrasting place attachments are at the heart of the emotional impacts experienced by residents, in response to the OMRC proposal and development. Residents both with overall positive or negative perceptions of the facility itself were disheartened by the social impacts on the community and spoke with deep discontent. Though it is sometimes difficult to discern emotion from interview text, the very deep feelings are palpable in the ways residents recount events surrounding the facility.

For example, John – a facility proponent - expresses deep disappointment in the tactics that were being used by neighbours to vent their emotions and his disappointment in the community:

*John* - I am not going to start sending hate mail to my neighbours. We can still have a difference of opinion on what is right and what is wrong, but I mean there is hate mail being sent so it is a little disappointing. (30s, lifelong farmer, supportive)

Residents describe how the facility siting process strained and in many cases ended friendships dividing this previously closely-knit and friendly community. Ironically, it was this close-knit nature of the community that many people valued and thus residents like Ryan and Pam display sadness over this loss:

*Ryan* - There are some pretty upset people. It's definitely divided a lot of friendships... It's a big deal. I mean a lot of people that liked each other, don't like each other now and I mean functions in town seem strange because there's a group of people who are for it [the facility] and there's a group of people who are against it. (20s, lifetime non-farm rural resident, undecided)

*Pam* - I can't believe things that are being said and done: neighbours arguing with each other and not talking over some of this stuff. It is literally tearing this town apart and it's horrible to see. (40s, short-term village resident, opposed)

Residents frequently talked about how the facility and conflict in the community is not going to help anybody with “all the grief it’s causing everybody” (Ryan). Claire expresses shock and sadness with how things have turned out:

*Claire* - Ya I mean as a member of the community... it’s been difficult to watch some of the things happening and the way people have been acting. I think this has maybe shocked us a little bit and... you know some of the accusations and some of the measures that people have gone to make their point, I think sometimes exceeds what we would consider to be reasonable and that’s too bad. (undecided, agricultural, long-time resident)

Residents outwardly spoke of these emotional impacts and divisions whereby Olivia (undecided, short-term village resident) described how “the divide that is occurring in the community could be more detrimental than the effects of the plant itself”. While facility risk assessments are meant to consider potential environmental and health implications of a proposed facility they may not adequately consider the social and emotional implications and how these might be mediated. While less tangible and more difficult to quantify, at least eight Southgate residents expressed this as being the most detrimental and greatest felt impact throughout this facility siting process. Similar to Olivia, Luke (undecided, lifelong agricultural) went so far as to say: “As I’ve thought about it, I think it’s the single thing that bothers me the most: it’s pitted people against each other”.

#### 6.3.4 Community Stigmatization

Conflict was also manifest in strong expressions of concern about community stigmatization that accompanied the biosolid treatment facility. However, not unlike the polarized responses to the facility, residents’ beliefs about what is stigmatizing differed and is bound up with the place attachment, values and importantly, the neighbor blaming that had begun to spiral out of control.

### 6.3.4.1 Technological Stigma: The Facility is the Problem

Some residents (n=9) argued that the facility has disrupted the community's image and its ability to attract future residents, hence they blamed the municipality and proponents for imposing this negative and hazardous waste image on the township. These residents, who were generally newer to the community, expressed their concern for example, for children being teased in high school by their classmates from surrounding towns for being from "Dumpdalk... [where kids are] making fun of it all" (Andrea, 30s, short-term non-agricultural resident, opposed) and reluctance for families to move to the area because of the stigmatization surrounding the facility: "to Toronto or Vaughan or the larger centres... Southgate could be known as garbagegate or shitgate" (Anna, 50s, undecided, short-term non-agricultural resident).

*Ryan* - You try to sell your house and all you see on the streets is "Truth not Trash" signs, it's kind of hard and people are going to start to wonder what that is and if you tell them oh it's this possible facility that is going to process waste you go oh I don't know if I want to raise my kids there. (20s, lifetime non-farm rural resident, undecided)

Individuals' place attachments are reinforced by perceived stigma as a result of a noxious facility.

### 6.3.4.2 The Notion of Confrontational Stigma

The facility protest and actions of those opposing the facility precipitated what we refer to as *confrontational stigma* – with some residents indicating their concern that their community is becoming negatively known to outsiders as a place where neighbours are vehemently against each other. Mike suggests that protest itself was too frequent: "I really feel that we've got this protest group that when they hear there's a protest [they say] 'lets join in'" (Mike, 50s, lifelong agricultural resident, supportive). Yet, in terms of community conflict, residents in favour of development viewed conflict as more disruptive and stigmatizing. These residents felt the protesting and opposition was

resulting in the community being labeled by outsiders as a community rife with fighting and confrontation. This is evident in an outside news editorial in a neighboring community entitled *Controversy Continues*, which stated that some residents “ [have taken] it upon themselves... [to start a] blockade, to write letters to the editor, attend and disrupt council meetings demanding to be heard, and initiating a court challenge to the [facility] proposal” (Mount Forest Confederate Editorial, 2012). In the comment below, David discussed how the community was largely being stigmatized because of the opposing group’s actions rather than the facility itself:

*David* - I believe that there are some citizens in this area that... will fight it until the end.... I would say from the group’s actions. The plant itself, if it goes ahead and it runs according to plan I don’t believe it will give Southgate the negative stigma people are saying. (40s, lifelong non-agricultural resident, supportive)

Among residents who shared this belief is Maria, who also expressed her concern that the main stigmatization is a result of community conflict: “Unfortunately, I’m afraid they’ve already done that [stigmatization] because of the nay sayers and how they’ve portrayed their side of the issue and protested the plant coming here. I’m afraid Southgate has been black listed because of that” (Maria, 70s, long-time agricultural resident, supportive).

Other residents, such as Mike and Emily, further expressed their concern for how this form of stigmatization would negatively impact economic development and industries locating in the community:

*Mike* - Ah ya because signs of the protest and everything else if I was an industry wanting to relocate into the area here why would I even try, everybody is fighting. As far as the Lystek plant, I don’t think we are going to become stigmatized because of it. (50s, lifelong agricultural resident, supportive )

*Emily* - Out there to me it seems like really people only know about it because you know we’ve had protests and all that. If I was somebody looking to start a business here, or wanting to move my factory here, I’d think ‘oh god, what am I going to have to put up with to move it there’. I think it’s kind of a negative for any industry or anything coming here because I think I’d be worried if I was a small business owner, like why would I want to go to Dundalk now because look

at all the fuss they've made just over this. (30s, lifelong non-farm rural resident, undecided)

These responses to development in Southgate and the notion of 'confrontational stigmatization' showed residents' dynamic attachments to place and how each perceived community change, the construction of the facility or increased community conflict, was believed to disrupt these attachments and stigmatize the community.

## 6.4 Discussion

This case study highlights the concerns and community-level identity threats described by residents both opposing and in favour of the proposed facility, the most prominent being threats to quality of life and community cohesion. Emerging from the findings is the notion of confrontational stigma (Figure 6-1) as a manifestation of the interaction between literatures on place attachments (Brehm et al., 2013; Devine-Wright and Howes, 2010; Stedman, 2006; Vorkinn and Riese, 2001; Altman and Lowe, 1992), facility/technological stigma (Peters et al., 2004; Gregory and Satterfield, 2002; Gregory et al., 1995; Slovic et al., 1994) and community conflict in rural communities who face facilities perceived by some to be noxious.

This study contributes to literature showing residents' varied expectations of and attachments to their community can contribute to a diversity of responses to proposed noxious developments (Devine-Wright, 2009; Devin-Wright and Howes, 2010; Baxter, 2006; Vorkinn and Riess, 2001; Walker, 1995; McLachlan, 2009; Manzo 2014). These findings substantiate research (for example Manzo, 2014 and Devine-Wright, 2012 among others), showing that experiences of place change are not always disruptive and perceived as negative, but is instead based on residents' place attachments.

Furthermore, although previous research has shown that residents with stronger attachment to place showed comparatively stronger opposition to technological development (Vorkinn and Riese, 2001), we found that having strong attachment to





Brehm et al. (2013) suggest that sense of place promotes pro-environmental attitudes and behaviours. While this may generally be the case, our study shows that residents' have varying definitions of what is 'best' for the community and environmental and thus their 'pro-environmental attitudes and behaviours' are not always aligned. Notably, the value differences and seemingly divergent expectations apparent in this case study appeared to influence the varied responses to the biosolids facility in this rural community (Jacquet and Stedman, 2013) and even act to accentuate intra-conflict and negative interaction between these divergent groups. These inherent differences in what precipitated conflict and confrontation such that outsiders are viewing the community as a place divided so harshly that friends publicly call each other out in local media and family members sit on opposing sides of the church pews depending on their views.

The conflict between residents in this rural community emerged as being influenced by the core difference between those who view 'rural' landscapes as a resource, equating it with food, agriculture and primary production; and those more inclined to emphasize the pastoral rural countryside as a place of relaxation and refuge. Techno-industrial (and potentially noxious) developments align with residents who hold a conception of their landscape as a place of production, however often conflicts with the expectations of residents idealizing a more consumptive or emotionally restorative rural landscape. While previous research has shown differing attachments to place and responses to place change, we contribute to the relative lack of research examining how these disparate groups interact throughout the development process and can contribute to lasting intra-community conflict.

In Southgate, the emerging perceptions of confrontational stigmatization showed residents' dynamic and yet conflicting desires and how these affect their attachments to place. Consistent with Gregory and Satterfield (2002) we find that the biosolids facility and the associated risk "overturn a previously favoured condition", an untouched natural wooded and grassland lot or a harmonious rural community, and thus are

shunned. Similarly, Atari et al. (2011) found that technologies often share the common feature of eliciting high perceptions of risk and a violation of what residents perceive to be 'right' or 'natural' for their community. However, confrontational stigma extends these ideas of conflict and neighbor blaming. For those not opposed to the facility, confrontational stigma challenges their belief that the facility siting process, opposition and community conflict is potentially *more* detrimental and stigmatizing to the community than the facility itself. The social impact of residents' differing place attachments and responses to techno-industrial developments in rural communities can, in the eyes of some residents, create conflict so bad as to stigmatize the community, whether imagined as harmoniously pastoral or agricultural (Woods, 2005). This notion of community conflict as stigmatizing and a lasting felt impact in the community warrants future research after such facilities have become operational examining how 'lasting' such siting conflict may be.

We demonstrate how these contrasting perceived stigmas (technological or confrontational) may be drivers of the intra-community conflict and neighbor blaming occurring within the community. Stedman (2006) as well as Soini et al. (2012) found that long-term residents' place attachments are based on social relations while short-term residents tend to base their attachment to place on the quality of the environment. This may help to explain why some residents (primarily shorter-term) saw the community as stigmatized by its environmental change while other (mainly long-time) residents were concerned with stigmatization due to community conflict and the changing community social relations observed in this case study. Similarly, Stedman (2002) found that place attachment fosters place protective behaviours. This can help to explain the action to protect ones' meaningful environment adopted by residents experiencing place-based disruptions, whether that is the physical environment short-term residents attach to or the social structures which long-term residents were found to base their attachments on. With the drive to rural landscapes for both residential and industrial development, this notion of confrontational stigma may emerge at various geographical scales when a clash in place attachments, as observed in this case study, exists.

Last, we extend the facility siting and risk literatures (Baxter et al., 1999; Pigeon et al., 2003; Kunreuther et al., 1993; Krinsky and Golding, 1992) by showing how this changing sense of the community signifies a new form of risk from this facility – the social risk of conflict that can be both debilitating and perceived as stigmatizing. This has implications for facility siting and environmental assessment processes as many urban centres look towards rural landscapes for spaces of production and disposal. Further, as rural community expectations tip more towards consumptive uses and feelings of social change and distrust within the community continues in instances like these; this opposition and conflict is likely to increase.

## 6.5 Conclusion and Implications

This research shows how residents' differing attachments to place impacted the degree to which a (sewage) biosolids facility was seen to change such places, instigating opposition or support and driving community conflict that may be seen as stigmatizing as the facility itself. That is, we argue for attention to confrontational stigma in rural communities that may arise out of these contentious facility-siting processes or redevelopment of rural agricultural lands. This research emphasizes that residents' emotions and the social impacts of facility siting processes are present throughout the development of such facilities, but that broader emotional impacts can occur when community cohesion is disrupted. Although difficult to predict and measure, the impacts are long lasting. The findings call for a consideration beyond the traditional macro scale risk society literature and the localized social engineering approach of the facility siting credo (Kunreuther et al., 1993); towards a deeper accounting of the complex nature of rural community context. Differing responses to changes and development in rural communities, such as regional biosolid recycling in Southgate, are strongly felt and emotionally embodied and can fuel intra-community conflict resulting in potentially powerful impacts on social well-being.

From the point of view of facility siting and environmental assessment policy and implementation, proponents and developers alike need to better understand the dynamic and complex nature of rural communities that are now frequently targeted for noxious facility siting. Furthermore, this deeper understanding may help proponents to better execute siting processes that are inclusive and accommodating of the varied attachments to place and community expectations. Future research could examine a more dynamic and participatory siting process that attempts to accommodate residents' varying expectations of their locale and seeks to work with these residents to make such developments better 'fit' with these expectations. While we have no definitive answer yet as to how specific mechanisms will mitigate these impacts, we hope this would help to decrease rather than propagate community conflict helping to mitigate the negative emotional impacts of noxious facility siting processes as was observed here. However, given the raw nature of community divisions, it is important to consider whether or not developers and planners alike will ever be able to please everyone in these contentious siting issues.

## 6.6 References

- Abrams, J., Bliss, J. and Gosnell, H. (2013). Reflexive gentrification of working lands in the American west: contesting the 'middle landscape'. *Journal of Rural and Community Development*, 8(3), 144-158.
- Altman, I. and Low, S. M. (1992). *Place Attachment*. New York and London, Plenum Press.
- Anderson, C. (2013). The networked minority : how a small group prevailed in a local windfarm conflict. *Energy Policy*, 58, 97-108.
- Atari, D. O., Luginaah, I. and Baxter, J. (2011). "This is the mess that we are living in": residents' everyday life experiences of living in a stigmatized community. *GeoJournal*, 76, 483-500. doi:10.1007/s10708-010-9365-7

- Batel, S., Devine-Wright, P., Wold, L., Egeland, H., Jacobsen, G. and Aas, O. (2015). The role of (de-)essentialisation within siting conflicts: an interdisciplinary approach. *The Journal of Environmental Psychology*, 44, 149-159.
- Baxter, J. (2006). A case study of intra-community conflict as facility impact. *Journal of Environmental Planning and Management*, 49(3), 337–360.
- Baxter, J. and Eyles, J. (1999). The utility of in-depth interviews for studying the meaning of environmental risk. *The Professional Geographer*, 51(2), 307 – 320.
- Baxter, J., Eyles, J. and Elliott, S. (1999). ‘Something Happened’: The relevance of the risk society for describing the siting process for a municipal landfill. *Geografiska Annaler*, 81B(2), 91-109.
- Baxter, J. and Greenlaw, K. (2005). Explaining perceptions of a technological environmental hazard using comparative analysis. *The Canadian Geographer*, 49(1), 61-80.
- Baxter, J. and Lee, D. (2004). Understanding expressed low concern and latent concern near a hazardous waste treatment facility. *Journal of Risk Research*, 7(7-8), 705-729.
- Baxter, J., Morzaria, R. and Hirsch, R. (2013). A case-control study of support/opposition to wind turbines: Perceptions of health risk, economic benefits and community conflict. *Energy Policy*, 61, 931-943.
- Beck, U. (1992). *Risk Society: Towards a New Modernity*. London: Sage Publications.
- Brehm, J. M., Eisenhauer, B. W. and Stedman, R. C. (2013). Environmental Concern: Examining the role of place meaning and place attachment, *Society and Natural Resources*, 26, 522 – 538.
- Boyd, A. D. and Paveglio, T. B. (2015). “Placing” energy development in a local context: exploring the origins of rural community perspectives. *Journal of Rural and Community Development*, 10(2), 1-20.
- Butz, D. and Eyles, J. (1997). Reconceptualizing senses of place: social relations, ideology and ecology. *Geografiska Annaler Series B Human Geography*, 79(1), 1-25.

- Cadieux K. V. and Hurley, P. T. (2011). Amenity migration, exurbia and emerging rural landscapes: Global natural amenity as place and as process. *Geojournal*, 76(4), 297 – 302.
- Cheeseman, K. (2012, May 2). Letter to the Editor. *The Dundalk Herald*, p. 7.
- Cooke, B. and Lane, R. (2015). How do amenity migrants learn to be environmental stewards of rural landscapes? *Landscape and Urban Planning*, 134, 43 – 52.
- DeMiglio, L. and Williams, A. (2008). A sense of place, a sense of wellbeing. In J. Eyles and A. Williams (Eds.), *Sense of Place, Health and Quality of Life*. Pp. 15-30. Hampshire, England: Ashgate.
- Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community and Applied Social Psychology*, 19(6), 426-441.
- Devine-Wright, P. (2012). Explaining “NIMBY” objections to a power line: the role of personal, place attachment and project-related factors. *Environment and Behavior*, 45(6), 761-781.
- Devine-Wright, H. and Devine-Wright, P. (2009). Social representations of electricity network technologies: exploring processes of anchoring and objectification through the use of visual research methods. *British Journal of Social Psychology*, 48, 357-373.
- Devine-Wright, P. and Howes, Y. (2010). Disruption to place attachment and the protection of restorative environments: A wind energy case study. *Journal of Environmental Psychology*, 30, 271-280.
- Eyles, J. (1985). *Senses of Place*. Cheshire, England: Silverbrook Press.
- Fletcher, T. (2002). Neighborhood change at love canal: contamination, evacuation and resettlement. *Land Use Policy*, 19, 311 – 323.
- Freudenberg, W. (1997) Contamination, corrosion, and the social order: an overview, *Current Sociology*, 45, 19–40.
- Goffman, E. (2009). *Stigma: Notes on the Management of Spoiled Identity*. New York, London and Toronto: Simon and Schuster.

- Gregory, R., Flynn, J. and Slovic, P. (1995). Macroscopic: Technological stigma. *American Scientist*, 220-223.
- Gregory, R. and Satterfield, T. A. (2002). Beyond perception: the experience of risk and stigma in community contexts. *Risk Analysis*, 22(2), 347-358.
- Hay, D. A. (1992). Rural Canada in transition: trends and developments. In D. A. Hay and G. S. Barson (Eds.), *Rural Sociology in Canada* (pp. 4-15). Toronto; Oxford; New York: Oxford University Press.
- Hiner, C. C. (2014). "Been-heres vs. come-heres" and other identities and ideologies along the rural-urban interface: A comparative case study in Calaveras County, California. *Land Use Policy*, 41, 70-83.
- Hoggart, K. (1997). Rural migration and counter-urbanization in the European periphery: the case of Andalusia. *Sociologia Ruralis*, 37(1), 134-153.
- Hummon, D. M. (1986). City mouse, country mouse: The persistence of community identity. *Qualitative Sociology*, 9(1), 3-25.
- Jacquet, B. J. and Stedman, R. C. (2013). The risk of social-psychological disruption as an impact of energy development and environmental change. *Journal of Environmental Planning and Management*, 57(9), 1285-1304.
- Jorgenson, B. S. and Stedman, R. D. (2001). Sense of place as an attitude: lakeshore owners' attitudes towards their properties. *Journal of Environmental Psychology*, 21, 233-248.
- Krimsky, S. and Golding, D. (eds) (1992). *Social Theories of Risk*. Westport, Conn: Praeger.
- Kroll-Smith, J. S. and Couch, S. R. (2015). *The Real Disaster is Above Ground: A Mine Fire and Social Conflict*. University Press of Kentucky.
- Kunreuther, H. Fitzgerald, K. and Aarts, T. D. (1993). Siting noxious facilities: a test of the facility siting credo. *Risk Analysis*, 13(3), 301-318.
- Luginaah, I. N., Taylor, S. M., Elliott, S. J. and Eyles, J. D. (2002). Community responses and coping strategies in the vicinity of a petroleum refinery in Oakville, Ontario. *Health and Place*, 8(3), 177-190.



