Playing within the trouble: ecoaesthetic games and environmental thought

Erica Lynn Damman

University of Iowa

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PLAYING WITHIN THE TROUBLE:
ECOAESTHETIC GAMES AND ENVIRONMENTAL THOUGHT

by

Erica Lynn Damman

A thesis submitted in partial fulfillment
of the requirements for the Doctor of Philosophy
degree in Interdisciplinary Studies (Environmental Humanities)
in the Graduate College of
The University of Iowa

December 2018

Thesis Supervisor:   Associate Professor Barbara Eckstein
This is to certify that the Ph.D. thesis of

Erica Lynn Damman

has been approved by the Examining Committee for the thesis requirement for the Doctor of Philosophy degree in Interdisciplinary Studies (Environmental Humanities) at the December 2018 graduation.

Thesis Committee:

Barbara Eckstein, Thesis Supervisor

Steve Hendrix

Sarah Kanouse

Tyler Priest

Eric Tate

Stephan Voyce
To RAC
ACKNOWLEDGEMENTS

Foremost, I wish to express my gratitude to Professor Barbara Eckstein of the English Department at the University of Iowa. This interdisciplinary project came to shape and completion after many, many conversations in Professor Eckstein’s office. She consistently allowed this project to be my own, while gently, patiently prodding me in the right direction. Her direction, commitment, and humor helped me to conceptualize, wrangle, and finish this dissertation.

I would also like to thank the individuals on my committee. Professor Sarah Kanouse has given me invaluable critiques and guidance from the outset. Professor Stephan Voyce and Professor Steve Hendrix gave of their time and support during the game design and writing process. To Professor Eric Tate and Professor Tyler Priest I offer my thanks for their willingness to join the committee when they did and for their continued support and good will throughout the preparation and review of this document.

My thanks also go to Clar Baldus, and other faculty, who helped shape the early stages of this work. Thank you to the University of Iowa for support through the Dean’s Graduate Research Fellowship, the Graduate College Post-Comprehensive Research Award, the Marcus Bach Fellowship, and the Ballard and Seashore Dissertation Fellowship. Also thank you to everyone who participated in game play events, this would be impossible without them.

Finally, to my friends and family I wish to express gratitude—hugs to each of them. It is the lunch dates, hikes, vent sessions, and bocce games that made this project bearable. To my sister, Jessica Plassman, for her careful reading of every word of every page and sweet encouragement, thank you. And to my husband Royce Chestnut, who has been patiently waiting for our next adventure to begin, endless thanks.
ABSTRACT

This dissertation explores the use of play in three ecoaesthetic games and considers their potential for affecting environmental thought. Ecoaesthetic games leverage the power of play as a “foot in the door” for divisive topics. Play, as structured through games, is found to be a powerful generator of meaning. Games specifically are found to be representational, affective, and relational systems that can facilitate critical thinking, sustained reflection, and thoughtful deliberation around intractable problems. My games Tether, recollect, and Fringe-assay modify the well-known games Scrabble, Memory, and Snakes and Ladders, respectively, in order to bring attention to three different but intertwining, environmental crises: language and species endangerment, species extinction, and growing human vulnerability in a climate changed world. In this study, I consider human cognitive tendencies that inhibit our desire to engage with and take action within complex politico-ecological problems. Then, I locate promising game features that can be modified in order to work against such tendencies. The dissertation closes with a consideration of the iterative design process and the insights I gained from each of the games designed for this study.
PUBLIC ABSTRACT

Climate change. Everywhere around you, you hear about it and its attendant complications. Melting ice caps. Threats to human health. Massive species extinction. For the first time in human history, we recognize ourselves as a species capable of altering Earth’s systems. This is very serious business, certainly not a time for play. But, perhaps, play is exactly what we need. There is a plethora of scientific information capable of describing the situation we find ourselves in, and yet, a gap remains between scientific knowledge and actionable change among a general public. The question, what accounts for this gap and how to address it, has been the topic of much scholarly debate.