- Mainprize, B. (2012, May 9). Letter to the Editor. *The Dundalk Herald*. p. 12.
- Manzo, L. C. (2014). Exploring the shadow side: place attachment in the context of stigma, displacement, and social housing. In L. C. Manzo and P. Devine-Wright (Eds.) *Place Attachment Advances in Theory, Methods and Applications*. Pp 178-190. Oxon: Routledge.
- Manzo, L. C., and Perkins, D. D. (2006). Finding common ground: The importance of place attachment to community participation and planning. *Journal of planning literature*, 20(4), 335-350.
- Mason, S.A., Dixon, J., Mambulu, F., Rishworth, A., Mkandawire, P. and Luginaah, I. (2015). Management challenges of urban biosolids: narratives around facility siting in rural Ontario. *Journal of Environmental Planning and Management*, 58(8), 1363.
- Mason, S.A., Walker, C., Baxter, J. and Luginaah, I. (2016). Ethics and activism in environment and health research. In N. E. Fenton and J. Baxter (Eds.) *Practicing Qualitative Methods in Health Geographies* (pp. 54-72). Routledge.
- Mason-Renton, S. and Luginaah, I. (2016). Interfering with therapeutic tranquility: debates surrounding biosolid waste processing in rural Ontario. *Health Place*, 41, 42-49.
- Masuda, J. and Garvin, T. (2008). Whose heartland? The politics of place in a rural-urban interface. *Journal of Rural Studies*, 24, 112-123.
- McClymont, K. and O'hare, P. (2008). "We're not NIMBYs!" Contrasting local protest groups with idealised conceptions of sustainable communities. *Local Environment*, 13(4), 321-335.
- McLachlan, C. (2009). 'You don't do a chemistry experiment in your best china': Symbolic interpretations of place and technology in a wave energy case. *Energy Policy*, 37, 5342-5350.
- Mount Forest Confederate Editorial. (2012, April 11). Controversy Continues. *Mount Forest Confederate*. <http://www.southwesternontario.ca/opinion-story/5983766-controversy-continues/>

- Parkhill, K. A., Butler, C. and Pidgeon, N. F. (2014). Landscapes of threat? Exploring discourses of stigma around large energy developments. *Landscape Research*, 39(5), 566-582.
- Parr, J. (2010). *Sensing Changes*. Vancouver and Toronto: UBC Press.
- Patterson, M. E. and Williams, D. R. (2005). Maintaining research traditions on place: Diversity of thought and scientific progress. *Journal of Environmental Psychology*, 25, 361-380.
- Peters, E. M., Burraston, B. and Mertz, C. K. (2004). An emotion-based model of risk perception and stigma susceptibility: cognitive appraisals of emotion, affective reactivity, worldviews, and risk perceptions in the generation of technological stigma. *Risk Analysis*, 24(5), 1349-1367.
- Picou, S., Marshall, B. and Gill, D. (2004) Disaster, litigation and the corrosive community, *Social Forces*, 82(4), 1493 – 1522.
- Pidgeon, N., and Kasperson, R. E. (2003). *The Social Amplification of Risk*. Cambridge University Press
- Relph, E. (1976). *Place and Placelessness*. London: Pion Limited.
- Simmons, P. and Walker, G. (2004). Technological risk and sense of place: industrial encroachment on place values. In A. Boholm and R. Löfstedt (Eds), *Facility Siting: Risk, Power and Identity in Land Use Planning* pp. 136-155. Earthscan, London; Sterling, VA.
- Soini, K. Vaarala, H. and Pouta, E. (2012). Residents' sense of place and landscape perceptions at the rural-urban interface. *Landscape and Urban Planning*, 104, 124-134.
- Slovic, P., Flynn, J. and Gregory, R. (1994). Stigma happens: Social problems in the siting of nuclear waste facilities. *Risk Analysis*, 14(5), 773-777.
- Smith, M. D. and Krannich, R. S. (2000). Culture clash" revisited: Newcomer and longer-term residents' attitudes toward land use, development, and environmental issues in rural communities in the Rocky Mountain West. *Rural Sociology*, 65(3), 396-421.

- Statistics Canada. (2013). Southgate, TP, Ontario (Code 3542005) (table). National Household Survey (NHS) Profile. 2011 National Household Survey. Statistics Canada Catalogue no. 99-004-XWE. Ottawa. Released September 11, 2013. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E> (accessed December 1, 2015).
- Stedman, R. C. (2002). Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior*, 34(5), 561-581.
- Stedman, R. (2006). Understanding place attachment among second home owners. *American Behavioral Scientist*, 50, 187-205.
- Strauss, A., Cobin, J. (1990). Basics of Qualitative Research. Grounded Theory Procedures and Techniques. California: Sage.
- Tuan, Y. F. (1980). Rootedness versus sense of place. *Landscape*, 24, 3-8.
- Tuan, Y. F. (1974). *Topophilia*. New Jersey: Prentice-Hall Inc.
- Vorkinn, M. and Riese, H. (2001). Environmental concern in a local context: the significance of place attachment. *Environment and Behavior*, 33, 249-263.
- Wakefield, S. and Elliott, S. J. (2000). Environmental risk perception and well-being: effects of the landfill siting process in two southern Ontario communities. *Social Science and Medicine*, 50(7), 1139-1154.
- Walker, C., Baxter, J. and Ouellette, D. (2015). Adding insult to injury: the development of psychosocial stress in Ontario wind turbine communities. *Social Science and Medicine*, 133, 358-365. doi:10.1016/j.socscimed.2014.07.067.
- Walker, C., Baxter, J. and Ouellette, D. (2014). Beyond rhetoric to understanding determinants of wind turbine support and conflict in two Ontario, Canada communities. *Environment and Planning A*, 46(3), 730-745.
- Walker, G. (1995). Renewable energy and the public. *Land Use Policy*, 12(1), 49-59.
- Walker, G., Devine-Wright, P., Hunter, S., High, H. and Evans, B. (2010). Trust and community: exploring the meanings, contexts and dynamics of community renewable energy. *Energy Policy*, 38(6), 2655-2663.

- Wester-Herber, M. (2004). Underlying concerns in land-use conflicts – the role of place identity in risk perception. *Environmental Science and Policy*, 7, 109-116.
- Wilkinson, Kenneth P., James. G. Thompson, Robert R. Reynolds, Jr., and Lawrence M. Ostresh. (1982). "Local Social Disruption and Western Energy Development: A Critical Review." *Pacific Sociological Review*, 25, 275-296.
- Williams, A., Kitchen, P., DeMiglio, L., Eyles, J., Newbold, B. and Steiner, D. (2010). Sense of place in Hamilton, Ontario: empirical results of a neighbourhood-based survey. *Urban Geography*, 31(7), 905-931.
- Wolsink, M. (2006). Invalid theory impedes our understanding: a critique on the persistence of the language of NIMBY. *Transactions of the Institute of British Geographers*, 31(1), 85-91.
- Wolsink, M. (2000). Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support. *Renewable Energy*, 21, 29-64.
- Woods, M. (2005). *Rural Geography: Processes, Responses and Experiences in Rural Restructuring*. London; Thousand Oaks, California: Sage.

## Chapter 7

LASTING IMPACTS AND PERCEIVED INEQUITIES: COMMUNITY REAPPRAISAL OF THE  
SITING OF A REGIONAL BIOSOLID PROCESSING FACILITY IN RURAL ONTARIO.

Sarah Mason-Renton<sup>1\*</sup>, Isaac Luginaah<sup>1</sup>

1. Department of Geography, The University of Western Ontario

\*Doctoral Candidate

Under Review: *Journal of Risk Research*

## 7 LASTING IMPACTS AND PERCEIVED INEQUITIES: COMMUNITY REAPPRAISAL OF THE SITING OF A REGIONAL BIOSOLID PROCESSING FACILITY IN RURAL ONTARIO.

This paper presents a comparative study of residents' reappraisal of a biosolids processing facility - the Organic Material Recovery Centre - in the Township of Southgate, Ontario, both during an acrimonious siting process and during the facility operational phase three years later. The study responds to the need for comparative studies examining residents' perceptions of noxious facilities over time. Interviews were conducted before and after the techno-industrial facility was sited. Results reveal that once the facility began operations and residents had the opportunity to understand its operational mandate and directions, many residents seem to have accepted the facility as less threatening to wellbeing, quality of life and core values. Nonetheless, those who remained concerned generally shifted their unease to invisible impacts and long-term uncertainty. This reinforces a sustained community conflict between those supporting and those who remained concerned about negative impacts. As a result of the hostile community conflict, the local politics seems to have morphed into a 'one-issue' political scene, whereby all issues are divided along the lines of municipal officials opinions of the facility. These findings contribute to our understanding of residents' reappraisal of potentially noxious techno-industrial facilities, show divisive social impacts within the community, and call for meaningful consultation and increased participatory siting processes that accounts for the diversity of values and expectations during facility siting.

### 7.1 Introduction

The siting of waste processing industries is highly contested such that public conflict over potentially noxious facilities has seemingly become the norm. Such waste (hazardous and nonhazardous) infrastructure siting disputes have been condemned with community conflict for years (Elliott et al., 1997) with the policy domain surrounding waste management becoming internationally known for its environmental

conflicts (Kirkmann and Voulvoulis, 2016; Elliott and McClure, 2009; Gallagher et al., 2008). These conflicts are likely to increase in the context of rapidly growing urban populations producing increasing volumes of waste, which are often transported to peripheral regions for management. Further, a drive towards a Circular Economy, which promotes resource productivity and waste reduction by recycling biological and technical nutrients, requires infrastructure able to process wastes into resources (Kirkmann and Voulvoulis, 2016). Such facilities are often regarded as essential to the advancement of broad sustainability goals that includes environmental protection and climate change issues (Lidskog, 2005). However, benefits of recycled products may be disputed at the local level as proponents and opponents draw on their core values (Wolsink, 2010). Consequently, public opposition to the development of waste infrastructure within their communities constitutes to government and industries' failed attempts to meet waste recycling, recovery and reuse goals (Kirkman and Voulvoulis, 2016; Wolsink and Devilee, 2009; Edelstein, 2004). This is similarly observed in other contentious 'green' developments, whereby the 'greenness' of such developments is often in itself contested. This presents a new kind of facility siting dispute whereby local, regional and global sustainability benefits may be felt (and advocated for) by some but contested by others, rather than traditional waste infrastructure whereby communities are pitted against potential polluters. Whereas previous research pushed the field of inquiry from hazardous to non-hazardous waste facilities (Elliott et al., 1997) to unravel a new set of issues regarding the impacts of siting processes (Munton, 1996), this research aims to drive this farther by examining the contested nature of waste management facilities seen by some as beneficial, green and sustainable (Edelstein, 2004).

While there have been several studies which examine public risk perception, what is less studied is how the publics' perception of risk may evolve once a facility is successfully sited. Studies that investigate how community experiences and perceptions of potentially noxious facilities change over time are rare, and the few that exist (for example Luginaah et al., 2002a, 2002b, Wakefield and Elliott, 2000, and Elliott et al.,

1997) have tended to examine community members' reappraisal of established facilities that have undertaken some modifications or at least approved noxious facilities that are later built. What remains unexamined is the reappraisal that occurs during the uncertain facility siting phase, whereby there is no certainty that the industry's request to site the facility will be approved, and subsequently when the facility is operational (one notable exception is Elliott and Mclure, 2009). Further, other studies (for example Okeke and Armour, 2000) of post-siting changes in perceptions are cross-sectional in nature and call on residents' recollection of their experiences during the siting phase rather than conducting longitudinal or comparative research.

In response, this research comparatively examines residents' perceptions during a contentious facility siting process (prior to facility approval) and a follow-up during facility operations. Gaining a better understanding of residents' changing responses and perceptions over time, as well as their emergence from a contentious siting process can help to improve the effectiveness and success of participatory facility siting processes, risk management and communication strategies. Consequently, this research has two main objectives: (1) to unravel residents' evolving perceptions of an operational waste processing facility that went through a contentious siting process in Southgate Township as well as any perceived residual impacts; and, (2) to examine community constructions on the process that brought the facility to their community.

### 7.1.1 Theoretical context

This research is informed by the cultural theory of risk (Douglas, 1992) and broader risk society (Beck, 1992; Giddens, 1990) as well as facility siting (Kunreuther et al., 1993) and noxious facility threat reappraisal theory (Luginaah et al., 2002b).

Risks are socially constructed and influenced by individuals' histories, beliefs and experiences as well as by one's cultural surroundings. Pitfalls of risk communication have been recognized more recently and communication strategies involving two-way



communication and increased public participation have been implemented. However, Kaspersen et al. (2003) discuss how risk communication efforts regularly fail because they do not account for the complex interplay of political, social, and psychological factors that drive risk amplification and result in a deep mistrust of regulatory agencies and industries, which further heightens risk perceptions and opposition. The ‘nestedness’ of local action as related to the intersection of locally held values and the broader influence of social and organizational institutions is important to consider (Pavelglio et al., 2016; Larock and Baxter, 2013). Pavelglio et al. (2016) also calls for an understanding of community diversification, whereby community can take on alternate meanings to different people based on differences in culture or landscape connections.

Increasingly diverse rural landholders generally possess different perspectives on the rural landscape, values, ways of life and political ideologies than multigenerational farmers (Cooke and Lane, 2015; Cadieux and Hurley, 2011; Soini et al., 2012; Masuda and Garvin, 2008), which has been found to influence cliques and defined social patterns within close-knit rural community structures (Jacquet and Stedman, 2013). Thus, emerging change, such as potentially noxious facility proposals, can result in disagreement and conflict (Baxter, 2006, Masuda and Garvin, 2008). Previous research shows that conflict may be linked to variation in place attachment (Devine-Wright and Howes, 2010; Kroll-Smith and Couch 2015), while intra-community conflict may likewise be linked to concerns surrounding place, health and the distribution of techno-industrial risks and benefits within the community (Walker et al., 2014; Baxter, 2006). Yet, empirical research devoted to how these contextual factors relate to community conflict – which may have an equally serious short and long-term impact – remains negligible. With increasing pressures on rural communities both for residential and industrial purposes, this research aims to address this gap in the literature.

### 7.1.1.1 Residents' reappraisal of threat

Individual responses to an environmental stressor are a continual process of primary and secondary appraisal and reappraisal (Elliott et al., 1997; Lazarus and Folkman, 1984). Further, appraisal and reappraisals are context dependent (Luginaah et al., 2002a, 2002b; Elliott et al., 1997; Lazarus, 1993) and environmental stress theory emphasizes the role of community setting on individuals' appraisals and coping responses (such as McGee, 1999; Taylor et al., 1991; Edelman, 1988). Luginaah et al. (2002b) present a conceptual framework of community reappraisal and responses of a noxious facility, proposing that residents confront their reappraisal of local risk through dual lenses – societal and individual. While cognizant of societal expectations (e.g. the need for green technology in response to climate change); residents' expectations and values tend to influence their responses and reactions to facility impacts (Luginaah et al., 2002b). Elliott et al. (1997) examined residents' reappraisal of a local landfill and found concerns decreased as residents lived with the landfill. This diminution of perceived risk is attributed to residents' anticipatory anxiety (Elliott et al., 1997; Elliott and Maclure, 2009).

While there is some indication that residents' negative perceptions and concerns decline as they live with such techno-industrial risks, a limited attempt has been made to explore residual impacts following contentious facility siting processes. Previous research has shown that individual and community wellbeing may be impacted as much, if not more, by the process of making the decision than the outcome itself (Elliott et al., 1993; Elliott 1997; Hadden, 1991). Psychosocial effects have been found to be at their height during the often uncertain and ambiguous facility siting phase whereby residents' may perceive a loss of control and are experiencing anticipatory anxiety rather than felt facility impacts. Environmental stress and coping theories (Lazarus and Folkman 1984) suggest that individuals may be responding to the siting process itself as the environmental stressor (Elliott and Maclure, 2009).

### 7.1.1.2 Facility Siting, Public Participation and Procedural Inequities

Literature on facility siting shows that community opposition to noxious facilities is dependent on the theoretical constructs of fairness, voluntariness, perceived health effects and trust, dread and familiarity (Kunreuther et al., 1996). Public participation and consultation is crucial for addressing facility siting issues surrounding equity, justice, voluntariness and trust (Slovic, 2000). If biosolid processing facilities are improperly sited, it can have lasting negative impacts on the level of trust and public support (Goven and Langer, 2009; Beecher et al., 2004). These processes need to be thoughtfully and meaningfully conducted as well as considered early in the decision-making process (Kirkman and Voulcoulis, 2016). Wolsink (2010) views the social dimensions of infrastructure siting decisions as the key agent generating conflict, rather than the direct environmental impact of the proposed facility. While a waste management facility may be deemed non-hazardous and low risk by experts, the siting process itself may act as a threat to residents' values, worldviews and ways of life (Baxter et al., 1999b). Risk managers often assume that a community is one undifferentiated unit (Baxter, 2006), however it is widely recognized that rural areas are comprised of a diverse mixture of residents with differing expectations of their community and desires for their way of life. This heterogeneity of rural areas complicates social construction of risk and can result in intra-community conflict (Baxter, 2006; Masuda and Garvin, 2006; Devine-Wright and Howes, 2010). Building on this, Wolsink (2010) urges for collaborative processes, which recognize the diversity within cultures and among stakeholders, to replace hierarchical procedures and arrangements.

Just as equity is a social construct influencing risk constructions, interpretations of what 'equitable' means are also socially constructed. Environmental inequality confronts structural questions regarding social inequities and environmental burdens (Pellow, 2000). Further, environmental injustices are defined as the relationships between communities and injustices surrounding the avoidance of hazards and procurement of benefits from one community or region, while negatively impacting the environment of

others (Kelly-Reif and Wing, 2016). Notably, rural dimensions of environmental justice research have historically not been taken seriously as a social, cultural, economic, ecological or political category shaping environmental justice struggles, even though urban demands on rural areas are increasingly 'parasitic' (Pellow, 2016; Kelly-Reif and Wing, 2016). Traditional risk communication, whereby technical information is disseminated to the affected population, does not account for the subjectively constructed equitable and just distribution of risks and the role this plays in individuals' risk perceptions. Worth noting is the inherent regional policies which govern biosolids processing and land application as a fertilizer resource at both the provincial and federal level. These governing bodies and regulatory decision makers are overwhelmingly located in urban centres and are often far removed from local realities of felt injustices and inequalities (Masterman-Smith et al., 2016). The 'fair process effect' (Folger et al., 1979) was documented in the 1970s and it is now well accepted that fair siting procedures can affect outcome perceptions as well as the acceptance of unfavourable siting results (Krutli et al., 2012). Baxter et al. (1999a) shows that when issues of equity were present, public participation efforts acted to increase conflict and opposition as it created a forum for the opposition group to communicate and disseminate their heightened negative risk perceptions. Thus, it is not only questions of distribution (who gets what) that can be controversial and lead to perceived injustice in infrastructure decision-making, but also questions of process (how decisions are made) and recognition (who is respected) (Pellow, 2016; Wolsink, 2010). While distributive equity was examined in Chapter 4, this research examines residents' reflections on these constructs of process and recognition throughout the siting process and any conflict that may have precipitated from these perceived inequities.

This research examines the impacts of such a process both during the facility siting stage and three years later as residents reappraise the process which brought the OMRC to their community as well as the effects of a fully operational facility.

### 7.1.2 Community and Facility Siting Context

This empirical case study examines the Southgate Organic Material Recovery Centre (OMRC): a waste processing facility that accepts biosolids (treated sewage sludge) from regional municipal waste water treatment plants (primarily urban) and further processes this material to produce a liquid fertilizer product that is sold to area farmers as an organic nutrient soil amendment. This facility was proposed to be in Southgate's EcoPark, an industrial park neighbouring the village of Dundalk, late in the summer of 2011. The proponent and municipality brought the siting application to the public during September of 2011 simultaneous with the MOE's Environmental Registry Public Review Comment Period. Community concern almost instantaneously grew and hostile debate and community conflict quickly followed. Local activist groups held their own community information meetings shortly thereafter. The relatively short siting process continued in this manner whereby decisions were generally made, followed by public outreach efforts to notify the public by means such as community meetings, storefront open houses and public advisory committees, and subsequently local opposition responded with increasing fervour. This contentious siting process lasted over a year until approvals were granted in the fall of 2012 and the facility became operational in 2013. (For a detailed presentation of siting process timelines see Mason et al., 2015 as well as Chapter 1 in this dissertation)

The Township of Southgate (population: 7 100; Statistics Canada, 2013), in rural southwestern Ontario, is characterized as a middle class rural municipality (median household income of \$56,480 (Statistics Canada, 2013)). Dundalk is the only sizable village in the municipality (population 1 900; Statistics Canada, 2013; for a full description of sociodemographic community characteristics see Mason et al., 2015). Southgate is characterized by a recent high turnover of population and rapidly increasing income. Southgate has experienced substantial (21.5%; accompanied by a nearly double in household median family income) in- and out-migration over the last two decades, resulting in population demographic and socio-cultural changes as

generally wealthier residents belonging to the rising commuter population are immigrating and influencing overall expectations of Southgate (Mason-Renton and Luginaah, 2016). This has implications for residents' sense of place as a locale for refuge and restoration from their daily work rather than a place of work and production. Also, residents described a general decoupling between the agricultural and non-agricultural publics in Southgate which contributed to a changing sense of community and amplified intra-community conflict throughout the siting process (Mason-Renton et al., 2016). As we observe, this can have implications for reactions towards proposed techno-industrial developments within the community.

## 7.2 Methodology

The complexity of the perceived risk, social processes and community context therefore calls for in-depth qualitative exploration and analysis of community perceptions over time. This comparative research uses qualitative in-depth interviews (n=39) that were conducted with residents both during the contentious siting period (2012; n=23), prior to any final decisions regarding facility approval or zoning appeal had been made, and during facility operation (2015-2016; n=16), nearly three years after the OMRC became operational. This qualitative methodology allowed for an in-depth understanding of how residents' respond to and perceive risks surrounding the proposed and actual processing and land application of biosolids within their locale; and to explore more deeply residents' ongoing community experiences and reflections on the siting process which brought the examined techno-industrial facility to their locale.