In my dissertation, I explore the idea that artist-made ecoaesthetic games may offer one way of addressing this gap. I look at three games that I made for this study: Tether, recollect, and Fringe-assay, to see how they can get people to think about growing human and nonhuman vulnerabilities in the age of climate change. The games were played by a diverse group of people and I share some of the insights gained from both the design process and the playing of the games. Games, I argue, are powerful sites for making meaning, generating emotion, and creating the space we need to think slowly, to find ourselves capable of responding to the crises we find ourselves in.
# TABLE OF CONTENTS

LIST OF FIGURES.............................................................................................................................................................. VIII

PREFACE.................................................................................................................................................................................. XI

CHAPTER 1: THE POWER OF PLAY IN ECOAESTHETIC GAMES................................................................. 1

Slow Violence: Problems of Attention, Representation, and Apprehension..................................................... 2
Psychological Obstacles: The Challenges of Human Behavior........................................................................... 5
Strategizing around Our Cognitive Tendencies ......................................................................................................... 13
The Ludic: Defining Play and Games .......................................................................................................................... 29
Making Meaning in the Space of Possibility ............................................................................................................... 37
Observing Play: Iterative Design, Playtesting, and Game Play Events .............................................................. 44
The Chapters ........................................................................................................................................................................ 46

CHAPTER 2: SCRABBLE AND TETHER—MULTISPECIES CONFIGURATIONS IN A WORD WORLD ........................................................................................................................................................................ 51

Language as Human Habitat .................................................................................................................................. 51
Accumulating Absence: (Bio)Cultures in Peril ................................................................................................. 56
Archive vs. Repertoire: Embodiment and Ethos ................................................................................................. 59
Ludic Language: Play and Fluency ......................................................................................................................... 61
*Scrabble*: a Playful Manifestation of Language as Human Habitat ................................................................. 64
*Tether*: Adapting *Scrabble* .................................................................................................................................. 68

CHAPTER 3: MEMORY AND RECOLLECT—PLAYFUL MNEMONICS AS COMMEMORATION........................................................................................................................................................................ 87

The Story(s) of Species Extinction ............................................................................................................................ 87
A Poetics of Memory: Multispecies Commemoration ......................................................................................... 90
Facing Others: Ethics and Community .................................................................................................................. 92
*Kai-awase* and Poetry: History of the Game *Memory* .................................................................................... 95
*recollect*: Multispecies Commemoration ............................................................................................................. 101

CHAPTER 4: SNAKES AND LADDERS AND FRINGE-ASSAY: DESIGNING CONSEQUENTIAL DIFFERENCES ........................................................................................................................................................................ 114

Systemic Complexity: the “Hyperobject” Climate Change ............................................................................. 114
Considering the Spatio-temporal Reach of Climate Change .................................................................117
Tools for Thinking Climate Justice ........................................................................................................121
Rethinking “Place” within a Hyperobject ..............................................................................................126
Adapting Snakes and Ladders ..................................................................................................................129
Shifting Worldviews: Successive Exclusions ..........................................................................................132
Fringe-Assay: Incorporating Spatio-Temporalities of Climate Change ..............................................135

CHAPTER 5: TAKING STOCK—ITERATIVE DESIGN AND LESSONS LEARNED .........................147

Tether: Modifying Scrabble ....................................................................................................................147
recollect: Modifying Memory ..................................................................................................................159
Fringe-assay ...........................................................................................................................................165

WORKS CITED .......................................................................................................................................181
LIST OF FIGURES

Figure 1 *The Psychophysics of Brightness—and Valuation of Human Life.* Afleje, Foss, Palfreman, University of Oregon, documentary film. 2008. Used with permission...... 8

Figure 2 André Breton, Man Ray, Max Morise, and Yves Tanguy. *Exquisite Cadaver (Cadavre exquis).* 1927. Musée National d'Art Moderne, Centre Georges Pompidou, Paris, France. ARTSTOR University of Iowa............................................. 16

Figure 3 *Go.* Photographed by Zizou. 2014. Distributed under a CC 2.0 Generic License. ....... 24

Figure 4 *GO ECO 2005 – 2007.* Lillian Ball. Used with permission.............................................. 25

Figure 5 *Play the LA River: Bowtie Parcel 2014 – 2015.* Project 51. Used with permission..... 27

Figure 6 *Scrabble: Rule Book.* Hasbro, 2007. pp. 1 & 2 [abridged]. ........................................ 65

Figure 7 *Tether Game Kit.* 2017. Personal Collection....................................................................................... 67

Figure 8 *Species Letter Card: Front and Back.* 2018. Personal Collection................................. 68

Figure 9 *Tether Species Letter Book.* 2018. Personal Collection......................................................... 69