Snowball sampling was utilized for both the 2012 and 2015-2016 studies and on each occasion sampling continued until saturation was reached (Strauss and Cobin, 1990). Key informants with a range of views were purposefully selected such as opposition leaders, farmers interested in the product and residents involved in the siting process. During the second round of interviews the sample included both participants that took

part in the 2012 study (n=4) and new participants (n=12). This was done to check for possible over-reporting from the previous participants as they may have been well-informed or already sensitized given they were asked several facility related questions in the first round. Also, more farmers using the product and residents employed at the OMRC came forward in the second round of interviews than in the first round resulting in more 'new participants'. Interviews incorporated semi-structured open-ended questions related to participants' background, quality of life, general community concerns, biosolid facility specific opinions and experiences with the facility siting process. Typically, residents were interviewed at their homes and interviews lasted 42 and 64 minutes on average during the siting and operational phases respectively. Interviews and field notes were transcribed verbatim, examined for accuracy, and emerging themes were analyzed using NVIVO qualitative analysis software. To enhance analytic rigor researcher triangulation, long-term field exposure, ongoing researcher reflexivity, and expert checking were utilized.

Pseudonyms are used to protect participant anonymity. Length of residence is expressed as either long-term or shorter-term being greater or less than 25 years, as many participants described 'newcomers' as having lived in the community for 25 years or less. Place of residence (Dundalk, rural, rural agricultural) and agricultural involvement is indicated. Last, quotes are labelled as either 'siting' or 'operational' to denote which stage of data collection they are from.

### 7.3 Results

This section begins with an overview of community reactions during the contentious siting process as a background to the comparative interpretation of the current findings. Results are then presented addressing key themes that emerged: residents' adaptation to the facility, residents' shift in concern to invisible impacts and long-term uncertainty,

emergence of residual impacts related to lasting community conflict and one-issue politics, and residents' pre- and post- siting conceptions.

### 7.3.1 Community perceptions during the facility siting process

During the siting process, residents' primary concerns included facility odour, the proposed location of the facility, truck traffic, environmental contamination and community stigma, all of which were seen as having potential impacts on residents' quality of life. This was manifest in the highly emotive ways residents expressed their concern over the multiple risks they thought they may be left to deal with if the facility was sited in their community. Residents such as Luke (long-time, agricultural, siting) described concern for "discharge" filtering down around "our youngest most vulnerable people" in reference to the OMRC's proximity to the elementary school. Other residents went on to discuss concern for quality of life and being trapped in their homes due to adverse odors. With the location of the proposed site being on the periphery of Dundalk, in many ways this pitted agricultural residents against their generally non-agricultural village neighbours, as the distribution of risks and benefits was seen as inequitable in many cases. These concerns for residents' wellbeing throughout the siting process are described in greater detail in Mason-Renton and Luginaah (2016).

It is important to note that while many residents' concerns were heightened throughout the siting process, not all residents felt the same. Some advocated for the facility, referencing its benefits to the local economy and agricultural community. This fueled community conflict and hostility between residents, both evident through participant observation and manifest in local media. With the agricultural community set to benefit from an affordable local nutrient source and primarily valuing a productivist way of life, this facility not only generally fit with their view of what was acceptable in the community but was something that many fought for (Mason-Renton and Luginaah, 2016; Mason-Renton et al., 2016).



Because of the depth of concern embodied by opposing residents they initiated a three-month site blockade and took the municipality to court over land zoning issues. Local action taken between neighbours led to a level of hostility during the siting process not previously seen in the community whereby friends and families found themselves on opposing sides of this newly polarized community depending on their stance on the facility. John (long-time agricultural, siting) described his disappointment in the “hate mail” he was receiving from his neighbours who were intolerant of his differing opinion. During the siting process, Pam (shorter-term, Dundalk, siting) similarly expressed disbelief about the level of hostility and actions some residents were taking and the ways it was “literally tearing this town apart”. The following sections follow up with residents to examine how sustained some of the impacts experienced throughout the siting process may be.

### 7.3.2 Experiences living with an operational waste processing facility

Once the facility became operational, concerns seemed to shift from a focus on immediate impacts from the facility to three main outcomes: facility acceptance, concern for the long-term uncertainty of the product and for broader community impacts.

#### 7.3.2.1 Facility acceptance

Concern in the community seems to have decreased now that residents have adapted to living with the facility. Luke, who was interviewed during both the siting and operational phases, discussed how his perception of the facility had improved as he saw how it operated and had an opportunity to tour it and now sees it as ‘a non-issue’, whereas he previously opposed the facility.

Concerns for disruption to residents' quality of life were rarely mentioned during the follow-up study as participants cited either no or only occasional odour detected from the facility: 'As far as where we live, there's been no smell at all.... and that's what our big concern was' (Pam, shorter-term, Dundalk resident, operational, undecided, previously opposed). It was further noted by some farmers that the injection technique used to apply the product greatly reduced odours compared to conventional biosolid application methods to the point where a farmer stated that 'people don't seem to mind it' compared to regular biosolids that were 'not as well received' (Thomas, long-term, agricultural resident, operational). With good management from the facility that has not resulted in odours 'trapping' residents indoors or causing immediate respiratory issues, as many initially feared, residents' short-term health and quality of life concerns appear notably reduced.

### 7.3.2.2 Residents' concerns shift to invisible impacts

Once the facility became operational and the proponent demonstrated good management practices whereby immediate impacts to residents that were of primary concern were mitigated, concerns shifted towards invisible long-term impacts whereby overarching unease with regulatory and scientific uncertainty emerged. Long-term uncertainty and pervasive distrust in experts' ability to regulate potential risks were the most prevalent concerns among opposed residents.

*Ryan* - I guess the potential for something to not work right, or to be a problem... I'm sure it's like anything else, it's an idea or concept and there could be problems down the road because it's just the way it is ya. (long-time, Dundalk, operational, undecided, previously undecided)

*Pam* - I have very real concerns for the future... it could be fifty years before we discover that wow we never expected that to happen you know we were thinking it was safe so um it, it really does concern me... Even researchers are, half of them are saying it's terrible and the other half are saying it's fine... you don't know who to trust... (shorter-term, Dundalk, operational, undecided, previously opposed)

For many residents, it was just the potential that something could happen and that potential became reality because the plant is now operating within their community. These lingering environmental and health concerns focused on the overarching uncertainty around the long-term impacts of such a dynamic product. With the heterogeneity of biosolid products, potential risk is constantly evolving, which elicits a lack of trust in regulatory agencies' ability to manage these emerging risks.

*Jack* - I think a lot of people have the wrong concerns... my concerns are a little deeper... There's a lot of unknowns in it that are really not regulated enough... they're only testing for the stuff they're regulated for... you know they don't test for the pharmaceuticals and trace amounts of this and that... that is a question I would raise with the regulatory frameworks. (long-time, Dundalk, operational)

For residents sharing these concerns, their opposition had less to do with the actions of the specific facility per se as 'it's beyond them. You know they're just a company doing their job and getting paid... good for them you know' (Pam), but more to do with the level of regulatory oversight. While other concerns seem to be alleviated by good facility management, lingering uncertainties and distrust persist and are now at the core of concerned residents' unease.

### 7.3.2.3 Lingered conflict and community divide

Community conflict as lasting impact was discussed by an overwhelming 12 of 16 participants during the operational interviews, most of whom brought it up without being specifically asked. During the siting process (discussed in depth in Chapter 6), many referenced the conflict as hostile and 'more detrimental than the effects of the plant itself' (Olivia, long-term, agricultural, siting) and these feelings remained well after final decisions had been made. In a tight-knit community where most residents referenced the small-town nature and relationships with friends and neighbours as what they valued most in the community, the impact of lasting intra-community conflict is notable. Four years post-siting, the community divide is described as 'more negative

now than it was even two years ago' (Barb) as residents describe how community divisions and hostility are evident, and even increasing, after the siting debate concluded.

*Pam* - There's such a divide that the emotions are still being held over now and I don't know when that's going to change... I don't understand, I don't it's just we're fractured, we're a fractured community (shorter-term, Dundalk, operational)

*Barb* - I was really hoping I guess (laughs) that we would've turned the corner but no, no I don't. If there's change, I'd say it's been to the negative with more, more negativity, more divide... people are digging in their heels now (shorter-term, agricultural, operational)

This reinforces the concept of *Confrontational Stigma* (developed in Chapter 6), demonstrating the sustained impact of the community conflict in Southgate.

After asking participants why they thought this divide was so pronounced and what may have contributed to it, both long and shorter-term residents similarly cited the difference in people's expectations, relationships and community attachment based on their length of residence. Pam describes how long-time residents generally did not adopt the intensity of community and facility opposition as some newer residents with seemingly tenuous community attachments:

*Pam* - I really think it's a line of people that lived here their whole lives and the people that have lived here for a long time, 20-25 years, but they haven't been here for 200 years... they were kind of drawn along those lines... I'm not saying that everybody necessarily that was from town for 200 years agreed with having the plant but they just didn't take it [conflict] to the level that some of the others did because they were friends and family of the people [supporting it]... I think a lot of newer people were swayed and I think they thought that 'oh these are poor country bumpkins and they don't know what they're talking about'. (shorter-term Dundalk resident, operational)

The community differences and divide are described as an underlying issue in the community, rather than something that materialized because of the proposed facility.

*Margaret* - I do think that uh this facility brought to light, um I'm not going to say it caused it... but it brought to light um some big differences in our community and it's unfortunate (rural, long-time resident, operational)

It is notable how this facility siting process did not necessarily cause the socio-cultural differences among community members but seemingly fueled the conflict that emerged from these preexisting differences. The siting process seemingly acted to emphasize these value differences, pitting those with differing values against each other, as well as solidify a long-lasting community divide whereby residents and community groups cannot seem to move past this.

Barb describes how this sustained conflict and divide colours other debates in the community whereby opinions and coalitions formed during the biosolid facility siting controversy have hardened residents' stances on other environmental siting debates. This divide and 'negativity' is even described as getting worse over time.

*Barb* - You know whether it's gravel pits or solar farms... either you're negative and will always be negative or you're pro and will always be pro with no intent to ever meet in the middle... I just wish that it could evolve somehow 'cause it's frustrating when you hear the same argument year after year after year. (agricultural, shorter term resident, operational)

This hardened intra-community conflict and divide that has spilled over into many other community disputes. This is not seen only in the informal community sector but has come to impact municipal politics as well.

#### 7.3.2.4 One-issue politics as a fall-out from the lingering conflict

The notion of one-issue politics emerged in Southgate, as the municipal election following the siting process (2014) centred primarily on candidates' opinions around the OMRC, its siting process and the EcoPark where the facility is located.

*Pam* - You were against the plant or you were for the plant and that's the way the election went and that's it. That plant was the election. It's as if every other

issue in town stopped. Roadwork, our failing systems, water systems... and it's like council is still [two years later] separated along those lines... it doesn't matter what the issue is, they're going to butt heads and they're going to draw it out and um I don't know if anything can get done... this facility, I've never seen anything like it. (shorter-term, Dundalk, operational)

The 2014 municipal election resulted in a newly elected Mayor as well as four of five new councilors being elected. The newly elected Mayor had no previous experience with municipal politics, was also married to the president of the SPIRG activist group and ran a campaign extremely critical of the OMRC and previous council's transparency and siting procedures. She won by a marginal 49 votes, however this was swayed by a large win with Dundalk voters, whereas the incumbent mayor won in the two rural sectors. Similarly, other councilors, particularly those receiving the three highest votes, ran their campaigns centred around their critique of the OMRC. The only returning members were the Deputy Mayor and one councilor. Both returning members are long-standing members in the community with extensive municipal experience. Both also openly supported the OMRC development. It is worth noting that there was a low voter turnout of 31.8% across the township. Many residents commented that for all the conflict over the facility they could not believe that people could not take the time to vote and express their opinion. For those most strongly opposing the facility, they were successful in mobilizing support at the polls, however there was comments of disbelief in the community following the election that some had not worried to vote because they never thought there would be such change.

The current municipal term has been rid with conflict and controversy as there remains a clear divide in the council chambers that is now hardened between the mayor and another councilor (also a previous member of SPIRG) and the rest of the council and much time is spent debating excessive procedural issues such that it is not uncommon for council meetings to be carried over into additional days.

The impacts of such drastic political change can be far reaching into other policy and development areas in the community as residents commented on the lack of

consideration for other municipal priorities, such as infrastructure maintenance, as well as new development proposals, whereby municipal politics remains centred around past issues and current councilors fail to move forward as a newly elected unit.

*Barb* - As a tax payer, I am concerned that our governance has stalled out and I think that is gonna cost us in the end... I have certain um clients in Southgate that I'm a little concerned about them; their own development could stagnate because of living in this municipality... I'm really concerned that they [municipal officials] have not successfully figured out how to work together. (agricultural, shorter term, operational)

Not all residents agree that a lack of municipal direction is necessarily a detriment to the community but may be a necessary step to achieve desired change:

*Jack* - We're not really going in a direction right now... sometimes it takes a pretty big shift and takes quite a while to turn it around if it was going in the wrong direction, and in my opinion it was. (long-time, Dundalk, operational)

While it is too early to tell whether stagnated municipal politics is an overall detriment to long-term community growth as some have suggested, or a slow beginning to a new direction others called for, continued divide and strife among municipal officials is unlikely to help repair the lingering community divide and conflict that materialized throughout the facility siting process.

### 7.3.3 Residents' reflections on the siting process: Calls for meaningful consultation

Discontent regarding the siting process was commonly referenced in both data collection phases. Two official community meetings were organized by the proponent and municipality, the company opened a community storefront and held open houses, a public advisory committee was formed and community members had the opportunity to submit online comments on the facility application. While at face value, these actions suggest the participatory planning and consultation that has been advocated for over the past decade, residents felt that the facility was being presented as a 'done deal' to

the community and these actions were merely a means to notify the community about it and not to engage the community in a participatory process.

*Kim* - Certainly, at the time the feeling of many was that there was very little consideration for public views or input... many believed that it was a 'done deal' and very little could be changed. (opposed, operational)

This left many residents feeling they had to stand strongly against the facility or else they would not be heard. The perception that a decision had already been made, left many residents feeling that the actions the proponent and municipality took to consult with the community was nothing more than a smoke screen.

The 'tension' at community meetings was emphasized even four years later. Participants reflected that meetings and community discussions had quickly become controversial as opposed, and even uncertain, residents fought to stop the proposed facility before it was too late, feeling that may already be the case.

*Ryan* - I remember being at the arena when they had the speakers... like you could cut the tension there with a knife. It was terrible because they couldn't answer the questions 100% and people were getting upset and it was like an episode of Jerry Springer... it just it didn't unfold very well (long-time, Dundalk resident, operational)

To better communicate details regarding the proposed facility, a municipal official<sup>1</sup> reflected on the siting process suggesting that 'maybe we should've had a couple smaller meetings or got more material and had different people there to present it' as the municipal employee found it 'hard the night they had it [information meeting], uh the nay-sayers like you were lucky if you'd get even a good word in' (operational).

Residents cited the siting process as fuel for the lasting community conflict and divide that remains:

*Jack* - Well it's kind of upsetting because it really didn't need to be that way, um I think if it had of been handled in a different manner they [the municipality] could've maybe achieved the same goals but with a different road taken... Have the public more involved with more openness on it. (long-time, Dundalk resident, operational)



Other residents, such as Margaret, commented on how increased knowledge and consultation would not have convinced everyone it was good for the community but could have provided the 'middle of the road' individuals the tools to decide for themselves.

*Margaret* - More education, more information, more of an invitation for people to have more impact might've helped the situation. I still think it might have helped... Do I think more education and consultation would've made a difference for everyone, no, but it might've given people that were unsure, that are rational, enough knowledge and confidence to stand up against the ridiculous nonsense in the community (rural non-agricultural, long-time resident, operational)

The notion that those who opposed the facility were considered a 'ridiculous' 'minority' who 'knew very little' reiterates feelings of neighbour blaming and hostility towards the 'other side', rather than an acceptance of difference of opinion that is conducive to participatory community discussion accounting for individuals' differences in values and expectations for the landscape.

Another municipal official involved in the siting process thought it was a 'win-win' for the community. In the official's eyes, they did not try to deceive the community, they thought it would be a positive change for the township that other residents would see in such a way as well. The official acknowledges that had they anticipated such backlash and opposition from the community, perhaps they would have better explained their vision for community change and growth to the community as a whole.

*Municipal Official* - You can see perfectly in hindsight... I thought naively that everyone would say well this is great, we can have our cake and eat it too, but well apparently not... We could have done better in terms of trying to describe to the community in terms of what the change meant and what it didn't mean. (operational)

Another municipal official felt that what was done was good enough and that they were not 'hiding' anything, they were just following the rules.

*Municipal Official* - We sent the notices out, which were done properly, and they still don't understand that, that we only had to send them within 120 m or some damn thing from the EcoPark... they thought that we should've sent them to everybody in Dundalk, well that is not what the law says. It says this 120m or whatever so that was only about ten people that we had to send them to... (operational)

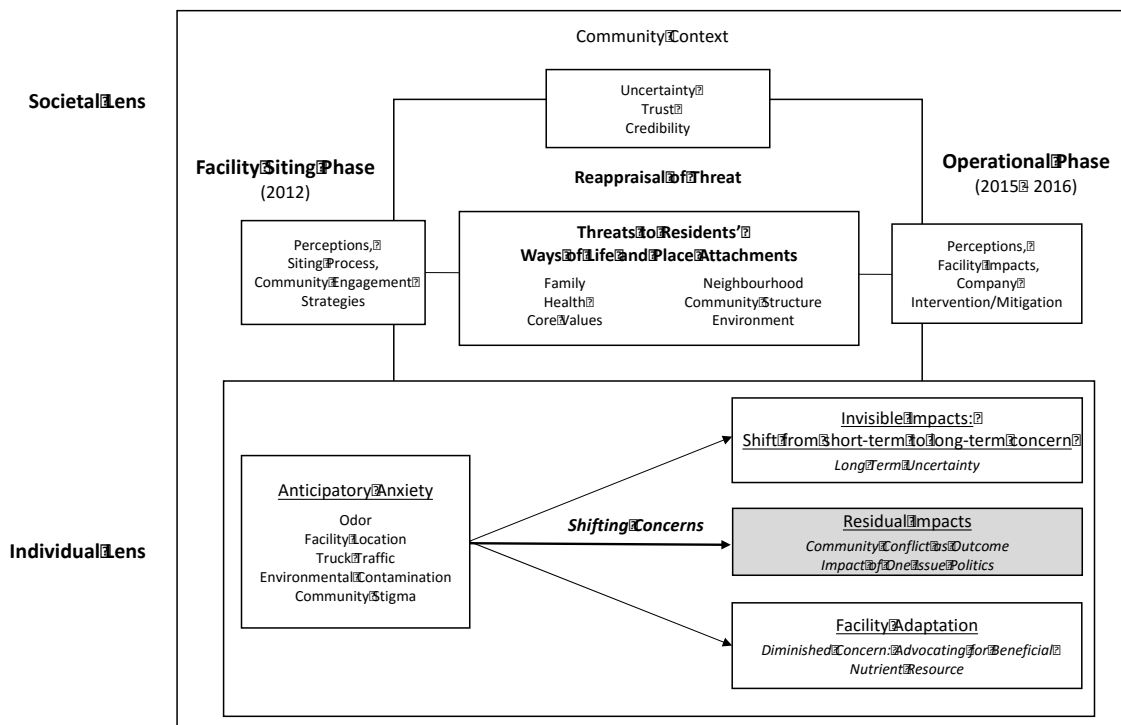
Some residents acknowledged that while procedures may have been followed throughout the siting process, there were still feelings of inequity among community members. Jack expressed discontent with the municipality while acknowledging they did what was required, but felt that morally there should have been additional notification to residents:

*Jack* - I'm a [close] property. They did what they were mandated to but you know I didn't feel I was really notified... They weren't concerned with what was said at all, they were just going through the motions I guess. (long-time, Dundalk, operational)

Acknowledging that the proper notifications may have been disseminated and community meetings held, residents like Jack do not feel that the required processes are sufficient to address community concerns and facilitate true public participation. He, among others, discussed concepts of procedural justice and the fairness in how the facility was brought to their community, calling for mandated notifications to a wider geographic area surrounding the facility and earlier involvement with community members where they had the opportunity to truly participate rather than just going through the motions. Residents not only opposed the proposed facility itself, but also the municipality's consultation and notification process as they challenged the site's zoning in court. This emphasizes the importance of *perceived* fairness and equity, regardless of whether regulations were followed.

## 7.4 Discussion and Conclusions

Residents’ reappraisal of the Southgate OMRC and its siting process revealed a shift in concerns from anticipatory anxieties to concern for invisible (long-term uncertainty) and residual (community conflict and one-issue politics) impacts as well as overall adaptation to the facility with diminished concern (Figure 7-1). Reflections on the siting process suggest there was limited consultation during the siting process which focused on merely checking boxes. Consequently, residents critiqued the siting process and suggested this may have fueled the lingering intra-community conflict and one-issue political focus evident in the subsequent municipal election that was overwhelmingly referenced as an impact of the siting of this facility.



**Figure 7-1 Conceptual framework of community responses pre- and post-siting of a potentially noxious facility in their vicinity.’**

These findings contribute to a limited body of research examining residents’ reappraisal of potentially noxious facilities as they transition through a siting process, when

ambiguity and uncertainty are highest, through facility approval and finally operation. Consistent with Elliott and McClure (2009) and Elliott et al. (1997), this research finds that many residents have adapted to the facility in their community and do not currently perceive it as an immediate threat to their wellbeing. Consequently, the amplified risk during the siting phase is likely due to 'anticipatory anxiety' (Figure 7-1) (Elliott and McClure, 2009) and the notion that siting processes themselves can act as environmental stressors (Lazarus and Folkman, 1984). Related to this is the notion of odour as an effect modifier (Luginaah, 2002b), given that there was extensive worry about the impacts of odour on residents' quality of life during the siting process. Yet, following the siting and operation of the facility residents now say they rarely experience such odours. The reported lack of odorous emissions from the facility reinforces the reappraisal process and serves to reduce the fears previously held by residents. Further, residents are now able to tour and directly experience the operation of the local facility and this has provided added satisfaction and a feeling that the facility is acting to reduce negative impacts. Consistent with operational risk communication strategies, this helps to deal with some of the ambiguities residents may have had and further acted to alleviate concerns. It is important to note that not all current residents have conceded to the facility being located in their locale and taken up offers for a tour; however, those who have toured the facility expressed content and satisfaction arising from this experience. This brings a new dimension to reappraisal theory – people who are unwilling to visit an operational facility out of anger or 'they simply don't want to know or be seen as though they are now in favour...' within a community will have an influence on the overall reappraisal process.

Consistent with earlier work (Luginaah et al., 2002a, 2002b; Elliott and McClure, 2009), while short-term impacts were mitigated, some residents' focus shifted towards invisible impacts (Figure 7-1) as broader concerns with the long-term uncertainty around the land application of biosolid products were at the core of concerned residents' discussion during the operational phase. Long-term uncertainties are not an interim issue, and it is arguable that increasing openness and humility about these

persistent uncertainties, both those we are aware of and those we are not, could act to increase trust and further the conversation about how to achieve beneficial reuse and circular economy goals based on existing knowledge. The land application of biosolids is one example of this. However, these results extend into other controversies around the reuse or transition of stigmatized waste products, such as waste-to-energy incinerators (Baxter et al., 2016) among others whereby discussions of underlying uncertainties and issues of trust are similarly notable.

Residents' reflection on the siting process as well as impacts from these siting procedures reveal notable findings on the importance of accounting for residents' diverse values, expectations and attachments in their community (Paveglio et al., 2016). The historical and socio-cultural context in which residents' make decisions regarding what is perceived to *fit* or to *intrude* into their community can influence their social amplification of risk (Mason-Renton and Luginaah, 2016). While some community officials assumed that such a proposed facility would be well-received by the community (similar to Edelstein et al., 2004), the heterogeneous values and expectations of some residents and underlying socio-cultural divide was however overlooked. This was seemingly not done as an intentional means to ignore different sectors of the community, but more likely due to an underestimation of the increasing diversity and various 'communities' (Paveglio et al., 2016) within what the policy makers and regulators perceive as a homogenous rural locale (Baxter, 2006). Consequently, planners, regulators and facility proponents alike must account for the diversity of attachments residents have in their communities and account for these in a truly participatory siting process whereby all residents can participate.

The OMRC and the siting process that brought it to Southgate has undoubtedly changed this rural town as indicated by participants accounts. Regardless of facility outcome, residents expressed how the siting process acted to highlight existing community value and expectation differences, pit residents against one another, and drive a sustained wedge in the community lasting long after the siting process concluded. In contrast to

much research showing conflict between communities and industrial developers, we show intra-community conflict, neighbour blaming and ongoing divide precipitating from this facility siting process. These findings are consistent with Baxter's (2006) findings that techno-industrial development can result in disagreement and conflict and similarly we find that community context is key. However, to the best of our knowledge, this is the first case where such hostility and prolonged divide emerged as the primary impact of a facility siting process. Further, the notable impact on local municipal politics will influence the community for at least the near future. Such divisiveness, which can be particularly detrimental for close-knit rural communities, should be accounted for and further research conducted to determine a means to mitigate ongoing negative impacts arising from noxious facility siting processes.

Issues of process and perceived inequity also emerged. Perceived fairness, equity and transparency throughout siting processes can be more influential than the actual equity of siting processes. Our findings align with Kirkman and Voulvoulis (2016) as we call for meaningful consultation that occurs early in the decision-making process. While proper procedures may have been followed, many residents expressed discontent with procedural fairness and opposed this in addition to the facility itself. Dissatisfaction and unrest with the perceived equity and transparency throughout the siting process became the pivotal issue in the municipal election following the siting of the OMRC. With community officials expressing their satisfaction with completing what was required of them, perhaps increased participatory process and meaningful consultation should not be merely an additional 'risk communication tool' for municipalities and industries to voluntarily adopt as has traditionally been the case, but a requirement of facility siting and environmental assessment processes moving forward. This could act to both increase the perceived equity and participatory nature of siting processes but also act to mitigate potential residual impacts of intra-community conflict described above.

While we have presented a comparative lens into residents' experiences with and reappraisal of the OMRC, it is important to keep in mind that this reappraisal process and lived community experience is ongoing. The practical and policy significance of this study is notable in that it is one of two (Elliott et al., 2009) known studies that comparatively examines how a community responds to the process of siting waste management facilities, while uncertainty and ambiguity are greatest, and how residents' reappraisal and responses evolve over time as they live with such facilities. Additionally, this research identifies community conflict and one-issue politics as notable sustained outcomes from this facility siting process. Industries and planners alike can do more to not amplify, divide and pit residents against each other in other communities to ease the ongoing impacts experienced in Southgate. While the distinct circumstances associated with a specific facility and community context are somewhat unique, there are important contributions here reinforcing the utility of meaningful community consultation and the need to account for the diversity of values and expectations seen even in small seemingly homogenous communities.

This research shows how perception of fairness, just process, and anticipated impacts are crucial to a successful siting process and important to mitigate residual impacts. Lengthy siting processes often involving community protests, stalled development and even potential legal action are becoming the norm and not the exception, even for facilities viewed as 'green' or 'progressive' by some. Better strategies must be adopted to work with communities to mitigate long-term impacts and maximize community benefits or else technologies touted as green or sustainable are unlikely to come to fruition. As the waste management industry further emphasizes beneficial reuse technologies we must better understand residents' responses to these contested facilities and the sustained community impacts that such controversial and divisive siting debates may generate.

## 7.5 Notes

To protect anonymity municipal officials are not given pseudonyms.

## 7.6 References

- Baxter, J. (2006). A case study of intra-community conflict as facility impact. *Journal of Environmental Planning and Management*, 49(3), 337-360.
- Baxter, J. W., Eyles, J. D. and Elliott, S. J. (1999a). From siting principles to siting practices: a case study of discord among trust, equity and community participation. *Journal of Environmental Planning and Management*, 42(4), 501-525.
- Baxter, J., Eyles, J. and Elliott, S. (1999b). 'Something Happened': The relevance of the risk society for describing the siting process for a municipal landfill. *Geografiska Annaler*, 81B(2), 91-109.
- Baxter, J., Ho, Y., Rollins, Y. and Maclaren, V. (2016). Attitudes toward waste to energy facilities and impacts on diversion in Ontario, Canada. *Waste Management*, 50, 75-85.
- Beck, U. (1992). *Risk Society: Towards a New Modernity*. Sage Publications, London.
- Cadieux K. V. and Hurley, P. T. (2011). Amenity migration, exurbia and emerging rural landscapes: Global natural amenity as place and as process. *Geojournal*, 76(4), 297 – 302.
- Cooke, B. and Lane, R. (2015). How do amenity migrants learn to be environmental stewards of rural landscapes? *Landscape and Urban Planning*, 134, 43 – 52.
- Devine-Wright, P. and Howes, Y. (2010). Disruption to place attachment and the protection of restorative environments: A wind energy case study. *Journal of Environmental Psychology*, 30, 271-280.
- Douglas, M. (1992). *Risk and Blame Essays in Cultural Theory*. London; New York: Routledge.



- Edelstein, M.R. (1988). *Contaminated Communities*. Westview, Boulder, CO.
- Edelstein, M. R. (2004). Sustainable innovation and the siting dilemma: thoughts on the stigmatization of projects and proponents, good and bad. *Journal of Risk Research*, 7(2), 233-250.
- Elliott, S.J. and McClure, J., (2009). "There's just hope that no one's health is at risk": residents' reappraisal of landfill siting. *Journal of Environmental Planning and Management*, 52, 237-255.
- Elliott, S.J., Taylor, S.M., Hampson, C., Dunn, J., Eyles, J., Walter, S. and Streiner, D. (1997). 'It's not because you like it any better...': residents' reappraisal of a landfill site. *Journal of Environmental Psychology*, 17(3), 229-241.
- Elliott, S. J., Taylor, S. M., Walter, S., Stieb, D., Frank, J., and Eyles, J. (1993). Modelling psychosocial effects of exposure to solid waste facilities. *Social Science and Medicine*, 37(6), 791-804.
- Folger, R., Rosenfield, D., Grove, J., and Corkran, L. (1979). Effects of "voice" and peer opinions on responses to inequity. *Journal of Personality and Social Psychology*, 37(12), 2253-2261.
- Gallagher, L., Ferreira, S. and Convery, F. (2008). Host community attitudes towards solid waste landfill infrastructure: comprehension before compensation. *Journal of Environmental Planning and Management*, 51, 233-257.
- Giddens, A. (1990). *The Consequences of Modernity*. Cambridge, Polity Press.
- Goven, J. and Langer, E.R.L. (2009). The potential of public engagement in sustainable waste management: designing the future for biosolids in New Zealand. *Journal of Environmental Management*, 90, 921-930.
- Jacquet, B. J. and Stedman, R. C. (2013). The risk of social-psychological disruption as an impact of energy development and environmental change. *Journal of Environmental Planning and Management*, 57(9), 1285-1304.
- Kelly-Reif, K. and Wing, S. (2016). Urban-rural exploitation: an underappreciated dimension of environmental injustice. *Journal of Rural Studies*, 47, 350-358.

- Kirkman, R., Voulvoulis, N., (2016). The role of public communication in decision making for waste management infrastructure, *Journal of Environmental Management*, <http://dx.doi.org/10.1016/j.jenvman.2016.06.002>
- Kroll-Smith, J. S., Couch, S. R. (2015). *The Real Disaster is Above Ground: A Mine Fire and Social Conflict*. University Press of Kentucky.
- Kruti, P., Stayfacher, M., Pedolin, D., Moser, C., and Scholz, R. W. (2012). The process matters: fairness in repository siting for nuclear waste. *Social Justice Research*, 25, 79-101.
- Kunreuther, H., Fitzgerald, K. and Aarts, T. D. (1993). Siting noxious facilities: a test of the facility siting credo. *Risk Analysis*, 13(3), 301-318.
- Kunreuther, H., Slovic, P. and Macgregor, D. (1996). Risk perception and trust: challenges for facility siting. *Risk*, 7, 109.
- Larock, S. and Baxter, J. (2013). Local facility hazard risk controversy and non-local hazard risk perception. *Journal of Risk Research*, 16(6), 713-732.
- Lazarus, R. S. and Folkman, S. (1984). Coping and adaptation. *The Handbook of Behavioral Medicine*, 282-325.
- Lidskog, R. (2005). Siting conflicts – democratic perspectives and political implications. *Journal of Risk Research*, 8(3), 187-206.
- Luginaah, I. N., Taylor, S. M., Elliott, S. J. and Eyles, J. D. (2002a). Community reappraisal of the perceived health effects of a petroleum refinery. *Social Science and Medicine*, 55(1), 47-61.
- Luginaah, I. N., Taylor, S. M., Elliott, S. J. and Eyles, J. D. (2002b). Community responses in the vicinity of a petroleum refinery in Oakville, Ontario. *Health and Place*, 8, 177-190.
- Mason, S.A., Dixon, J., Mambulu, F., Rishworth, A., Mkandawire, P. and Luginaah, I. (2015). Management challenges of urban biosolids: narratives around facility siting in rural Ontario. *Journal of Environmental Planning and Management*, 58(8), 1363.

- Mason-Renton, S. and Luginaah, I. (2016). Interfering with therapeutic tranquility: debates surrounding biosolid waste processing in rural Ontario. *Health and Place* 41, 42-49.
- Mason-Renton, S. A., Luginaah, I. and Baxter, J. (2016). Community Divide as more Detrimental than the Plant Itself: Confrontational Stigma and Community Responses to Rural Facility Siting. *Journal of Rural and Community Development*, 11(2), 22-44.
- Masterman-Smith, H., Rafferty, J., Dunphy, J., and Laird, S. G. (2016). The emerging field of rural environmental justice studies in Australia: reflections from an environmental community engagement program. *Journal of Rural Studies.*, 47, 359-368.
- Masuda, J., and Garvin, T. (2008). Whose heartland? The politics of place in a rural-urban interface. *Journal of Rural Studies*, 24, 112-123.
- McGee, T. (1999). Private responses and individual action: community responses in chronic environmental lead contamination. *Environment and Behaviour*, 31(1), 66-83.
- Okeke, C. U., and Armour, A. (2000). Post-landfill siting perceptions of nearby residents: a case study of Halton landfill. *Applied Geography*, 20, 137-154.
- Paveglio, T. B., Boyd, A.D. and Carroll, M.S. (2016). Re-conceptualizing community in risk research. *Journal of Risk Research*, doi: 10.1080/13669877.2015.1121908
- Pellow, D. (2000). Environmental inequality formation: toward a theory of environmental injustice. *American Behavioral Scientists*, 43(4), 581-601.
- Pellow, D. N. (2016). Environmental justice and rural studies: a critical conversation and invitation to collaboration. *Journal of Rural Studies.*, 47, 381-386.
- Slovic, P. (Ed.) (2000). *The Perception of Risk*. London; Sterling, VA: Earthscan Publications Ltd.
- Smith, M. D. and Krannich, R. S. (2000). Culture clash" revisited: Newcomer and longer-term residents' attitudes toward land use, development, and environmental

- issues in rural communities in the Rocky Mountain West. *Rural Sociology*, 65(3), 396-421.
- Soini, K. Vaarala, H. and Pouta, E. (2012). Residents' sense of place and landscape perceptions at the rural-urban interface. *Landscape and Urban Planning*, 104, 124-134.
- Statistics Canada. (2013). Southgate, TP, Ontario (Code 3542005) (table). National Household Survey (NHS) Profile. 2011 National Household Survey. Statistics Canada Catalogue no. 99-004-XWE. Ottawa. Released September 11, 2013. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E> (accessed December 1, 2015).
- Strauss, A. and Cobin, J. (1990). Basics of Qualitative Research. Grounded Theory Procedures and Techniques. California: Sage.
- Taylor, S.M., Elliott, S., Eyles, J., Frank, J., Haight, M., Streiner, D., Walter, S., Norman, W. and Willms, D. (1991). Psychosocial impacts in populations exposed to solid waste facilities. *Social Science and Medicine*, 33(4), 441-447.
- Wakefield, S. and Elliott, S. J. (2000). Environmental risk perception and well-being: effects of the landfill siting process in two southern Ontario communities. *Social Science and Medicine*, 50(7), 1139-1154.
- Walker, C., Baxter, J. and Ouellette, D. (2014). Beyond rhetoric to understanding determinants of wind turbine support and conflict in two Ontario, Canada communities. *Environment and Planning A*, 46(3), 730-745.
- Wolsink, M. (2010). Contested environmental policy infrastructure: socio-political acceptance of renewable energy, water, and waste facilities. *Environmental Impact Assessment Review*, 30, 302-311.
- Wolsink, M. and Devilee, J. (2009). The motives for accepting or rejecting waste infrastructure facilities. Shifting the focus from the planners' perspective to fairness and community commitment. *Journal of Environmental Planning and Management*, 52(2), 217-236.

## Chapter 8

### 8 DISCUSSION AND CONCLUSIONS

#### 8.1 Introduction

This final chapter summarizes the major findings and theoretical contributions of this dissertation according to the objectives described in Chapter One. Within the discussion, the findings are drawn upon to suggest a conceptual framework for exploring responses to contentious developments in rural communities. This chapter also provides a discussion of the implications of the study for policy and practice. The chapter highlights the limitations of the research before concluding with suggestions for future research.

#### 8.2 Summary and Contributions of Findings

##### 8.2.1 Objective One: To explore the risk perceptions associated with the processing and end usage of biosolid waste.

Drawing on in-depth interviews conducted with Southgate residents during the acrimonious siting process, this objective addresses risk perceptions surrounding the contested nature of transformed waste products. Public perception of biosolids wastes remains underexplored and a depth understanding of residents' conceptions of transformed biosolid products is relatively non-existent.

The findings of this research (primarily found in Chapter 4) show that within increasingly dynamic rural communities biosolid processing and reuse as an agricultural fertilizer product is dually contested as either a valuable resource sustainably recycling nutrients or an intrusive waste product permeated with uncertainty and risk. Both residents opposing and supporting the proposed facility advocate for what is beneficial for the

environment, drawing on an environmental or green narrative. However, residents remained polarised and farther from reaching a common understanding. These qualitative interview findings align with media analysis of competing facility narratives (Mason et al., 2015) and offer a depth understanding of residents' perception of risk of such stigmatized and contested waste products.

Overall, the uncertainty surrounding the impacts of biosolid processing and land application contributes to a polarizing debate whereby some residents fear for their own and their children's health in this changing environment while others believe there are worse risks in the community. Chapter five highlights opposing residents' concern for health and wellbeing, most notably risks to child safety. This concern for the uncertainty of long-term impacts to residents' health is also highlighted in Chapter seven. The uncertainty of how residents would be impacted, such as potential odours, impacts of truck traffic, and environmental contamination, became rallying points throughout the siting process and residents opposing the facility touted biosolids as an uncertain waste product which needs disposing of. Many residents spoke of their concern for impacts to their quality of life as well as long-term health and environmental impacts.

In contrast, community proponents of the beneficial reuse of biosolid products as agricultural fertilizers referenced the beneficial organic nutrients, the need to return nutrients to the land in a closed-loop sustainable manner and also the economic benefits the facility would bring to the community. While many proponents acknowledged the initial waste properties of biosolids, focus was on the transformation of these by-products as well as the best option based on current available knowledge.

These findings contribute to a relatively minimal body of literature on the public response to biosolid products, despite the fact that public perception and opposition remains the primary hindrance to its beneficial reuse (Beecher, 2004). Further, much of the research that does exist has been quantitative in nature (Robinson et al., 2012; Beecher et al., 2005; Goven et al., 2012) thus this research contributes a more nuanced

and place-based contextualized understanding of residents' response to the transformation of biosolid products in their locale.

### 8.2.2 Objective Two: To examine how the siting of this processing facility is affecting residents' emotional and sensual geographies in time and place.

Addressing Objective Two, chapter five highlights the importance of rural residents' conceptions of their environment as a tranquil place to live with their children and future generations and how such therapeutic tranquillity can be turned upside down with the intrusion of urban waste products. Utilizing depth qualitative interviews conducted during the siting phase, this research draws on the contested nature of both the riskiness of the facility and fertilizer product in itself as well as the challenged inherent therapeutic nature of the landscape. These findings extend literature on contested therapeutic landscapes (Milligan, 2007; Smith et al., 2010; Wakefield and McMullin, 2005) and relational change in rural landscapes (Conradson, 2005) revealing how therapeutic contestations and selectivities (Smith et al., 2010) can be influenced by the imaginary geographies of uncertainties in ordinary rural landscapes when there are unwanted intrusions of urban by-products and processes. Under such situations, landscapes that were considered to be therapeutic (by some) may now become non-therapeutic when potentially noxious developments take place.

Residents opposing the OMRC generally viewed the facility as a disruption to the healthy, restorative and tranquil nature of their pastoral landscape. Whereas, residents supportive of this new development in their community saw the proposed facility as a benign or even beneficial part of their landscape that was neither eliciting additional risk nor disrupting their attachment to place but was bringing economic benefits, by means of increased tax dollars and local employment opportunities. This contributes to an understanding of individuals' differential and subjective experiences in place (Bell et al., 2015; Townsend and Pascal, 2012; Williams 2007; Gesler 2005; Rose, 2012). Further,

these findings highlight the ways differential place attachments influences residents' perceived level of disruption to their locale's contested therapeutic qualities and influences their response to techno-industrial facilities.