Figure 10 *Tether Rules: Quick Play Legend.* 2017. Personal Collection........................................ 70

Figure 11 *Tether Play Space,* featuring Species Letter Card "O" & "V." Personal Collection... 71

Figure 12 *Tether Rules: Species Diminishment and Triple Word Score Amendment.* 2017. ...... 72

Figure 13 *Play Space Positions for Species Letter Cards during Play.* 2018. Personal Collection................................................................................................................................. 76

Figure 14 *Species Letter Cards "O" and "H".* 2018. Personal Collection........................................ 81

Figure 15 *Species Letter Card "E.* 2018. Special Collection.............................................................. 83

Figure 16 *Shell Game (Kai-awase) Set.* 18th Century. The Metropolitan Museum of Art. ARTSTOR University of Iowa................................................................. 96

Figure 17 *recollect.* 2018. Personal Collection........................................................................................... 100

Figure 18 *recollect Pamphlet: Front, Interior, and Back.* 2018. Personal Collection. .......... 101

Figure 19 *recollect "Deep Time" Species.* 2018. Personal Collection.................................................. 103
Figure 20 recollect "Near Time" Species. 2018. Personal Collection. ............................................... 104
Figure 21 recollect Present/Future Species, 2018. Personal Collection. ........................................... 105
Figure 22 recollect: Dodo bird, Near-Perfect Match. 2018. Personal Collection................................. 108
Figure 23 recollect: Perfect Match—Trilobite. 2018. Personal Collection.............................................. 109
Figure 24 recollect: Near-Perfect Match—Rocky Mountain Locust. 2018. Personal Collection........... 110
Figure 25 recollect: Non-Matching Match—Higgin's Eye Pearly Mussel. 2018. Personal Collection...... 110

Figure 26 Game of Snakes and Ladders (Gyanbazi). Late 19th Century. London, Victoria & Albert Museum. ARTSTOR University of Iowa. ................................................................. 130
Figure 27 Fringe-assay: Game Board Pieces. 2017. Personal Collection............................................ 136
Figure 28 Fringe-assay Desert Quadrant. 2017. Personal Collection.................................................. 137
Figure 29 Fringe-assay Arctic (polar) Quadrant. 2017. Personal Collection........................................... 138
Figure 30 Fringe-assay, Inland (mid-equatorial) Quadrant. Primary, Secondary, and Tertiary Effects, detail. 2018. Personal Collection................................................................. 140
Figure 31 Fringe-assay Spinner. 2017. Personal Collection................................................................. 142
Figure 32 Early Attempt: Game Board and 16 Chance Outcomes Draft. 2016. Personal Collection.... 148
Figure 33 Early Species Letter Card—Versions I & II. 2016. Personal Collection................................. 150
Figure 34 Species Letter Cards: A through I. 2016. Personal Collection.............................................. 152
Figure 35 Species Letter Cards "J" through "R". 2016. Personal Collection.............................................. 153
Figure 36 Species Letter Cards "S" through "Z". 2016. Personal Collection.............................................. 154
Figure 37 University of Iowa Students Playtest Tether. 2017. Personal Collection.............................. 156
Figure 38 Participants at Tether Game Play Event. 2017. Personal Collection....................................... 157
Figure 39 Game. 2017. Personal E-mail............................................................................................ 158
Figure 40 Sketch: Fossilized Coral Remains of the Late Devonian Period. 2016. Personal Collection........................................................................................................ 160
Figure 41 Deep Time: Rugose Coral. 2017. Personal Collection............................. 161

Figure 42 Participants at recollect Game Play Event. 2017. Personal Collection........... 163

Figure 43 Players Deliberate. 2017. Personal Collection. .................................................. 164

Figure 44 recollect Participant and Feedback. 2017. Personal Collection.......................... 165

Figure 45 The Game of Owls by Sandi Rigby. 2015. Limited edition hand-stained etching, 33 cm x 50 cm. Used with permission................................................................. 166

Figure 46 Fringe-assay: Four-Quadrant Playspace. 2017. Personal Collection................. 167

Figure 47 Early iteration Game Layout: Imagery Obscures Numbers. 2017. Personal Collection.................................................................................................................. 168

Figure 48 Fringe-assay detail. 2017. Personal Collection..................................................... 171

Figure 49 University of Iowa Students Play Fringe-assay. 2017. Personal Collection.......... 173