Chapter Six extends this discussion of embodied emotional geographies and felt place-based socio-cultural impacts (Baxter, 2006; Masuda and Garvin, 2008) by showing the concerns and community-level identity threats described by residents opposing and supporting the proposed facility, the most prominent being threats to quality of life, community cohesion and stigmas. Similar to Chapter five, these findings show that experiences of place change are not inherently disruptive and perceived as negative, but are instead based on residents' place attachments. Community conflict emerged as a notable outcome of the facility siting process in this research and some residents went as far as suggesting the opposition and community conflict was potentially more detrimental and stigmatizing than the facility, thus chastising those residents vocally opposing the facility. Subsequently, a new form of perceived stigma, coined *Confrontational Stigma*, emerged from this research on residents' varied attachment to place and response to place change.

### 8.2.3 Objective Three: To examine residents' reappraisal of an operational facility and the facility siting process that brought it to their community.

Addressing Objective Three, comparative qualitative analysis between the siting and operational phases shed light on residents' reappraisal of the Southgate OMRC in Chapter Eight. Interviews conducted during the facility's operational phase revealed a shift in concerns from anticipatory anxieties towards facility acceptance, concern for invisible impacts (long-term uncertainty) as well as a prominent concern for residual impacts such as community conflict and one-issue politics. These findings contribute to a limited body of research examining residents' reappraisal of potentially noxious facilities as they transition through a siting process, when ambiguity and uncertainty are



highest, through facility approval and finally operation. Consistent with earlier work (Luginaah et al., 2002a, 2002b; Elliott and McClure, 2009), while short-term impacts such as odour were mitigated, some residents' focus shifted towards invisible impacts as broader concerns with the long-term uncertainty around the land application of biosolid products were at the core of concerned residents' discussion during the operational phase.

Reflections on the siting process suggest some residents felt there was insufficient consultation during the siting process which focused on merely checking boxes. Consequently, residents critiqued the siting process and suggested this may have propagated the one-issue political focus evident in the subsequent municipal election that was overwhelmingly referenced as an impact of the siting of this facility. Issues of process and perceived inequity materialized whereby, perceived fairness, equity and transparency throughout siting processes emerged as more influential than the actual equity of siting processes. Findings call for meaningful consultation that occurs early in the decision-making process.

While there are few examples showing techno-industrial developments leading to intra-community conflict (Baxter, 2006), this is the first case I am aware of where such hostility and prolonged divide emerged as the primary sustained impact following a facility siting process. Further, examples of such notable implications leading to one-issue politics in the rural municipality is also relatively non-existent in the social construction of risk and facility siting literatures. Companies do not expect to fundamentally change the social cohesion of a community or a local election in its entirety when they conduct their environmental impact assessment, however this is something that deserves attention to ensure such sustained impacts are mitigated.

## 8.3 Contributions of the Study

Emerging from this research are the notions that both the community itself as well as the 'greenness' of the OMRC were contested. Findings show that residents' conception of their rural community and subsequently their attachments to place and landscape expectations were varied and often in conflict with each other's. This revealed that this rural place was in itself contested. Adding to this was the claim that the land application of transformed biosolid fertilizer products is sustainable and green – a way to address broader contemporary waste management and climate change issues. This 'greenness' was similarly contested, rather than being universally recognized and accepted throughout the community, which acted as further fuel for community contention. These contested rural communities and 'green' developments and the resultant social risk of conflict act as the thread that ties the four manuscripts presented in this dissertation together. The following sections discuss the theoretical contributions and practical implications of this research.

### 8.3.1 Theoretical Contributions

This research calls for consideration beyond the traditional risk society literature and facility siting credo to a more inclusive framework accounting for the nature of the hazard, the complex community context and residents' varying place attachments given that places are variably experienced and these experiences may evolve over time. While techno-industrial risk perceptions and responses to facility siting processes have been investigated extensively, this contextual place-based emphasis has received less attention and is helpful in better understanding the complexity of responses to contested and stigmatized by-products of modern society, particularly those considered 'green' by some.

### 8.3.1.1 Differential place attachments and response to place change in evolving rural communities

Whereas rural communities are often viewed as homogenous units by planners and developers alike (Baxter, 2006), this research shows the differential expectations, place attachments and responses to place change in this evolving rural community. The value differences and seemingly divergent expectations apparent in this empirical case study appeared to influence the varied responses to the biosolid processing facility in this rural community and even act to accentuate intra-community conflict and negative interaction between these divergent groups. These findings contribute to the relative lack of research examining how these disparate groups interact throughout the development process and can contribute to sustained intra-community conflict.

Differential place attachments in this rural community propagated disparate responses to proposed place change and fueled intra-community conflict. Conflict emerged between residents who view the 'rural' landscape as a resource, equating it with agriculture, food and primary production and extraction industries and those who emphasized the pastoral qualities of the rural countryside as a place of refuge and relaxation. While previous research has shown different attachments to place (Devine-Wright and Howes, 2010; Vorkinn and Riess, 2001), I contribute to the relative lack of research examining how these differential place attachments are influential to these disparate groups' responses to contested green developments as well as how such groups interact throughout the facility development and operational phases.

Also at the root of this contentious facility siting process are the communication barriers present in a system which fails to recognize the evolving nature of the community and act to legitimize the differing place attachments and experiences of place change.

When differing sides fail to recognize that opposing groups disagree based upon their differing values, attachments to and expectations of the landscape each side is likely to talk past, rather than with, each other. Both residents and municipal officials spoke of the ways they were unaware of the changes that had occurred in the community as well

as the differing ways residents had perceived the proposed facility would impact their daily lives. The lack of awareness of these differences acted as a communication hindrance whereby residents were not able to discuss and respect each other's differing perspectives. Such evolving rural communities must exert greater effort at collective community visioning, whereby all stakeholders have a role in driving community visioning and development moving forward.

Thus, in addition to traditional risk constructs of dread, uncertainty, trust and voluntariness, I expanded my analysis to account for place-based factors including place attachments and relational experiences of place change. This contextually grounded work contributes to an emerging body of work regarding techno-industrial siting risk (Devine-Wright, 2009; Devine-Wright and Howes, 2010; Baxter, 2006; McLachlan, 2009; Manzo, 2014; Walker et al., 2014; Masuda and Garvin, 2008) and an understanding of individuals' differential and subjective experiences in space (Bell et al., 2015; Townsend and Pascal, 2012; Williams, 2007; Gesler, 2005; Rose, 2012). Brehm et al. (2013) suggest that sense of place promotes pro-environmental attitudes and behaviours. However, this research shows that residents have varying definitions of what is 'best' for the community and environment and thus their pro-environmental attitudes and behaviours' are not always aligned. This is particularly relevant when considering the environment and health risks associated with contested green developments. Although previous research has shown that residents with stronger attachment to place showed comparatively stronger opposition to technological development (Vorkinn and Riese, 2001), findings here suggest that stronger attachment to place alone is insufficient. The diverse place attachments and response to techno-industrial development corroborates existing research that strength of place attachment is only associated with opposition when a development is not perceived to 'fit' with residents' place attachments (Devine-Wright, 2012). Residents who saw this proposed facility as a benign or even beneficial part of their landscape and thus did not perceive this development as disrupting their attachment to place generally supported the facility. Whereas, opposed residents viewed the relational place change as disruptive to their attachment to place and also

viewed the waste as an intrusive urban risk. This research suggests that the interplay of place attachment, relational experience of place change and the technology of the facility at issue are influential in motivating opposition or support.

### 8.3.1.2 Contested green developments and scalar mismatch

The contested nature of the processing and land application of biosolids is notable as it moves beyond traditional risk perceptions associated with hazardous and even non-hazardous waste disposal towards the contested nature of 'green' developments motivated by broader sustainability goals, whereby the greenness in itself is often challenged. This inherent dualism associated with such contested green developments acts as a contextual backdrop of this facility siting debate. Whereas traditional techno-industrial facility siting disputes often pitted residents concerned with environment and health risks against corporations or developers after the economic benefits, both sides in this contentious debate claim to be acting on behalf of protecting the environment. This resulted in a community which turned inward, became intensely polarized and intra-community conflict materialized. Uncertainty became a rallying point as environment and health risks and benefits and sustainability of the land application of biosolid fertilizer products was contested. Persistent uncertainties allowed opposition groups to dispute scientific 'facts' guiding biosolid policies (Mason et al., 2015). While there has been a paradigm shift over the last few decades calling for sewage wastes to be seen as a resource, public opposition to lingering uncertainties remains a barrier to the successful implementation of technologies considered forward-thinking and sustainable by some (Morales and Oberg, 2012). These differing discourses, analytical paradigms, and agreed upon conventions used to evaluate potential risks can act to further amplify the communication barriers between groups described above.

Further, resistance to sustainable innovation often stems from the scalar mismatch of risks and benefits whereby residents may acknowledge global or even regional benefits,

but feel that risks are unjustly concentrated in their locale (Chapter Four). This research contributes to an understanding of residents' scale framing and value (or not) in regional interconnectivity, relationalities and broader environmental benefits. This work is consistent with Edelstein (2004: 234) whereby he describes opposition as rational and motivated by 'compelling *personal* reasons' founded on concern for adverse consequences to both their lifestyle and lifescape. Further, Edelstein (2004) describes the YIMBYs, or supporters of such projects, as potentially motivated personally (such as profit-based) but mostly driven by the desire to meet broader perceived public needs. This research corroborates these conclusions by highlighting the influence of scalar conception of place, relationalities and contested environmental inequities on residents' perceived level of risk surrounding the transformation of biosolids into an agricultural fertilizer in their locale was viewed as either a sustainable circular process or an inequitable intrusion of an urban waste problem. This scalar mismatch also has implications for residents' perceptions of fairness and equity, a division particularly notable between the agricultural and non-agricultural community members in Southgate. The differing analytical paradigms used to assess risk, particularly the ways residents' draw on relationalities and their scalar conception of place to evaluate the distribution risk and benefits between urban and rural regions (Massey, 2004; Pellow, 2016), contribute to the perceived dualism associated with contentious green developments.

### 8.3.1.3 New form of facility siting risk: social risk of conflict

Last, I extend the facility siting and risk literatures (Slovic, 1987; Baxter et al., 1999; Pigeon et al., 2003; Kunreuther et al., 1993; Krinsky and Golding, 1992; Kasperson et al., 2003) by showing how this changing sense of the community signifies a new form of risk from this facility – the social risk of conflict. Much of the facility siting and techno-industrial risk literature to date has focused on environment and health impacts, with negligible attention paid to sustained ramifications to community social wellbeing.

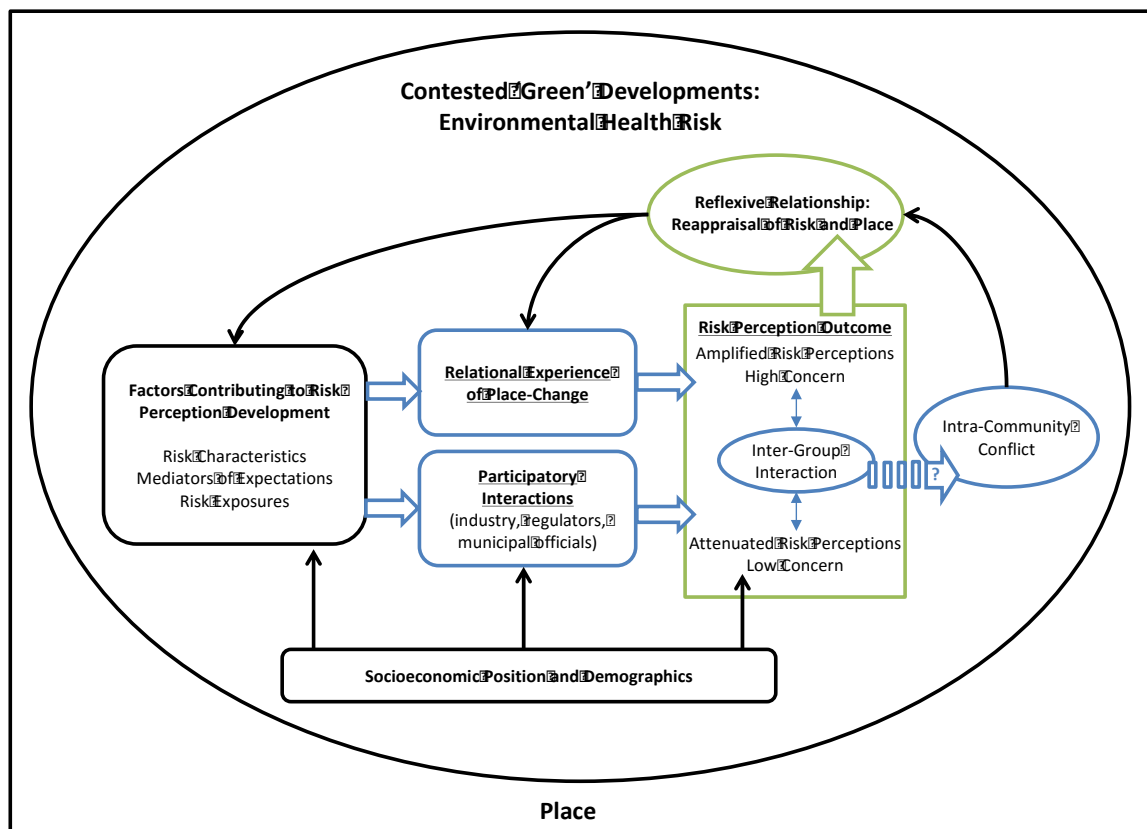
While difficult to measure or predict, these outcomes should be better assessed and actions taken to enhance rather than degrade local social capital.

These findings have implications for facility siting and environmental assessment processes as many urban centres look towards rural landscapes for spaces of production and disposal. Further, as rural community expectations tip more towards consumptive uses and feelings of social change and distrust within the community continues in instances like these this opposition and conflict is likely to increase. While not all instances of rural amenity immigration will lead to increased conflict, contention over community development can be fueled by varied place-based expectations. Small towns are known for their defined social patterns and close knit structures and thus the hostility, one-issue politics and prolonged divide which emerged as the primary impact of this facility siting process is detrimental to communities previously experienced as harmonious. Such divisiveness, should be accounted for and further research conducted to determine a means to mitigate ongoing negative impacts arising from noxious facility siting processes. Further, corporations and planners should take responsibility for processes which act to pit residents against each other and amplify community conflict.

#### 8.3.1.4 Understanding Environment and Health Risk Perceptions Surrounding Contested Green Developments

Figure 8-1 illustrates the theoretical contributions of this research by building on Harrington and Elliott's (2015) relational framework of risk perception, with individual and contextual level influences. In addition to traditional factors including risk characteristics (dread or uncertainty), exposure (direct or indirect) and mediators of expectations (such as general risk attitudes, trust and coping mechanisms), this research adds to our understanding of perceived risk by also accounting for residents' relational experiences of place change as well as the participatory interactions that occur. As discussed above, residents' differing attachments to place as well as the contested

nature of green developments contribute to varied experiences of place change. The less a development is perceived to 'fit' with one's place attachments the more likely he or she is to oppose such a development. Further, the interactions residents have throughout the siting process were found to influence their risk perceptions, both in the ways the participatory process was perceived to be equitable (or not) but also in how residents' felt their concerns were legitimized (or not) throughout the siting process and during the operational phases. Place represents the backdrop against which the public experiences emerging environmental risks, and is an important determinant of each of the internal components depicted in this framework. This accounts for the sociocultural, political, economic and physical environments in which environmental health risks occur.



**Figure 8-1 Relational framework conceptualizing the importance of relational experiences of place-change and community participatory interactions for influencing risk perception outcomes and the potential for intra-community conflict.**



These factors contribute to the development of the diverse level of perceived risk observed here. Residents continuously reappraise risk and place in a reflexive relationship, demonstrating that perceived levels of risk are not static but a continual and dynamic process. This research contributes this notion of reappraisal as is demonstrated in the reflexive relationship which occurs throughout the ongoing reappraisal process of risk and place. Additionally, emerging from this research, the interaction between residents with differing conceptions of risk has the potential to result in detrimental intra-community conflict. While it is yet to be seen how lasting this conflict may be, this comparative research shows that three years later the social impacts from the facility siting process are being felt; suggesting the intra-community conflict that was present during this siting process is more than merely a short-term community squabble as may have been captured in a cross-sectional study.

### 8.3.2 Methodological Contributions

There are also methodological contributions that arise from this research: demonstrating the value of temporally comparative research. This study contributes to a limited body of temporally comparative facility siting research examining residents' reappraisal of techno-industrial facilities as they transition through a siting process, when ambiguity and uncertainty are highest, through facility approval and finally operation. Most studies examining techno-industrial risk perceptions are cross-sectional in nature or call on residents' recollection of experiences at an earlier time (for example Okeke and Armour, 2000) rather than conducting truly longitudinal or comparative research. While valuable, such studies rely on residents' recall of their siting perceptions or fail to follow-up with residents' reappraisal of facilities following approval and operations or assess the presence and severity of potential lasting impacts. Notable exceptions are Elliott and Mclure (2009) who, like this research, examined residents' responses before and after facility approval, as well as others who examined pre- and post-perceptions of a facility that underwent some form of modification to mitigate

local impact (Luginaah et al., 2002a, 2002b, Wakefield and Elliott, 2000; Elliott et al., 1997). This research demonstrated the value in comparative research for demonstrating both individuals' reappraisal process and how this influenced their perceptions over time as well as shed light on community level reappraisal and reflections and the severity of sustained impacts. Further, only by revisiting communities can you assess measurable impacts, such as economic benefits and political repercussions, all of which are valuable to the assessment of long-term facility implications.

### 8.3.3 Practical Contributions and Policy Implications

There are several practical contributions and policy implications which emerged from this research. First, given our understanding of biosolids as a contested product, it is important for proponents, developers and risk managers alike to acknowledge the varied conceptions of biosolid products and work with residents to mitigate potential risks and accentuate benefits. Uncertainty inherent to these transformed waste products is unavoidable and should be addressed in a transparent and forthcoming manner when consulting with communities. Such uncertainties and complexities allow for the public to draw on other forms of evidences and knowledges and undermine the hegemony of science (Garvin, 2001). With expanding access to differing forms of knowledge accessible online, residents are becoming increasingly aware of sciences' inherent uncertainties and distrustful of the often too-good sounding sales pitches. Open acknowledgement and discussion of the state of uncertainty is both humbling and may act to amplify trust and help to facilitate dialogue of potential risks and actions to mitigate these.

Second, I conclude that it is important for developers and local officials alike to better understand residents' differential attachments to place where a development is proposed. This is reinforced by municipal officials' reflections that the diversity of perceptions of anticipated place change was overlooked. Individualized risk factors are

not sufficient for predicting community response to proposed risk. Drawing on these differential place attachments helps to contextualize residents' responses to this contested green development. Furthermore, this deeper understanding may help proponents to better execute siting processes that are inclusive and accommodating of the varied attachments to place and community expectations.

Consistent with Edelstein's (2004) conclusions, I also found that the opposition/support dynamic devolved into contest over who will win, rather than offering a base for reevaluation and social change. Thus, emerging from this research is a call for a formal process involving a knowledge broker or conflict resolution specialist to help communities better communicate and move beyond this fierce and polarized contest towards a process of understanding and legitimizing each other's claims and advance towards social change and successful community development. Such a mediator could help bring together divergent community groups in a truly collaborative and participatory process of community development and help to mitigate the sustained impact of relentless intra-community conflict observed in this research. A knowledge broker could act to facilitate an understanding of the differing expectations of place and epistemologies for approaching risk evaluation and lead to true two-way communication and more meaningful and engaging consultation processes. While participatory consultation processes are encouraged, the extent to which they are truly implemented varies and they remain ineffective when one side does not feel that they are truly being heard as was seen in this case-study. Further, Chapter Seven shows how it is not whether the required consultation processes were followed or not, but how fair and equitable these were perceived to be by the community. While community meetings were held and a public advisory committee was formed to liaison between the community and industry, all of these actions were done after the municipality agreed to sell the land and a Certificate of Approval application was submitted to the MOE (See table 1.2 for reference to siting process history). While public meetings and liaison committees are acts of public consultation, they occurred both too late in the siting

process and acted more as an information dissemination tool, rather than a participatory consultation process prior to any decisions being finalized.

Community consultation and participatory processes need to move beyond the Decide, Announce and Defend approach to facility siting and community consultation and must be more than a smoke screen to appease regulatory requirements. While at first glance adopting additional and sometimes voluntary acts of meaningful community consultation may appear time consuming and a financial burden, such a participatory process involving local actors could help to avoid prolonged protests and blockades, damaging media campaigns and costly lawsuits as were observed in this research. Corporate social responsibility extends beyond an industry's effects on the environment to a community's social wellbeing as well. Many small municipalities and indigenous communities are tasked with providing resources for or receiving and processing waste by-products to meet growing urban demands. It is unjust to expect these communities to also be tasked with funding participatory consultation processes just to ensure their voices may be heard. Industries and urban municipalities set to benefit must accept their corporate social responsibility to also protect the social wellbeing of communities and adopt a siting process that does not act to drive a wedge in previously harmonious communities and amplify intra-community conflict and strife. One solution proposed above is with a community mediator of some form, such as a knowledge broker or conflict resolution specialist, however this must be motivated by a truly participatory process and not as a public relations guise.