Figure 50 Participants play Fringe-assay: Mid-equitorial Quadrant. 2017. Personal Collection.................................................................................................................. 177
PREFACE

I came to games accidentally. As an artist, I focus on human and nonhuman entanglements. Particularly, I enjoy working in the archives, digging through old photographs, mapping and chasing hints for how our relationships with specific places have changed over time. I find that paying attention to the traces of humans and nonhumans helps me understand where we are and to imagine potentialities for moving forward with more care and consideration for human and nonhuman relationships. In 2012, at a residency at the Lakeside Lab near Lake Okoboji in western Iowa, I poured over aerial photos and read settler accounts of the region. I walked along acres of cornfields in an area that, up until the late 19th century, were under water. Contemplating three large, drained lakes and the lingering environmental consequences of their loss, I resolved to make an object that would enable gallery goers to interact with the history and future of the region. For this purpose, I created a three-dimensional topographic map puzzle. But also, quite accidentally, I created a playspace—a space with, it seemed, magical powers to arrest gallery-goer’s attention and action, and to elicit from them casual conversation about landscapes and environments with which they were familiar. While I had, in the past, made works with which the public could interact, including participatory art tours and field guides, I had never created an object that engrossed people so deeply, so un-self-consciously. This, I would learn, is the power of play.
CHAPTER 1: THE POWER OF PLAY
IN ECOAESTHETIC GAMES

In this dissertation, I explore the power and potential of ecoaesthetic games for affecting environmental thought. I investigate play as a powerful generator of meaning and emotion through three games designed and played for this study: Tether, recollect, and Fringe-assay. Each of the three games modifies a game well known to most Westerners: Scrabble, Memory, and Snakes and Ladders, respectively. By exploring the iterative design process of game making generally, and the manipulation of game components such as the representational space, mechanics, meaningful choices, and victory conditions specifically, I highlight the ways that games can be made into spaces where players may be affected by the realities of living on a damaged planet. The games in this study, and their creation, began under the assumption that potential players have been exposed, at least in part, to some information or data surrounding climate change, species loss, human vulnerability, and environmental degradation and furthermore that they likely have beliefs—whether entrenched or not—related to that information because of how the data surrounding such problems comes to fit, or not, with their worldview. Understanding that additional facts and figures are not likely to sway individuals, the goal of the games is to allow players, regardless of their positions on the matter, to dwell in a game that slowly unfolds and shares information with them while bringing questions of valuation, efficacy, and affect to the forefront. Ecoaesthetic games, I argue, allow players to “stay with the trouble,” Donna Haraway’s simple phrase for the complex interaction of human and nonhuman, and the various entanglements and crises “we” find ourselves in. Because games can leverage the power of play to subvert human tendencies that fuel powers of avoidance, they become an interesting complement and affecting antidote to the bombardment of numbers and information already swirling around species’ extinction, environmental degradation, human suffering, and climate change. Through this work, I demonstrate that ecoaesthetic games offer potentialities for intervening in and affecting environmental thought around growing human and nonhuman vulnerabilities in the age of climate change.

At the outset, the dissertation hypothesizes that game design proves a valuable platform for affecting environmental thought for several reasons. The form of the game is approachable, even if the content is complex. And play, structured through games, is a generator of meaning. These affordances encourage individuals to both participate in and complete the game experience even if the content may not align with or may directly conflict with their personal or cultural values. Beginning to play a game also represents a conceptual “opting-in” that inhibits reactions that would produce defensiveness in players’ attitudes to the environmental topics addressed by the games. All of this means that players
remain open to both the play experience and the content therein in ways that are not possible in other forms of communication, especially not with the dissemination of yet more figures or more carefully communicated facts.

**Slow Violence: Problems of Attention, Representation, and Apprehension**

The three games discussed in this dissertation take as their subject, different but intertwining, environmental crises that coalesce around problems of living on a damaged planet, particularly with regards to climate change and growing human and nonhuman vulnerabilities, including species extinction. While each game, and its attendant chapter, explores an environmental crisis in more detail than I will here, in total they attempt to circle around the topic of environmental crises and challenges of human behavior starting from three different entry points: species extinction, language and species endangerment, and growing human vulnerability in a climate changed world. Two conceptual frameworks undergird this work: that of slow violence as explained by Rob Nixon and catastrophic convergence as defined by Christian Parenti. The concept of slow violence begins to outline broadly, types of slowly unfolding environmental crises that are difficult to represent and apprehend, while the concept of catastrophic convergence expresses something of the often, unequal geographical distribution of environmental crises and the populations affected. Together, these two concepts give shape to the type of problems taken up in this dissertation and lay the groundwork for understanding why climate change and growing vulnerabilities for humans and nonhumans is both difficult to think and act upon. These concepts are foundational to my assertion that ecoaesthetic games can serve as a strategy for intervening in the challenges of human behavior and in environmental crises.