It is important to consider how feelings of fairness, equity and meaningful process can influence residents' responses. While I have no definitive answer yet as to how specific mechanisms will mitigate the social risk of conflict, I hope this would help to decrease rather than propagate community conflict, helping to mitigate the negative emotional impacts of noxious facility siting processes as this research finds. However, given the raw nature of community divisions and persistent uncertainty in techno-industrial

innovations, it is important to consider whether or not developers and planners alike will ever be able to please everyone in these contentious siting issues.

## 8.4 Research Limitations

There are a few limitations of the findings presented in this dissertation. First, this research was undertaken as an in-depth case study of the siting and operations of the OMRC in the Township of Southgate. Inherent in such community focused qualitative research, findings are limited somewhat in their generalizability. This critique is grounded in context specific findings of the case study and the underlying processes and therefore findings are more difficult to generalize across contexts (Kearns and Moon, 2002). It is also worth noting, however, that much contextually grounded survey work conducted in depth case studies also suffers from a lack of generalizability – a random sample of 200 people in one community does not necessarily make it generalizable to broader populations. While these findings here are certainly contextually grounded, the results are applicable to other contested sustainable developments, particularly those proposed for evolving rural communities, as evidenced by parallels seen with other case studies.

Second, the degree of polarization and controversy present in the community resulted in some residents abstaining from participating in the research. While I do not claim to represent the activist community opposing the facility in its entirety, the voices of some of these residents are missing in the results, while others did choose to participate. Also, while my position as both an insider and researcher came with many benefits that I feel justified my role in the research (discussed in Chapter 3), the nature of depth qualitative research is that participants' responses are not fully independent of the researcher. However, drawing on both prolonged field exposure and consultation of media sources helped to corroborate the findings that emerged from this research.

## 8.5 Future Directions

Several key directions for future research are suggested as a result of the findings in this dissertation. First, future research should examine examples involving a more dynamic and participatory siting process that draws on a mediator to better accommodate residents' varying expectations of their locale and seeks to work with these residents' differing epistemologies and analytical paradigms in contested communities as seen in this case study. Second, as noted above, an open dialogue of uncertainties, potential risks and mitigation strategies should be discussed with residents in differing siting debates over contentious green developments to determine if this will in fact act to improve trust and the overall participatory process by acknowledging and legitimizing the differing evidences and knowledges that residents draw on throughout their analytical process. It is not as simple as merely engaging community members early and often, but must also be grounded in the diverse meanings, values and place attachments that residents' draw upon and work to move forward in a way that legitimizes all concerns, values and expectations for community development in a just manner. Third, while depth qualitative community research was necessary to achieve the contextually grounded and nuanced knowledge, it can hinder the generalizability of these findings. To overcome this, future research should extend the emerging concepts from this research to other communities and other contested green developments to test the transferability of these findings.

Another important future direction which emerged from this research is the notion of intra-community justice. Further research should examine who benefits most from such facilities and who is indeed at the greatest risk. While much research is conducted on the short and long-term impacts of such facilities, less is known about sustained benefits and *who* is set to benefit from such facilities. Were the benefits set out in the environmental impact assessment process, such as local jobs, tax revenues and local spin-off benefits, in fact realized or were they overestimated? Further, which groups benefit most from these facility benefits? Examining issues of intra-community justice

regarding who is most likely to oppose such facilities and who is set to benefit could shed light on how these facilities may be bringing stable jobs and reduced local tax burdens to those in the community who need it most, rather than wealthier commuters or retirees who were found to oppose the facility but are not set to benefit from these local economic advantages. In the grander scheme of the determinants of health, local jobs and economic benefits may have a more positive effect on those disadvantaged rural populations than the negative impacts on the sensual and emotional geographies of rural elites.

Last, future research should also focus on improving knowledge translation and mobilization to planners, regulators, industries and community partners alike. The ineffectiveness of some communication and participatory strategies observed in this case-study appear in many ways glaringly obvious to researchers familiar with research conducted on perceived risk and facility siting over the last couple of decades. However, while the academy continues to contribute to the advancement of knowledge, the public and private sectors are falling behind. Small municipalities, short on resources and techno-industrial facility siting experience, may be unaware of many contemporary strategies to facilitate participatory facility siting processes aimed at mitigating conflict. Future research should examine why some of these historical public participation and facility siting recommendations are not being adopted. Researchers and regulators must act to disseminate these important procedural and participatory developments and help communities to draw on the tools available to them and for industries to provide support for these processes. Pushing the boundary of theoretical understanding and knowledge contributions is essential, however, we must also ensure that these findings are accessible to the public and private sectors or we will continue to observe the same cycle of ineffective facility siting, community conflict and developments considered 'green' and forward thinking by many hindered by these drawn out, contentious processes.

## Chapter 9

### 9 REFERENCES

- Abrams, J., Bliss, J., and Gosnell, H. (2013). Reflexive gentrification of working lands in the American west: contesting the 'middle landscape'. *Journal of Rural and Community Development*, 8(3), 144-158.
- Aitken, S., and Valentine, G. (Eds.). (2006). *Approaches to Human Geography*. London: Sage Publications.
- Altman, I., and Low, S. M. (1992). *Place Attachment*. New York and London, Plenum Press.
- Anderson, C. (2013). The networked minority: how a small group prevailed in a local windfarm conflict. *Energy Policy*, 58, 97-108.
- Aronson, N. (1984). Science as a claims making activity: Implications for social problems research. In J. W. Schneider and J. I. Kitsuse (Eds.), *Studies in the Sociology of Social Problems* (pp. 1-30). Norwood, N. J.: Ablex.
- Asselin, M. E. (2003). Insider research issues to consider when doing qualitative research in your own setting. *Journal for Nurses in Staff Development*, 19(2): 99-103.
- Atari, D. O., Luginaah, I., and Baxter, J. (2011). "This is the mess that we are living in": residents' everyday life experiences of living in a stigmatized community. *GeoJournal*, 76, 483-500. doi:10.1007/s10708-010-9365-7
- Axelrad, G., Gershfeld, T., and Feinerman, E. (2013). Reclamation of sewage sludge for use in Israeli agriculture: Economic, environmental and organizational aspects. *Journal of Environmental Planning and Management*, 56(10), 1419-1448. doi:10.1080/09640568.2012.732009.
- Batel, S., Devine-Wright, P., Wold, L., Egeland, H., Jacobsen, G., and Aas, O. (2015). The role of (de-) essentialisation within siting conflicts: an interdisciplinary approach. *The Journal of Environmental Psychology*, 44, 149-159.



- Baxter, J. (2006). A case study of intra-community conflict as facility impact. *Journal of Environmental Planning and Management*, 49(3), 337–360.
- Baxter, J., and Eyles, J. (1997). Evaluating qualitative research in social geography: Establishing “rigour” in interview analysis. *Transactions of the Institute of British Geographers*, 22, 505 – 525.
- Baxter, J. and Eyles, J. (1999). The utility of in-depth interviews for studying the meaning of environmental risk. *The Professional Geographer*, 51(2), 307 – 320.
- Baxter, J. W., Eyles, J. D., and Elliott, S. J. (1999a). From siting principles to siting practices: a case study of discord among trust, equity and community participation. *Journal of Environmental Planning and Management*, 42(4), 501-525.
- Baxter, J., Eyles, J. and Elliott, S. (1999b). ‘Something Happened’: The relevance of the risk society for describing the siting process for a municipal landfill. *Geografiska Annaler*, 81B(2), 91-109.
- Baxter, J., Ho, Y., Rollins, Y., and Maclaren, V. (2016). Attitudes toward waste to energy facilities and impacts on diversion in Ontario, Canada. *Waste Management*, 50, 75-85.
- Beck, U. (1992). *Risk Society: Towards a New Modernity*. London: Sage Publications.
- Beecher, N., Connell, B., Epstein, E., Goldstein, N., Lono, M., (2004). Public Perception of Biosolids Recycling: Developing Public Participation and Earning Trust. (No. 00-PUM-5) Water Environment Research Foundation (IWA Publishing, London; Virginia)
- Beecher, N., Harrison, E., Goldstein, N., McDaniel, M., Field, P., and Susskind, L. (2005). Risk perception, risk communication, and stakeholder involvement for biosolids management and research. *Journal of Environmental Quality*, 34(1), 122-128.
- Bell, S. L., Phoenix, C., Lovell, R., and Wheeler, B. W. (2015). Seeking everyday wellbeing: the coast as a therapeutic landscape. *Social Science and Medicine*, 142, 56-67.
- Bennett, P. (2010). *Risk Communication and Public Health*. Oxford University Press.

- Boyd, A. D., and Paveglio, T. B. (2015). "Placing" energy development in a local context: exploring the origins of rural community perspectives. *Journal of Rural and Community Development*, 10(2), 1-20.
- Brehm, J. M., Eisenhauer, B. W., and Stedman, R. C. (2013). Environmental Concern: Examining the role of place meaning and place attachment, *Society and Natural Resources*, 26, 522 – 538.
- Brown, P. (2003). Qualitative methods in environmental and health research. *Environmental Health Perspectives*, 111(14), 1789-1798.
- Bryant, C.R. (1995). The role of local actors in transforming the urban fringe. *Journal of Rural Studies*, 11(3), 255-267.
- Bryman, A. and Teevan, J. J. (1995). *Social Research Methods Canadian Edition*. Oxford; New York: Oxford University Press.
- Butz, D., and Eyles, J. (1997). Reconceptualizing senses of place: social relations, ideology and ecology. *Geografiska Annaler Series B Human Geography*, 79(1), 1-25.
- Cadieux, K. V. (2005). Engagement with the land: redemption of the rural residence fantasy. In S. J. Essex, A. W. Gilg, R. B. Yarwood, J. Smither, and R. Wilson (Eds.), *Rural Change and Sustainability Agriculture, the Environment and Communities*. (pp. 215-227). Cambridge, MA: CABI Publishing.
- Cadieux K. V., and Hurley, P. T. (2011). Amenity migration, exurbia and emerging rural landscapes: Global natural amenity as place and as process. *GeoJournal*, 76(4), 297-302.
- Chouinard, V. (1997). Structure and agency: contested concepts in human geography. *Canadian Geographer*, 41(4), 363-377.
- Classen, C., Howes, D. and Synnot, A. (1994). *Aroma: The Cultural History of Smell*. London and New York: Routledge.
- Cloke, P., Philo, C., and Sadler, D. (1991). *Approaching' Human Geography: An Introduction to Contemporary Theoretical Debates*. New York: Guilford Press.

- Conradson, D. (2005). Landscape, care and the relational self: therapeutic encounters in rural England. *Health and Place*, 11, 337-348.
- Cooke, B., and Lane, R. (2015). How do amenity migrants learn to be environmental stewards of rural landscapes? *Landscape and Urban Planning*, 134, 43 – 52.
- Davidson, J., and Milligan, C. (2004). Embodying emotion sensing space: Introducing emotional geographies. *Social and Cultural Geography*, 5(4), 523-532.  
doi:10.1080/1464936042000317677
- DeLyser, D. (2001). “Do you really live here?” Thoughts on insider research. *The Geographical Review*, 91(1-2): 441-453.
- DeMiglio, L., and Williams, A. (2008). A sense of place, a sense of wellbeing. In J. Eyles and A. Williams (Eds.), *Sense of Place, Health and Quality of Life*. Pp. 15-30. Hampshire, England: Ashgate.
- Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community and Applied Social Psychology*, 19(6), 426-441.
- Devine-Wright, P. (2012). Explaining “NIMBY” objections to a power line: the role of personal, place attachment and project-related factors. *Environment and Behavior*, 45(6), 761-781.
- Devine-Wright, H., and Devine-Wright, P. (2009). Social representations of electricity network technologies: exploring processes of anchoring and objectification through the use of visual research methods. *British Journal of Social Psychology*, 48, 357-373.
- Devine-Wright, P., and Howes, Y. (2010). Disruption to place attachment and the protection of restorative environments: A wind energy case study. *Journal of Environmental Psychology*, 30, 271-280.
- De Vries, S., Verheij, R. A., Groenewegen, P., and Spreeuwenberg, P. (2003). Natural environments—healthy environments? An exploratory analysis of the relationship between greenspace and health. *Environment and Planning A*, 35, 1717-1731.

- Dijkema, G. P. J., Reuter, M. A., and Verhoef, E. V. (2000). A new paradigm for waste management. *Waste Management* 20, 633-638.
- Douglas, M. (1966). *Purity and Danger An Analysis of Concepts of Pollution and Taboo*. New York; Washington: Fredrick A. Praeger, Publishers
- Douglas, M. (1992). *Risk and Blame Essays in Cultural Theory*. London: Routledge.
- Drechsel, P., Qadir, M., and Wichelns, D., (Eds.). 2015. *Wastewater Economic Asset in an Urbanizing World*. Springer: New York, London.
- Du Wit, C. W. (2013). Interviewing for sense of place. *Journal of Cultural Geography*, 30(1), 120-144.
- Dwyer, S. C., and Buckle, J. L. (2009). The space between: On being an insider-outside in qualitative research. *International Journal of Qualitative Methods*, 8(1): 54-63.
- Edelstein, M. R. (2004). Sustainable innovation and the siting dilemma: thoughts on the stigmatization of projects and proponents, good and bad. *Journal of Risk Research*, 7(2), 233-250.
- Elliott, S.J., and McClure, J., (2009). "There's just hope that no one's health is at risk": residents' reappraisal of landfill siting. *Journal of Environmental Planning and Management*, 52, 237e255.
- Elliott, S.J., Taylor, S.M., Hampson, C., Dunn, J., Eyles, J., Walter, S., and Streiner, D. (1997). 'It's not because you like it any better...': residents' reappraisal of a landfill site. *Journal of Environmental Psychology*, 17(3), 229-241.
- Eyles, J. (1997). Environmental health research: setting an agenda on spinning our wheels on climbing the mountain? *Health and Place*, 3, 1-13.
- Eyles, J. (1985). *Senses of Place*. Cheshire, England: Silverbrook Press.
- Eyles, J., Williams, A. (Eds.) 2008. *Sense of Place, Health and Quality of Life* (pp 15-30). Ashgate, Hampshire, England.
- Fletcher, T. H. (2010). *From Love Canal to Environmental Justice The Politics of Hazardous Waste on the Canada-U.S. Border*. North York, Ontario: University of Toronto Press.

- Frewer, L. J. (2003). Trust, transparency and social context: Implications for social amplification of risk. In N. Pidgeon, R. E. Kasperson and P. Slovic (Eds). (pp. 123-137) *The Social Amplification of Risk*. Cambridge: Cambridge University Press.
- Gair, S. (2012). Feeling their stories: contemplating empathy, insider/outsider positionings and enriching qualitative research. *Qualitative Health Research*, 22(1), 134-143.
- Gallagher, L., Ferreira, S., and Convery, F., (2008). Host community attitudes towards solid waste landfill infrastructure: comprehension before compensation. *Journal of Environmental Planning and Management*, 51, 233-257.
- Garvin, T. (2001). Analytical paradigms: the epistemological distances between scientists, policy makers and the public. *Risk Analysis*, 21, 443-455.
- Garvin, T., and Eyles, J. (1997). The sun safety metanarrative: Translating science into public health discourse. *Policy Sciences*, 30, 47-70.
- Gatrell, A. G., and Elliott, S. J. (2009). *Geographies of Health an Introduction* (2nd ed.). Malden, MA: Wiley-Blackwell.
- Gattie, D. K., and Lewis, D. L.. (2004). A high-level disinfection standard for land-applied sewage sludges (biosolids). *Environmental Health Perspectives*, 112(2), 126-131. PMID: PMC1241820
- Gesler, W. (1993). Therapeutic landscapes: theory and a case study of Epidauros, Greece. *Environment and Planning D: Society and Space*, 11, 171-189.
- Gesler, W. (2005). Therapeutic landscapes: an evolving theme. *Health and Place*, 11, 295-297.
- Giddens, A. (1990). *The Consequences of Modernity*. Cambridge, Polity Press.
- Goven, J., and Langer, E. R. L. (2009). The potential of public engagement in sustainable waste management: Designing the future for biosolids in New Zealand." *Journal of Environmental Management*, 90, 921-930. doi:10.1016/j.jenvman.2008.02.006.
- Goven, J., Langer, E. R. L., Baker, V., Ataria, J., and Leckie, A. (2012). Community engagement in the management of biosolids: Lessons from four New Zealand

- studies. *Journal of Environmental Management*, 103, 154-164. doi: 10.1016/j.jenvman.2012.02.007.
- Gregory, R., Flynn, J., and Slovic, P. (2000). Technological stigma In P. Slovic (Ed.) *The Perception of Risk*. London; Sterling, VA: Earthscan Publications Ltd.
- Gregson, N., Crang, M., Fuller, S., and Holmes, H. (2015). Interrogating the circular economy: the moral economy of resource recovery in the EU. *Economy and Society*, 44(2), doi:10.1080/03085147.2015.1013353.
- Guest, G., MacQueen, K. M. and Namey, E. E. (2012). *Applied Thematic Analysis*. Thousand Oaks, California: Sage Publications Inc.
- Halfacree, K. (2006). Rural space: constructing a three-fold architecture. In P. Cloke, T. Marsden, and P. Mooney (Eds). *Handbook to Rural Studies* pp. 44-58. Thousand Oaks: Sage.
- Halstead, J. M. and Whitcomb, J. L. (1994). Getting beyond no: Strategies for MSW composting facility siting. *Biocycle*, 35(11), 35-39.
- Hannigan, J. (2006). *Environmental Sociology*. Routledge, New York
- Harrington, D. W., and Elliott, S. J. (2015). Understanding emerging environmental health risks: A framework for responding to the unknown. *The Canadian Geographer/Le Géographe canadien*, 59(3), 283-296.
- Hay, D. A. (1992). Rural Canada in transition: trends and developments. In D. A. Hay and G. S. Barson (Eds.), *Rural Sociology in Canada* (pp. 4-15). Toronto; Oxford; New York: Oxford University Press.
- Henderson, S. (2003). Regulating land use conflict on the urban fringe: two contrasting case studies from the Australian poultry industry. *Australian Geographer*, 34(1), 3-17.
- Hellawell, D. (2006). Inside-out: Analysis of the insider-outside concept as a heuristic device to develop reflexivity in students doing qualitative research. *Teaching in Higher Education*, 11(4): 483-494.
- Hoggart, K. (1997). Rural migration and counter-urbanization in the European periphery: the case of Andalusia. *Sociologia Ruralis*, 37(1), 134-153.

- Howes, D. and Classen, C. (2014). *Ways of Sensing: Understanding the Senses in Society*. London and New York: Routledge.
- Hummon, D. M. (1986). City mouse, country mouse: The persistence of community identity. *Qualitative Sociology*, 9(1), 3-25.
- Innes, R. A. (2009). "Wait a second. Who are you anyways?" The insider/outsider debate and American Indian studies. *American Indian Quarterly*, 33(4), 440-461.
- Jacquet, B. J., and Stedman, R. C. (2013). The risk of social-psychological disruption as an impact of energy development and environmental change. *Journal of Environmental Planning and Management*, 57(9), 1285-1304.
- Jenkins, S. R., Armstrong, C. W., and Monti, M. M. (November 2007). Health effects of biosolids applied to land: available scientific evidence. [http://www.virginiabiosolids.com/pdf/Biosolids\\_Available\\_Evidence\\_1107.pdf](http://www.virginiabiosolids.com/pdf/Biosolids_Available_Evidence_1107.pdf).
- Jones, C. C., (2011). Environmental justice in rural context: land-application of biosolids in Central Virginia. *Environmental Justice*, 4(1), 1-15. doi:10.1089/env.2009.0034.
- Jorgenson, B. S., and Stedman, R. D. (2001). Sense of place as an attitude: lakeshore owners' attitudes towards their properties. *Journal of Environmental Psychology*, 21, 233-248.
- Kaiser, R., and Nikiforova, E. (2006). Borderland spaces of identification and dislocation: multiscalar narratives and enactments of Seto identity and place in the Estonian–Russian borderlands. *Ethnic and Racial Studies*, 29(5), 928-958.
- Kasperson, J. X., Kasperson, R. E., Pidgeon, N. and Slovic, P. (2003). The social amplification of risk: assessing fifteen years of research and theory. In N. Pidgeon, R. E. Kasperson and P. Slovic, (Eds). (pp. 13-46). *The Social Amplification of Risk*. Cambridge: Cambridge University Press.
- Kearns, R. A. (1993). Place and health: towards a reformed medical geography. *Professional Geographer*, 45(1), 139-47.
- Kearns, R. and Moon, G. (2002). From medical to health geography: novelty, place and theory after a decade of change. *Progress in Human Geography*, 26(5), 605 – 625

- Kelly-Reif, K. and Wing, S. (2016). Urban-rural exploitation: an underappreciated dimension of environmental injustice. *Journal of Rural Studies*, 47, 350-358.
- Kirkman, R., and Voulvoulis, N., (2016). The role of public communication in decision making for waste management infrastructure, *Journal of Environmental Management*, <http://dx.doi.org/10.1016/j.jenvman.2016.06.002>
- Krimsky, S., and Golding, D. (Eds) (1992). *Social Theories of Risk*. Westport, Conn: Praeger.
- Krimsky, S. (1992). The role of theory in risk studies. , In. S. Krimsky and D. Golding, (Eds.) *Social Theories of Risk* (pp. 3-22). Westport, Connecticut: Praeger.
- Kroll-Smith, J. S., and Couch, S. R. (2015). *The real disaster is above ground: A mine fire and social conflict*. University Press of Kentucky.
- Krogmann, U., Gibson, V., and Chess, C. (2001). Land application of sewage sludge: Perceptions of New Jersey vegetable farmers. *Waste Management and Research*, 19, 115-125. doi: 10.1177/0734242X0101900204.
- Kunreuther, H. Fitzgerald, K., and Aarts, T. D. (1993). Siting noxious facilities: a test of the facility siting credo. *Risk Analysis*, 13(3), 301-318.
- Lazarus, R. S. (2006). Emotions and interpersonal relationships: Toward a person-centered conceptualization of emotions and coping. *Journal of Personality*, 74(1), 9-46.
- Lazarus, R. S., and Folkman, S. (1984). Coping and adaptation. The handbook of behavioral medicine, 282-325.
- LeBlanc, R. J., Allain, C. J., Laughton, P. J., and Henry, J. G. (2004). Integrated, long term, sustainable, cost effective biosolids management at a large Canadian wastewater treatment facility. *Water Science and Technology*, 49(10), 155-162.
- Lewis, D. L., Gattie, D. K., Novak, M. E., Sanchez, S., and Pumphrey, C. (2002). Interactions of pathogens and irritant chemical in land-applied sewage sludges (biosolids). *BMC Public Health*, 2, 11-18.



- Lowman, A., McDonald, M. A., Wing, S., and Muhammad, N., (2013). Land application of treated sewage sludge: community health and environmental justice. *Environmental Health Perspectives*, 121(5), 537-542.
- Luginaah, I. N. (2009). Health geography in Canada: where are we headed?. *The Canadian Geographer*, 53(1), 89-97.
- Luginaah, I. N., Taylor, S. M., Elliott, S. J. and Eyles, J. D. (2002a). Community reappraisal of the perceived health effects of a petroleum refinery. *Social Science and Medicine*, 55(1), 47-61.
- Luginaah, I. N., Taylor, S. M., Elliott, S. J., and Eyles, J. D. (2002b). Community responses in the vicinity of a petroleum refinery in Oakville, Ontario. *Health and Place*, 8, 177-190.
- Macintyre, S., Ellaway, A., and Cummins, S. (2002). Place effects on health: how can we conceptualise, operationalise and measure them? *Social Science and Medicine*, 55, 125-139.
- Manzo, L. C. (2014). Exploring the shadow side: place attachment in the context of stigma, displacement, and social housing. In L. C. Manzo and P. Devine-Wright (Eds.) *Place Attachment Advances in Theory, Methods and Applications*. (pp 178-190). Oxon: Routledge.
- Manzo, L. C., and Perkins, D. D. (2006). Finding common ground: The importance of place attachment to community participation and planning. *Journal of Planning Literature*, 20(4), 335-350.
- Mason, S. A., Dixon, J., Mambulu, F., Rishworth, A., Mkandawire, P., and Luginaah, I. (2015). Management challenges of urban biosolids: narratives around facility siting in rural Ontario. *Environmental Planning and Management*, 58(8), 1363-1383.
- Mason, S.A., Walker, C., Baxter, J., and Luginaah, I. (2016). Ethics and activism in environment and health research. In N. E. Fenton and J. Baxter (Eds.) *Practicing Qualitative Methods in Health Geographies*, (pp. 54-72). Routledge.

- Mason-Renton, S. A., and Luginaah, I. (2016). Interfering with therapeutic tranquility: Debates surrounding biosolid waste processing in rural Ontario. *Health and Place*, 41, 42-49.
- Mason-Renton, S. A., Luginaah, I. and Baxter, J. (2016). Community Divide as more Detrimental than the Plant Itself: Confrontational Stigma and Community Responses to Rural Facility Siting. *Journal of Rural and Community Development*, 11(2), 22-44.
- Massey, D. (2004). Geographies of responsibility. *Geografiska Annaler*, 86B(1), 5-18.
- Masuda, J. R., and Garvin, T. (2006). Place, culture, and the social amplification of risk. *Risk Analysis*, 26(2), 437-454.
- Masuda, J. R., and Garvin, T. (2008). Whose heartland? The politics of place in a rural-urban interface. *Journal of Rural Studies*, 24, 112-123.
- McClymont, K., and O'hare, P. (2008). "We're not NIMBYs!" Contrasting local protest groups with idealised conceptions of sustainable communities. *Local Environment*, 13(4), 321-335.
- McLachlan, C. (2009). 'You don't do a chemistry experiment in your best china': Symbolic interpretations of place and technology in a wave energy case. *Energy Policy*, 37, 5342-5350.
- Merton, R. K. (1972). Insiders and outsiders: a chapter in the sociology of knowledge. *American Journal of Sociology*, 78(1), 9-47.
- Miller, W. L., and Crabtree, B. F. (2004). Depth interviewing. In S. Nagy Hess-Biber and P. Leavy (Eds.), *Approaches to Qualitative Research: A Reader on Theory and Practice* (pp. 185-202). New York: Oxford University Press.
- Milligan, C. 2007. Restoration or risk? Exploring the place of the common place. In A. Williams (Ed), *Therapeutic Landscapes* (255-271). Ashgate, Hampshire.
- Morales, M., and Oberg, G., (2012). *The Idea of Sewage as a Resource*. Program on Water Governance, Vancouver, B.C.

- Neutra, R., Lipscomb, J., Satin, K., and Shusterman, D. (1991). Hypotheses to explain the higher symptom rates observed around hazardous waste sites. *Environmental Health Perspectives*, 94, 31-38.
- Okeke, C. U., and Armour, A. (2000). Post-landfill siting perceptions of nearby residents: a case study of Halton landfill. *Applied Geography*, 20, 137-154.
- Ontario Environmental Bill of Rights Registry. 2013. "Environmental Compliance Approval (011!4541)." January 8. <http://www.ebr.gov.on.ca/ERS-WEB-External/searchCommentList.do?ebrNum=011541&noticeId=MTE0Mjk3&statusId=MTc2MTc2&noticeHeaderIdString=MTE0Mjk3>
- (OMAFRA) Ontario Ministry of Agriculture, Food and Rural Affairs. (2010). *Best Management Practices: Application of Municipal Sewage Biosolids to Cropland*. Queens Printer for Ontario.
- (PAC) Southgate OMRC Public Advisory Committee. (August 25, 2015). Minutes from PAC Meeting #22. [http://lystek.com/wp-content/uploads/2014/07/August-2015-PAC-Minutes\\_Final.pdf](http://lystek.com/wp-content/uploads/2014/07/August-2015-PAC-Minutes_Final.pdf)
- (PAC) Southgate OMRC Public Advisory Committee. (May 24, 2016). Minutes from PAC Meeting #24. <http://lystek.com/wp-content/uploads/2014/07/Southgate-OMRC-Public-Advisor-Committee-Minutes-of-May-2016-Meeting.pdf>
- (PAC) Southgate OMRC Public Advisory Committee. (November 24, 2015). Minutes from PAC Meeting #23. [http://lystek.com/wp-content/uploads/2014/07/December-2015-FINAL\\_PAC-Minutes\\_with\\_Analysis.pdf](http://lystek.com/wp-content/uploads/2014/07/December-2015-FINAL_PAC-Minutes_with_Analysis.pdf)
- Pal, L. A. (2014). *Beyond Policy Analysis: Policy Issue Management in Turbulent Times*. 5th ed. Toronto: Nelson.
- Parr, J. (2010). *Sensing Changes*. Vancouver and Toronto: UBC Press.
- Parr, J. (2006). Smells like? Sources of uncertainty in the history of a Great Lakes environment. *Environmental History*, 2, 282-312.
- Patterson, M. E., and Williams, D. R. (2005). Maintaining research traditions on place: Diversity of thought and scientific progress. *Journal of Environmental Psychology*, 25, 361-380.

- Peccia, J., and Westerhoff, P., (2015). We should expect more out of our sewage sludge. *Environmental Science and Technology*, 49, 8271-8276.
- Pellow, D. N. (2016). Environmental justice and rural studies: a critical conversation and invitation to collaboration. *Journal of Rural Studies*, 47, 381-386.
- Pidgeon, N., and Kasperson, R. E. (2003). *The Social Amplification of Risk*. Cambridge University Press
- Porteous, J. D. (1985). Smellscape. *Progress in Human Geography*, 9(3), 356-378.
- Relph, E. (1976). *Place and Placelessness*. London: Pion Limited.
- Richmond, L. A., Filson, G. C., Paine, C., Pfeiffer, W. C., and Taylor, J. R. (2000). Non-farm rural Ontario residents' perceived quality of life. *Social Indicators Research*, 50(2), 159-186.
- Robinson, K. G., Robinson, C. H., Raup, L. A., and Markum, T. R. (2012). Public attitudes and risk perceptions toward land application of biosolids within the South-Eastern United States. *Journal of Environmental Management*, 98, 29-36.
- Rodaway, P. (1994). *Sensuous Geographies: Body, Sense and Place*. London and New York: Routledge.
- Rose, E. 2012. Encountering place: a psychoanalytic approach for understanding how therapeutic landscapes benefit health and wellbeing. *Health and Place*, 18, 1381-1387.
- Sabatier, P. A. (1987). Knowledge, policy oriented learning, and policy change. *Knowledge: Creation, Diffusion, Utilization*, 8(4), 649-692. doi: 10.1177/0164025987008004005.
- Sharma-Wallace, L. (2016). Towards an environmental justice of the rural-urban interface. *Geoforum*, 77, 174-177.
- Simmons, P., and Walker, G. (2004). Technological risk and sense of place: industrial encroachment on place values. In A. Boholm and R. Löfstedt (Eds), *Facility Siting: Risk, Power and Identity in Land Use Planning* (pp. 136-155). Earthscan, London; Sterling, VA.
- Slovic, P. (1987). Risk Perception. *Science*, 236(4799), 280-285.

- Slovic, P, Ed. (2000). *The Perception of Risk*. London: Earthscan Publications Ltd.
- Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis*, 19(4), 689-701.
- Smith, K., Luginaah, I., and Lockridge, A. (2010). 'Contaminated' therapeutic landscape: the case of the Aamjiwnaang First Nation in Ontario, Canada. *Geography Research Forum*, 30, 83 – 102.
- Smithers, J., Joseph, A. E., and Armstrong, M. (2005). Across the divide (?): Reconciling farm and town views of agriculture-community linkages. *Journal of Rural Studies*, 21, 281-295.
- Soini, K. Vaarala, H., and Pouta, E. (2012). Residents' sense of place and landscape perceptions at the rural-urban interface. *Landscape and Urban Planning*, 104, 124-134.
- Statistics Canada. (2012). Southgate, Ontario (Code 3542005) and Dundalk, Ontario (Code 0244) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released October 24, 2012. Accessed December 10 2012. <http://www12.statcan.gc.ca/censusrecensement/2011/dp-pd/prof/index.cfm?Lang=E>.
- Statistics Canada. (2013). Southgate, TP, Ontario (Code 3542005) (table). National Household Survey (NHS) Profile. 2011 National Household Survey. Statistics Canada Catalogue no. 99-004-XWE. Ottawa. Released September 11, 2013. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/index.cfm?Lang=E> (accessed December 1, 2015).
- Stedman, R. C. (2002). Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior*, 34(5), 561-581.
- Stedman, R. (2006). Understanding place attachment among second home owners. *American Behavioral Scientist*, 50, 187 – 205.
- Strauss A., and Cobin J., (1990). *Basics of Qualitative Research Grounded Theory Procedures and Techniques*. Sage, California.

- Tansey, J. and O'Riordan, T. (1999). Cultural theory and risk a review. *Health, Risk and Society*, 1(1), 71-90.
- Taylor, J. (2011). The intimate insider: negotiating the ethics of friendship when doing insider research. *Qualitative Research*, 11(1): 3-22.
- Taylor, S.M., Elliott, S., Eyles, J., Frank, J., Haight, M., Streiner, D., Walter, S., Norman, W., and Willms, D. (1991). Psychosocial impacts in populations exposed to solid waste facilities. *Social Science and Medicine*, 33(4), 441-447.
- Taylor-Gooby, P., and Zinn, J. O. (2006). Current directions in risk research: New developments in psychology and sociology. *Risk Analysis*, 26(2), 397-411.
- Thomas, A. R., Lowe, B. M., Fulkerson, G. M., and Smith, P. J. (2011). *Critical Rural Theory Structure, Space, Culture*. Plymouth: Lexington Books.
- Townsend, R. A., Pascal, J. 2012. Therapeutic landscapes: understanding migration to Australian regional and rural communities. *Rural Society*, 22(1), 59-66.
- Tuan, Y. F. (1980). Rootedness versus sense of place. *Landscape*, 24, 3-8.
- Tuan, Y. F. (1974). *Topophilia*. New Jersey: Prentice-Hall Inc.
- Tyagi, V. K., and Lo, S. L. (2013). Sludge: A waste or renewable source for energy and resource recovery? *Renewable and Sustainable Energy Reviews*, 25, 708-728.
- Von Schomberg, R. (1993). *Science, Politics, and Morality: Scientific Uncertainty and Decision Making*. Dordrecht, Boston: Kluwer Academic Publishers.
- Vorkinn, M., and Riese, H. (2001). Environmental concern in a local context: the significance of place attachment. *Environment and Behavior*, 33, 249-263.
- Wakefield, S. and Elliott, S. J. (2000). Environmental risk perception and well-being: effects of the landfill siting process in two Southern Ontario communities. *Social Science and Medicine*, 50, 1139-1154.
- Wakefield, S., McMullan, C. (2005). Healing in places of decline: (re)imagining everyday landscapes in Hamilton, Ontario. *Health and Place*, 11, 299-312.
- Walker, C., Baxter, J., and Ouellette, D. (2014). Beyond rhetoric to understanding determinants of wind turbine support and conflict in two Ontario, Canada communities. *Environment and Planning A*, 46(3), 730-745.

- Witcher, C. S. G. (2010). Negotiating transcription as a relative insider: implications for rigor. *International Journal of Qualitative Methods*, 9(2), 122-132.
- Williams, A. (2007). Introduction: the continuing maturation of the therapeutic landscape concept. In A. Williams (Eds), *Therapeutic Landscapes* (pp. 1-12). Ashgate, Surrey.
- Williams, A., Kitchen, P., DeMiglio, L., Eyles, J., Newbold, B., and Steiner, D. (2010). Sense of place in Hamilton, Ontario: empirical results of a neighbourhood-based survey. *Urban Geography*, 31(7), 905-931.
- Wolsink, M., Devilee, J. (2009). The motives for accepting or rejecting waste infrastructure facilities. Shifting the focus from the planners' perspective to fairness and community commitment. *Journal of Environmental Planning and Management*, 52(2), 217-236.
- Woods, M. (2011). *Rural*. New York: Routledge.
- Woods, M. (2005). *Rural Geography: Processes, Responses and Experiences in Rural Restructuring*. London; Thousand Oaks, California: Sage.

## APPENDICES

## Appendix A: NMREB Approval: Siting Process Community Interviews (2012)



## Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Isaac Luginaah  
 File Number: 102454  
 Review Level: Full Board  
 Approved Local Adult Participants: 25  
 Approved Local Minor Participants: 0  
 Protocol Title: Risk Perception of the Processing and Land Application of Biosolid Waste in the Township of Southgate - 18966S  
 Department & Institution: Social Science/Geography, Western University  
 Sponsor: Internal Research fund UWO

Ethics Approval Date: May 01, 2012 Expiry Date: December 31, 2014

## Documents Reviewed &amp; Approved &amp; Documents Received for Information:

Document Name	Comments	Version Date
Western University Protocol		
Letter of Information & Consent		2012/03/06

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 0000541.

 Grace Kelly	 Janice Sutherland
----------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------

This is an official document. Please retain the original in your files.

## The University of Western Ontario

Office of Research Ethics

Support Services Building Room 5150 • London, Ontario • CANADA - N6G 1G9  
 PH: 519-661-3036 • F: 519-850-2466 • ethics@uwo.ca • www.uwo.ca/research/ethics



## Appendix B: Letter of Information and Consent Form: Siting Process Community Interviews (2012)



Department of Geography

May 16, 2012

Dear Resident:

Perceptions Related to the Processing and Land Application of Biosolid Waste in the Township of Southgate.

I am an Associate Professor in the Department of Geography at the Western University and we are conducting a study in Southgate, which aims to investigate the community's perceptions related to the processing and land application of biosolid waste in your community. Sarah Mason, a graduate student at Western University, will be conducting this research as a part of her MSc degree in Geography.

The purpose of this letter is to invite you to participate in this study and to provide you with the information you require to make an informed decision on participating in the study. If you agree to take part in the study, we will arrange to come and interview you on a range of questions focusing on your concerns (if any) related to your experiences with the changes taking place as a result of the processing and land application of biosolids in Southgate, and more generally, your level of satisfaction with the community in which you live. The interviews will take approximately 40-50 minutes to complete. The interviews will be audio taped and transcribed into written format. The interviews will take place at your household or any public place that is convenient to you. We will also be able to hold interviews at a meeting room in the Dundalk Public Library.

Risks and discomforts to you if you participate in this study:

- Potential discomforts may be associated with the discussion of issues related to the siting of the biosolid processing plant in the community. You are reminded that during the interview it is not mandatory to answer any of the questions if you do not wish to.

The benefits to you if you take part in this study:

- While you will not get a personal benefit from participating in this study, the findings from this study may be used to influence government policy and other municipal decision-making processes. The findings may also be used to help set up a framework for addressing the siting and operations of emerging biosolid plants in Ontario and elsewhere.

Participation and Withdrawal:

- Participation in this study is voluntary.
- You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on you.
- If you are already participating in another study at this time, please inform the interviewer right away to determine if it is appropriate for you to participate in this study.

Participant's initials \_\_\_\_\_

Specific things you should know about confidentiality:

- All the information obtained from people participating in the study will be strictly confidential. Your research records will be stored in the following manner: locked in a cabinet in a secure office; only by members of the research team will listen to the audio tapes and the audio tapes will be destroyed after 2 years.
- Your confidentiality will be respected. Your name or any information that discloses your identity will not be released or published without your specific consent to the disclosure.
- The Research Ethics Board at The University of Western Ontario may contact you directly to ask about your participation in the study. If we find information we are required by law to disclose, we cannot guarantee confidentiality. We will strive to ensure the confidentiality of your research-related records. Absolute confidentiality cannot be guaranteed as we may have to disclose certain information under certain laws.

Contact persons:

- If you have any questions about this study please contact Dr. Isaac Luginaah at
- If you have questions about the conduct of this study or your rights as a research subject you may contact: Office of Research Ethics

Other pertinent information:

- You will not be compensated for your participation in this study.
- You do not waive any legal rights by signing the consent form.
- If the results of the study are published, your name will not be used.
- If you would like to receive a copy of the overall results of this study please put your name and address on a blank piece of paper and give it to the interviewer.

Thank you in advance for your participation in this important study.

Sincerely,

Isaac Luginaah (Principal Investigator)  
Associate Professor of Geography

Participant's initials \_\_\_\_\_ 2

**Perceptions Related to the Processing and Land Application of Biosolid Waste in the Township of Southgate.**

Principle Investigator: Isaac Luginaah  
Associate Professor of Geography  
Western University

CONSENT STATEMENT

I have read the Letter of Information, have had the nature of the study explained to me, and I agree to participate to in the study. All questions have been answered to my satisfaction.

Research Participant:

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Interviewer obtaining informed consent:

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

You will be provided with a copy of this letter once it has been signed.