In *Slow Violence and the Environmentalism of the Poor* Rob Nixon considers the temporal dimension of violence. Conventional assumptions about violence have it that violence is sensational, discrete, and short-term. Or as Nixon puts it, usually violence is recognized as violence when it is “event focused, time bound, and body bound” (3). But, says Nixon, “we need to engage a different kind of violence, a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales” (2). Nixon offers the term *slow violence* to describe temporally expansive violence. Slow violence is “a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all” (2). Slow violence brings into view violence that is relatively invisible, violence whose effects are decoupled from causality, violence that is not only attritional but also exponential, and violence “that overspill boundaries of time and space” (Nixon 7).

Slow violence widens the category of violence so that it can begin to include incrementally accruing catastrophes such as global warming and the climate refugees of the Maldives and Bolivia, tough
oil extraction and the contaminated drinking water of First Nation Communities in Northern Alberta, Canada,\(^1\) global e-waste streams and sacrifice zones in China and Nigeria,\(^1\) and nuclear weapons development and the legacy of contamination near Arvada, Colorado.\(^{ii}\) In each of these examples, Nixon demonstrates that tracing the lines of causality, tracking the known, unknown, expected and unexpected effects, and tallying those affected, human and non-human, becomes a daunting task that necessitates a focus on the question of time. Writes Nixon, “stories of toxic buildup, massing greenhouse gases, and accelerated species loss due to ravaged habitats are all cataclysmic, but they are scientifically convoluted catastrophes in which casualties are postponed, often for generations” (3). It takes an assortment of disciplines and research modalities to find and build evidence around these slower forms of violence but there remains the additional difficulty of getting the attention of a population base necessary to generate the political force to intervene.

The calamities of slow violence often fail to get or sustain media attention and therefore, the public’s attention. “In the long arc between the emergence of slow violence and its delayed effects, both the cause and the memory of catastrophe readily fade from view as casualties incurred typically pass untallied and unremembered” (Nixon 8 – 9). Temporal bracketing and unquestioned practices of valuation are the workhorses of slow violence (Nixon 16). As an example of temporal bracketing, Nixon discusses how the Vietnam War is said to have occurred over a twelve-year period resulting in at least 1.5 million casualties (13). This temporal bracketing, a “twelve-year period,” argues Nixon, “shrinks the toll, foreshortening the ongoing slow-motion slaughter” within the nation. Lingering effects of Agent Orange negatively affect the health and prosperity of communities decades after the war is over (Nixon 14 – 15). Too, historical legacies of violence such as colonialism, render certain people and places as expendable. The result is that in communities of color, the Global South, or poorer communities in general, scientific research—the very research required to describe the invisible, lingering effects of slow violence—is underfunded and sporadic at best (Nixon 16).

The combination of slow violence and current and looming effects of climate change is taken up further in Christian Parenti’s *Tropics of Chaos: Climate Change and the New Geography of Violence*. Parenti considers how "current and impending dislocations of climate change intersect with the already-existing crisis of poverty and violence," a perfect storm of "political, economic, and environmental

\(^1\) For more on sacrifice zones, see Chris Hedges and Joe Sacco’s book *Days of Destruction, Days of Revolt*. Hedges and Sacco define sacrifice zones as “those areas in the country that have been offered up for exploitation in the name of profit, progress, and technological advancement” (Hedges and Sacco 1). The concept of national sacrifice zones has been extended to include globally disadvantaged landscapes and communities made to bear exploitative practices such as mass extraction projects and waste disposal schemes. For more on early studies of e-waste stream out of the U.S., see Nicola J. Templeton, 2008, "The Dark Side of Recycling and Reusing Electronics: Is Washington's E-Cycle Program Adequate?"
disasters,” a *catastrophic convergence* (7). These problems are more than concurrent; they amplify and compound one another, expressing themselves in a variety of complex ways. For instance, Parenti begins his book asking what appears to be a straightforward question about an act of violence in eastern Africa: Who killed Ekaru Loruman? In Parenti’s skillful analysis the final identification of the culprit(s) comes only through successive widening of his frame of investigation. The simplest answer is that Loruman’s death was a moment of violence enacted by an individual from a neighboring tribe, the Pokot. But as Parenti widens his frame of investigation (both geographically and temporally), Loruman’s death becomes a textbook example of the catastrophic convergence: "poverty, violence, and climate change" (5). Yes, Parenti admits, Loruman was murdered during a cattle raid but the antecedents for this singular act of violence are located elsewhere in historically rooted poverty and regional violence provoked by drought. At fault, argues Parenti, are colonialism, Cold War-era militarism, and neoliberal capitalism—a slow violence that took generations to occur, innumerable accomplices to enact, and took place over vast geographical and temporal distances.

Like slow violence(s) generally, catastrophic convergence is especially prevalent in the Global South. Specifically, Parenti’s focuses on what he calls the Tropics of Chaos. The Tropics of Chaos is a region between the Tropic of Capricorn and the Tropic of Cancer, "a belt of economically and politically battered post-colonial states girding the planet's mid-latitudes” (9). For many humans and nonhumans located in the Tropics of Chaos, climate change acts as a “threat multiplier” where existing social conflicts escalate under new pressures brought about by droughts, floods, water scarcity, heat waves and other effects of global warming (Parenti 9). Nixon too talks of threat multipliers when he explores the ways that slow violence “can fuel long-term, proliferating conflicts in situations where the conditions for sustaining life become increasingly but gradually degraded” (3). In the Tropics of Chaos, and elsewhere, already extant slow violence(s) are exponentially compounded under increasing pressures of climate change. Nixon furthers this point when he highlights that people lacking resources, those dependent on ecosystem resources, and impoverished communities are the principal casualties of slow violence (4). Many of these same communities are among those already being negatively impacted by global warming.

Climate change shares a characteristic with all other forms of slow violence: it is difficult to apprehend. Timothy Morton touches on this challenge when he writes of climate change as a hyperobject. Morton defines Hyperobjects as temporally and spatially vast assemblages with natural, social, political, and psychological complexities. Thinking hyperobjects is, according to Morton, “intrinsically tricky” because “one only sees pieces of a hyperobject at any one time” (4). For Nixon, apprehension “draws together domains of perception, emotion, and action” (14). But giving the invisible a face that might affect people, especially those not in the Tropics of Chaos, and spur action is a challenge. “How do we bring home—and bring emotionally to life—threats that take time to wreak their havoc, threats that never
materialize in one spectacular, explosive, cinematic scene?” asks Nixon (14). The answer to the invisibility of slow violence, Nixon suggests, is to develop representational strategies that “can convert into image and narrative the disasters that are slow moving and long in the making” (3). We need to give “the unapparent a materiality upon which we can act” (Nixon 16). Doing so “turns the long emergencies of slow violence into stories dramatic enough to rouse public sentiment and warrant political intervention” (Nixon 3).

**Psychological Obstacles: The Challenges of Human Behavior**

While Nixon and others call for strategies to make the invisible visible in order to render slow violence grasable, unfortunately, human apprehension of large-scale, slow-moving, nearly invisible violence and the distant others it affects has other impediments that questions of representation alone cannot sufficiently address. These have to do with human cognitive tendencies. The research and theoretical approaches focusing on environmental crises and challenges of human behavior derived from fields such as the social sciences and neuroscience are vast, and impossible to comprehensively cover here. However, a brief look at several facets related to human cognition will illuminate some of the challenges to apprehending and caring about distant suffering. In particular, I look at human innumeracy, the failings of empathy, and biases of prominence effect.