### Appendix C: Interview Guide: Siting Process Community Interviews (2012)

Perception of Processing and Land Application of Biosolids 2012 Checklist for Depth Interviews		
<p>Preamble:</p> <p><i>My name is Sarah Mason.</i> I am a Graduate Student in the Department of Geography at Western University and we are conducting a study in Southgate, which aims to investigate the communities perceptions associated with the processing of biosolid waste and subsequent land application of the end product.</p> <p>Today's interview should take about 40 minutes. If you have any questions at any point do not hesitate to ask. With your agreement, we would like to record the interview to accurately document your views. Your name or address will not appear on any tapes or manuscripts.</p> <p>We are going to start the interview off with a few basic questions so that when results are published it will give the reader a background of Southgate's demographics, such as age, family, employment etc. This will allow readers to compare and contrast results from this study to other locations and better understand the similarities and differences between the two places.</p>		
TOPIC	QUESTION	PROBES
1. Background	<p>How old are you now?</p> <p>Were you born in this community/here?</p> <p>*How long have you lived in this area?</p> <p>*Where did you move from?</p> <p>Do you have family members here?</p> <p>Do you have children living at home?</p> <p>What is your highest level of education?</p> <p>Where do you work?</p>	<p>Highschool, apprenticeship, college, university...</p>
2. QUALITY OF LIFE	<p>How would you describe the area where you live to someone who was not familiar with it?</p>	<ul style="list-style-type: none"> <li>- likes and dislikes?</li> <li>- What do you value about this community?</li> <li>- Family, economic, recreational etc...</li> <li>- Why did you move here? Is it what you expected?</li> </ul>

	<p>What are your main concerns/worries about living here, if you have any?</p> <p>Do you currently have any health concerns about your community in general?</p> <p>Do you feel that there is anything specific in this area affecting your health or the health of others in this household in any way? How? Have you always felt this way?</p> <p>Where do your concerns about the environmental quality fit in/rank relative to these?</p> <p>Is there any environmental concern you would like to discuss?</p> <p>Is there anything else in terms of industry or the environment that you now feel different about?</p>	<ul style="list-style-type: none"> <li>- any risks related to living here? stemming from...?</li> <li>- how are you defining risk?</li> <li>- pesticides...?</li> <li>- children's health?</li> <li>- mental health? (e.g., stress)</li> <li>- physical health? (e.g., respiratory, eye irritation).</li> <li>- previous concerns about preexisting industry – ex. Dundalk Metal Systems?</li> <li>- altered concerns about local agricultural practices?</li> </ul>
<p>3. Preexisting Knowledge About Biosolids</p>	<p>How would you define biosolids?</p> <p>How would you describe your understanding and level of knowledge about biosolids?</p> <p>Explain to me your understanding of how and why biosolids have been used in agriculture.</p> <p>What do you know about other means to dealing with biosolid waste?</p> <p>What are the benefits associated with biosolids and utilizing the product on land?</p> <p>As well as the plant being</p>	<ul style="list-style-type: none"> <li>- understanding of the science behind the technology?</li> <li>- understanding of fertilizer used for crops?</li> </ul>

	located in this community?	
4. Biosolid Specific Concerns	<p>Do you have any concerns about the possible effects of the local processing plant?</p> <p>If so, can you describe these and why? Do you feel that odours represent a health threat or are a nuisance to your daily life?</p>	<ul style="list-style-type: none"> <li>- concerns about location?</li> <li>- concerns about increased truck traffic?</li> <li>- do odours/pollution trigger you to worry about your health?</li> <li>- concerns about technology?</li> <li>- uncertain risk</li> <li>- short term/long term</li> </ul>
	<p>What concerns you most about the local land application of the biosolid end product as fertilizer?</p>	<ul style="list-style-type: none"> <li>- concerns about contaminants such as heavy metals, pharmaceuticals etc being taken up by plants? Polluting local water sources?</li> <li>- short term/long term</li> </ul>
	<p>How do you deal with your health concerns?</p> <p>How could your health concerns (if any) be minimized?</p> <p>Who do you talk to for information on these issues?</p> <p>Do you trust the proponent, Lystek, when seeking out information?</p> <p>Do you think you will have to change your daily activities based on these concerns?</p> <p>Are you considering moving from this community because of health concerns?</p>	<ul style="list-style-type: none"> <li>- coping with health concerns: <ul style="list-style-type: none"> <li>o talk to physician?</li> <li>o talk to neighbours?</li> <li>o social networks</li> <li>o community organizing</li> <li>o read more information</li> </ul> </li> <li>- changes to daily routine due to concerns <ul style="list-style-type: none"> <li>o stay indoors, close windows, make different food choices at grocery stores etc</li> </ul> </li> <li>- minimizing health concerns: more info in papers etc.</li> </ul>
5. Trust	<p>How do you feel about the regulatory agencies?</p> <p>What were your previous perceptions of regulation/application and effects of biosolids and how have these changed since the process coming to Southgate?</p> <p>How do you feel about</p>	<ul style="list-style-type: none"> <li>- Ministry of Environment, OMAFRA, CFIA?</li> <li>- uncertainty? Conflicting results?</li> </ul>

	<p>scientific evidence in regards to the health effects?</p> <p>How do you feel about the municipal process?</p>	
<b>6. VULNERABLE POPULATIONS</b>	<p>Do you think there are particular groups of people in your area who are more affected by environmental quality than others?</p> <p>Why?</p> <p>What do you think those most affected should do?</p>	<ul style="list-style-type: none"> <li>- Who? - high risk groups:</li> <li>- children, elderly, those with existing health conditions, those living in certain areas.</li> <li>- Why? Basis for judgment (ask for example)</li> </ul>
<b>7. OTHER ENVIRONMENTAL CONCERNS</b>	<p>Do you have any other types of concerns related to your environment?</p> <p>How would you rank these concerns?</p> <p>Have you always felt this way?</p>	<ul style="list-style-type: none"> <li>- property values?</li> <li>- accidents/safety concerns?</li> <li>- other?</li> </ul>
8. Conclusions	<p>Is there anything else you would like to add?</p>	

**Appendix D: NMREB Approval: Operational Community Interviews (2015-2016)**



**Western  
Research**

Research Ethics

**Western University Health Science Research Ethics Board  
NMREB Full Board Initial Approval Notice**

**Principal Investigator:** Dr. Isaac Luginaah  
**Department & Institution:** Social Science/Geography, Western University

**NMREB File Number:** 106426  
**Study Title:** Emerging views of rural landscapes in Ontario: A Follow-Up Study of the Siting of a Regional Biosolid Processing Facility in Southgate Township  
**Sponsor:**

**NMREB Initial Approval Date:** April 24, 2015  
**NMREB Expiry Date:** April 24, 2016

**Documents Approved and/or Received for Information:**

Document Name	Comments	Version Date
Instruments	Interview Instrument	2015/02/24
Revised Western University Protocol	Revised REB protocol - cleaned	2015/04/10
Revised Letter of Information & Consent	Revised LOI - cleaned	2015/04/10

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Ethics Officer to Contact for Further Information

<input type="checkbox"/> Erika Basile	<input checked="" type="checkbox"/> Grace Kelly	<input type="checkbox"/> Mina Mehal	<input type="checkbox"/> Vikki Tran
---------------------------------------	-------------------------------------------------	-------------------------------------	-------------------------------------

*is an official document. Please retain the original in your files.*



## Appendix E: Letter of Information and Consent Form: Operational Interviews (2015 – 2016)



Geography

**Project Title:** Emerging views of rural landscapes in Ontario: A Follow-Up Study of the Siting of a Regional Biosolid Processing Facility in Southgate Township

**Date:** November 1, 2015

**Principal Investigator:** Dr. Isaac Luginaah

Dear Resident:

I am Sarah Mason, a PhD student working under Professor Isaac Luginaah in the Department of Geography at Western University and we are inviting you as a resident of Southgate to participate in this research study in Southgate, which aims to investigate the community's response to and experiences with the siting and operations of the biosolid processing facility in your community as well as to learn more about residents' daily lives in Southgate and their perceptions of how Southgate is evolving.

The purpose of this letter is to invite you to participate in this study and to provide you with the information you require to make an informed decision on participating in the study.

If you agree to take part in the study you will be asked to participate in a private interview with Sarah Mason. We will arrange a time and place at your convenience to interview you on a range of questions focusing on your feelings related to the community in general as well as to the biosolid facility and Eco-Park. The interview will take approximately 40-50 minutes to complete. During the interview discussion, digital voice recording will be done if that is fine with you. If you do not want to be audio recorded, we will write down your responses to the questions. The interviews will take place at your household or any public place that is convenient to you. We will also be able to hold interviews at a meeting room in the Dundalk Public Library. We are looking for about 25 residents to participate in this research.

Risks and discomforts to you if you participate in this study:

- There are no known risks associated with participating in this study.
- Potential discomforts may be associated with the discussion of issues related to the siting of the biosolid processing plant in the community or to other changes that have occurred in Southgate.

Benefits to you if you take part in this study

- While there are no personal benefits from participating in this study, the findings from this study may be used to influence government policy and other municipal decision-making processes. The findings may also be used to help set up a framework for addressing the siting and operations of emerging biosolid and other processing facilities in Ontario and elsewhere and to better understand the changing nature and expectations of rural communities.

Participation and Withdrawal

- Participation in this study is voluntary, you may refuse to participate, refuse to answer any questions or withdraw from the study at any time and it will have no effect on you.
- If you are already participating in another study at this time, please inform the interviewer immediately to determine if it is appropriate for you to participate in this study.

Page 1 of 3

Participant Initials \_\_\_\_\_

#### Compensation

- You will not be compensated for your participation in this research.

#### Specific things you should know about confidentiality:

- All the information obtained from people participating in the study will be strictly confidential. Your research records will be stored in the following manner: locked in a cabinet in a secure office; only by members of the research team will listen to the audio tapes and the audio tapes will be destroyed after 5 years.
- Your confidentiality will be respected. Your name or any information that discloses your identity will not be released or published without your specific consent to the disclosure.
- The Research Ethics Board at The University of Western Ontario may contact you directly to ask about your participation in the study. Absolute confidentiality cannot be guaranteed, as we may have to disclose certain information under certain laws.

#### Contact

- If you have any questions about the study please contact Dr. Isaac Luginaah, Principle Investigator and Professor at Western University.
- If you have questions about your rights as a research participant you may contact the Office of Research Ethics, The University of Western Ontario at

#### Publication

- If the results of the study are published your name will not be used.
- If you would like to receive a copy of any potential study results, please provide your name and contact number on a piece of paper separate from the Consent Form.

Thank you in advance for your participation in this research.

Sincerely,

Isaac Luginaah (Principal Investigator)  
Professor, Department of Geography, Western University

*This letter is yours to keep for future reference.*

**Emerging views of rural landscapes in Ontario: A Follow-Up Study of the Siting of a Regional Biosolid Processing Facility in Southgate Township**

Principle Investigator: Isaac Luginaah  
Professor  
Department of Geography, Western University

**CONSENT STATEMENT**

I have read the Letter of Information, have had the nature of the study explained to me, and I agree to participate to in the study. All questions have been answered to my satisfaction.

Research Participant:

Do you agree that you agree that we can record your interview:  Yes  No

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Interviewer obtaining informed consent:

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

You will be provided with a copy of this letter once it has been signed.

## Appendix F: Interview Guide: Operational Community Interviews (2015-2016)

Perception of Processing and Land Application of Biosolids 2015 Checklist for Depth Interviews		
<p>Preamble:</p> <p><i>My name is Sarah Mason.</i> I am a Graduate Student in the Department of Geography at Western University and we are conducting a study in Southgate, which aims to learn more about resident' experience living in Southgate as well as the community's perceptions associated with the processing of biosolid waste and subsequent land application of the end product in your community.</p> <p>Today's interview should take about 40 minutes. If you have any questions at any point do not hesitate to ask. With your agreement, we would like to record the interview to accurately document your views. Your name or address will not appear on any tapes or manuscripts. If at any time you are uncomfortable or would like to stop the interview you are free to do so as your participation in this research is completely voluntary.</p> <p>We are going to start the interview off with a few basic questions so that when results are published it will give the reader a background of Southgate's demographics and I will ask you to begin by discussing your community in general. This will allow readers to compare and contrast results from this study to other locations and better understand the similarities and differences between the two places.</p>		
TOPIC	QUESTION	PROBES
<b>1. Background</b>	<p>How old are you now?</p> <p>Were you born in this community/here?</p> <p>*How long have you lived in this area?</p> <p>*Where did you move from? Why did you choose to move here? Has Southgate/Dundalk turned out as you expected?</p> <p>Do you have family members here?</p> <p>Do you have children living at home?</p> <p>What is your highest level of education?</p> <p>Where do you work?</p>	<p>How do you feel the community is different or the same as you expected? Why do you think this is?</p> <p>Highschool, apprenticeship, college, university...</p> <p>Work in the community or commute elsewhere?</p>
<b>2. Community Discussions and Quality of Life</b>	<p>How would you describe the area where you live to someone who was not familiar with it?</p>	<ul style="list-style-type: none"> <li>- likes and dislikes?</li> <li>- What do you value about this community?</li> </ul> <p>Community's best attributes?</p>

	<p>Do you feel your community has changed recently?</p> <p>How do these changes make you feel about Southgate?</p> <p>When do you feel the community began to change?</p> <p>Are your daily activities in the community any different because of this?</p>	<ul style="list-style-type: none"> <li>- Family, economic, recreational etc...</li> <li>- What do you mean by a rural community?</li> <li>- Is Southgate or Dundalk different than it used to be? How so? People, Environment, Culture, Services, Economy...</li> </ul>
<b>3. General Community Concerns</b>	<p>What are your main concerns/worries about living here, if you have any?</p> <p>Do you currently have any health or environmental concerns about your community in general?</p> <p>Have you always felt this way?</p> <p>Where do your concerns about the environmental quality fit in/rank relative to these?</p> <p>Is there any environmental concern you would like to discuss?</p>	<ul style="list-style-type: none"> <li>- any risks related to living here? stemming from...?</li> <li>- how are you defining risk?</li> <li>- pesticides...?</li> <li>- children's health?</li> <li>- mental health? (e.g., stress)</li> <li>- physical health? (e.g., respiratory, eye irritation).</li> <li>- previous concerns about preexisting industry – ex. Dundalk Metal Systems?</li> <li>- altered concerns about local agricultural practices?</li> </ul>
<b>4. OMRC Facility Perceptions</b>	<p>Within the last few years the Lystek Biosolid plant, the OMRC, was sited and became operational. How do you feel about this facility?</p> <p>Have you always felt this way?</p> <p>Did the siting of this facility change the way you feel about anything or anyone in the community?</p> <p>Has it changed your daily activities at all?</p> <p>If you could change something about how the facility was brought</p>	<ul style="list-style-type: none"> <li>-</li> </ul>

	here what would that be?	
<b><u>5. Community's Future</u></b>	<p>Going forward, what direction do you see the community going?</p> <p>How do you feel about that direction?</p> <p>Do you see yourself staying in Southgate or have you ever considered moving?</p>	<ul style="list-style-type: none"> <li>- How do you see Southgate in 5, 10, 15 years? (not just the OMRC but the community as a whole)</li> <li>- Do you think this is what is best for the area or what you want to see?</li> <li>- What makes you want to stay or leave?</li> </ul>
<b>8. Conclusions</b>	Is there anything else you would like to add?	

## CURRICULUM VITAE

### EDUCATION

**PhD in Geography (Environment and Sustainability)** (2017).

University of Western Ontario, London, Ontario, Canada.

– MSc accelerated into Doctoral program, September 2013

**Bachelor of Science**, Honours Specialization in Cellular and Developmental Biology (2012). University of Western Ontario, London, Ontario, Canada.

### HONOURS AND AWARDS

**Postdoctoral Fellowship**, Social Sciences and Humanities Research Council, 2017 - 2019

**Western Doctoral Excellence Research Award**, Western University, 2016

**Environment and Sustainability Graduate Student Award (In-Stream PhD)**, Centre for Environment and Sustainability, Western University, 2016

**Best Doctoral Student Paper Award**, Canadian Association of Geographers Ontario Division Annual Meeting, 2015

**Best Student Paper Award**, Rural Geography Specialty Group, American Association of Geographers, 2015

**Environment and Sustainability Graduate Student Award (In-Stream PhD)**, Centre for Environment and Sustainability, Western University

**Vanier Canadian Graduate Scholarship**, Social Science and Humanities Research Council, 2014 – 2017

**Joseph-Armand Bombardier Canada Graduate Scholarship**, Doctoral, Social Science and Humanities Research Council, 2014 – 2017 (Declined)

**Ontario Graduate Scholarship**, Ontario Ministry of Training Colleges and Universities, 2014 (Declined)

**Environment and Sustainability Graduate Student Award (PhD Entrance)**, Centre for Environment and Sustainability, Western University, 2014

**Canadian Association of Geographers Award for Department Involvement**, 2014

**Joseph-Armand Bombardier Canada Graduate Scholarship**, Masters, Social Science and Humanities Research Council, 2013

**Ontario Graduate Scholarship**, Ontario Ministry of Training Colleges and Universities, 2013 (Declined)

**Western Graduate Research Scholarship**, School of Graduate and Postdoctoral Studies, Western University, 2013 – 2017

**Ontario Five-Year Volunteer Service Award**, Ontario Ministry of Citizenship, Immigration and International Trade, 2013

**Western Graduate Research Scholarship**, School of Graduate and Postdoctoral Studies, Western University, 2012

**Canadian Interuniversity Sport Academic All-Canadian**, 2009 - 2012

## RELATED WORK EXPERIENCE

**Research Associate**, Land Application of Biosolids: Public Attitudes and Risk Perception, Thompson Rivers University, Department of Biology, in partnership with Greater Vancouver Sewerage and Drainage District, Principle Investigator: Dr. Lauchlan Fraser, 2015 – 2017

**Lecturer, Geography of Health and Healthcare**, Winter 2017, University of Western Ontario, Department of Geography, Limited Duties Instructional Appointment for GEOG 3431B

**Lecturer, Geography of Hazards**, Intersession 2016, University of Western Ontario, Department of Geography, Limited Duties Instructional Appointment for GEOG 2152F

**Vice President**, Canadian Association of Geographers Ontario Division, 2015 - 2017

**Site Research Coordinator**, Outdoor and Indoor Physical Activity and Health Study, London, Ontario, Western University in partnership with Health Canada, 2015

**Site Research Coordinator**, Outdoor Physical Activity and Health Study, Kincardine, Ontario, Western University in partnership with Health Canada, 2013 – 2014

**Teaching Assistant**, Department of Geography, Western University, 2012 – 2016

**Lead Research Intern**, Department of Geography, Western University, London, Ontario, Supervised by Dr. Isaac Luginaah, 2012

## PUBLICATIONS

### Refereed Publications

Stieb, D. M., Shutt, R., Kauri, L., **Mason, S.**, Chen, L. Szyszkowicz, M. ... Luginaah, I. (2017). Cardiorespiratory effects of air pollution in a panel study of outdoor physical activity and health in rural older adults. *Journal of Occupational and Environmental Medicine*, 59(4), 365-364.

**Mason-Renton, S. A.** (2017, April). Are checking the boxes and meeting the requirements enough?: Community lessons learned from the siting of a regional biosolid processing facility in a rural Ontario community. Water Environment Association of Ontario Technical Symposium AND OPCEA Exhibition. National Conference. Ottawa, Ontario, April 2 - 4, 2017.

**Mason-Renton, S. A.**, Luginaah, I. and Baxter, J. (2016). Community Divide as more Detrimental than the Plant Itself: Confrontational Stigma and Community Responses to Rural Facility Siting. *Journal of Rural and Community Development*, 11(2), 22-44.

**Mason-Renton, S. A.**, Luginaah, I. and (2016). Interfering with therapeutic tranquility: Debates surrounding biosolid waste processing in rural Ontario. *Health and Place*, 41, 42-49.



- Mason, S. A.**, Walker, C., Baxter, J. and Luginaah, I. (2016). Ethics and Activism in Environment and Health Research. In N. E. Fenton and J. Baxter (Eds), *Practicing Qualitative Methods in Health Geographies*, Routledge. Pp. 54-72.
- Mason, S. A.**, Dixon, J., Mambulu, F., Rishworth, A., Mkandawire, P. and Luginaah, I. (2015). Management challenges of urban biosolids: Narratives around facility siting in rural Ontario. *Environmental Planning and Management*, 58(8), 1363-1383.
- Mason, S. A.** (2015, June). Urban Biosolids in the Rural Landscape: A Waste or a Resource. In Water Environment Federation (Eds.), WEF/IWA Residuals and Biosolids Conference 2015 The Next Generation of Science, Technology, and Management Conference Proceedings. Washington, DC, United States of America, June 10, 2015 (018\_A). Virginia: Water Environment Federation.
- Mambulu, F., Mkandawire, P., Dixon, J., **Mason, S. A.**, Rishworth, A., and Luginaah, I. (2015). Silence of the leaders: Alcohol policy making in Malawi. *African Geographical Review*. 34(3), 232-249
- Walker, C., Baxter, J., **Mason, S. A.**, Luginaah, I. and Ouellete, D. (2014). Wind energy development and perceived real estate values in Ontario, Canada. *AIMS Energy*, 2(4), 424-442.

### Reports

- Luginaah, I., **Mason, S. A.**, McIntosh, L. (2015). Outdoor and Indoor Physical Activity and Health Study – 2015 Technical Report. Report Submitted to Health Canada.
- Luginaah, I., **Mason, S. A.**, Mason, J. (2014). Outdoor Physical Activity and Health Study – 2014 Technical Report. Report Submitted to Health Canada.
- Luginaah, I., Buzelli, M. and **Mason, S. A.** (2013). Outdoor Physical Activity and Health Study – 2013 Technical Report. Report Submitted to Health Canada.