Before turning to those though, a brief note about how the human brain makes decisions. The human brain makes fast and slow decisions: the former is intuitive, instinctual, quick, and reliant upon feelings, the latter is slower, analytical, requiring logic, reason, and deliberation (Slovic and Västfjäll 27). “Reliance on feelings tends to be a quicker, easier, and more efficient way to navigate in a complex, uncertain, and dangerous world” write Slovic and Västfjäll (27). These gut feelings become conditioned into beliefs and values that coalesce over time and shape our worldview. Our worldview and attendant beliefs in turn determine how we gather, sort, and receive information almost without thinking. What may look and conscious moral judgment can actually be boxed in by intuitive thinking. Quick, intuitive feelings of “good” or “bad,” “like” or “dislike” help us make rapid decisions without much thinking labor. This process also means positive and negative feelings can hijack our decision-making. Regarding people’s acceptance or denial of anthropogenic climate change, researchers have found that people avoid and actively push away facts that do not fit with their deep-seated beliefs because doing so can be uncomfortable—it feels “bad” (Mooney par. 4).

Intuitive thinking motivated by affect is but one of our many adaptive psychological defenses that has enabled us to prosper as a species. Our psychological defenses focus on goals other than accuracy, for example, on “identity affirmation and protecting one's sense of self” (Mooney par. 7). Such goals serve individuals in the short-term but also render individuals highly resistant to information and facts that
challenge one’s beliefs. In fact, recent research on reactance theory explores the degree to which intuitive thinking in the service of psychological defenses steers our decision making process. Not only will more facts fail to sway people because of emotion-laden intuitive thinking, this approach has been found to trigger a defensive stance. Reactance theory demonstrates that when confronted with explicit messages that we perceive to be impinging on our real or perceived freedom of choice, we are triggered into an “aversive state of arousal that motivates us to defend that freedom—typically by resisting the persuasive attempt,” even, paradoxically, when we may agree with the position being espoused (Kauffman and Flanagan par. 5).

A simple example of reactance occurs in the example of a student prohibited from using their cell phone in school. With reactance, the desire to use the cell phone and restore one’s freedom to use the phone is strong. The student may surreptitiously text throughout class in order to reinstatetheir freedom. While the cell phone example seems quite innocuous, it demonstrates the power of being told “do not X” and the powerful emotional response to what we perceive as a limitation to our freedoms. In an example from Gilbey et al. one group of students was given a pamphlet suggesting that they avoid air travel whenever possible because of the damaging effects to global warming. The second group, the control group, was not given the pamphlet. Both groups responded to a questionnaire to measure how much they personally wanted to travel by air. The first group, the group who read the pamphlet, showed a significant increase in desire to travel by air than the control group (Gilbey et al. 21). This reliance on quick intuitive thinking and gut feelings becomes important to later discussions on how to strategize around human psychological obstacles that inhibit our ability to apprehend and act within slow violence.

Innumeracy, the Failings of Empathy, and Psychophysical Numbing

In their edited volume *Numbers and Nerves: Information, Emotion, and Meaning in a World of Data*, Paul Slovic and Scott Slovic, a father and son team made up of a social scientist and humanities scholar, explore several human cognitive tendencies that inhibit our desire to respond to large-scale crises. The first of these has to do with the fact that we are, as a species, largely innumerate. “Human beings,” the authors begin, “are psychologically limited when it comes to attaching feeling to numerical information” (7). The numbers used to describe problems as wide ranging as climate change and genocide, species extinction and health epidemics fail to accrue meaning—we simply cannot apprehend them. They write:

> We struggle to understand big numbers, whether these numbers describe quantities of things or the kinds of vast processes—either sudden cataclysms or slow, barely perceptible systemic changes—that we’re told are occurring in the natural world or in the arenas of public health, the economy, or human demographics (2).
Such numbers defy “our human-sized frames of reference” and outstrip our “emotional resilience” capacities, that is, our capacity for sustained emotional engagement with the topic (Slovic and Slovic 5). To illustrate, the authors turn to Annie Dillard’s meditation in her book *For the Time Being* (1999) on quantification and how meaning accrues from. Dillard writes, “there are 1,198,500,000 people alive now in China. To get a feel for what this means, simply take yourself—in all your singularity, importance, complexity, and love—and multiply by 1,198,500,000. See? Nothing to it” (qtd in Slovic and Slovic iv). Importantly, Dillard isn’t asking one to derive the meaning of “the humanity beneath the statistic” through some sort of mathematical computation but rather to *feel* it (Slovic and Slovic 2).

Dillard’s instruction requires an empathetic reach of the imagination (Slovic and Slovic 9), or what Elaine Scarry calls “generous imaginings” (98). Writes Scarry, typically “when we seek equality through generous imaginings we start with our own weight, then attempt to acquire knowledge about the weight and complexity of others” (105). The goal is to imaginatively mine one’s own notions of self and extend that weightiness toward others in order to get a sense of what it *feels* like to be a richly complex, vivid, (distant) other. And then, as Dillard requests, take that understanding and feeling and multiply it by some number expressing, for example, the number of individuals who are internally displaced, are climate refugees, are victims of genocide, are dying of curable diseases today. The task is an impossible one because we are far less imaginatively gifted then one might hope (Scarry 99). In “The Difficulty of Imagining Others” Scarry brings the point home. She instructs the reader to imagine a personal friend. “How capacious is the imagination at its most capaciousness?” she asks (102). Then, Scarry says, “transport the problems of trying to imagine a single friend to the imaginative labor of knowing the other—not an intimate friend, not any single person at all, but instead five, or ten, or one hundred, or one hundred thousand” (103). Even if a person can do the work to imagine one person, that ability falters under additional, anonymous beings.

**Psychophysical Numbing**

In the opening pages of their book, *Numbers and Nerves*, Slovic and Slovic share images from a short film produced by students Afleje, Foss, and Palfreman at the University of Oregon, 2008 (Slovic and Slovic 6). The film begins with an image of one candle on a tabletop, the light of which illuminates a black backdrop. In the next image, a second candle is brought to the tabletop, adding more light. In a third image, there are thirty candles, all lit. A forth image shows the addition of the thirty-first lit candle [see Fig. 1]. The change in luminosity from the thirtieth to the thirty-first is undetectable to the human eye. The film illustrates the phenomena known as the psychophysics of brightness. The human eye loses sensitivity to changes in brightness and is unable to discern a difference in illumination as the candles increase. This phenomenon affects more than just our eyesight. “Just as the eye loses sensitivity to
changes as the brightness of a scene increases, research on *psychophysical numbing*, shows that the value of a human life decreases similarly against a backdrop of an increasing number of lives” (Slovic and Slovic 6 – 7).

This problem of insensitivity means, as the title of Paul Slovic and Daniel Västfjäll’s chapter on the subject aptly describes “the more who die, the less we care” (27).

But, wouldn’t it stand to reason that the more who die, the more one should care? To demonstrate the diminishment in sensitivity brought about by psychophysical numbing, Slovic and Västfjäll turn to a study by Fetherstonhaugh et al. (1997) in which people made decisions about whether or not to disperse lifesaving funds from a hypothetical grant-funding agency. The researchers asked participants to set a “minimum benefit requirement,” that is, to determine the minimum number of lives that would have to be saved in order for a $10 million grant to be dispersed. When the total number of individuals at risk was listed as fifteen thousand, participants set their minimum benefit requirements lower (a minimum of 9,000 individuals) than when there were 290,000 individuals at risk (a minimum of 100,000). Additionally, they found that as the number of at-risk persons increased, the respondents were less willing to send aid altogether. This is the peculiar non-logic of psychophysical numbing: “the value of human life decreases against a backdrop of increasing number of lives” (6). Slovic and Västfjäll hypothesize that

Our affective responses and the resulting value we place on saving human lives follow the same sort of psychophysical function that characterizes our diminished sensitivity to changes in a wide range of perceptual and cognitive entities—brightness, loudness, heaviness, and wealth—as their underlying magnitudes increase (31).

As Slovic and Västfjäll interpretation of the example above argues, numbers not only fail to register emotionally, but also as numbers grow, we fail to appreciate the change.
An individual life is understood psychologically as a coherent unit (Slovic and Västfjäll 33). Rationally, that should mean that if saving the life of one person is important, then saving the lives of 2,000 persons would increase in importance by 2,000 times but that isn’t how the human mind works. There is a “devaluing of incremental loss of life against the background of large tragedy” (Slovic and Västfjäll 33). Slovic and Västfjäll suggest that “we may not ‘feel’ much difference, nor value the difference, between saving eighty-seven lives and saving eighty-eight” (31). There are some important questions to be asked about these conclusions however. The essays gathered for Numbers and Nerves are concerned first and foremost with humanitarian aid and decision-making. In many of the studies discussed, participants are led to the presumption that they are in a position to make decisions around whether or not to administer aid or intervene in some distant scenario, one that does not particularly pertain to them as participants directly. What Slovic and Slovic hope to elucidate is what cognitive barriers inhibit a person, in a position to do something, from intervening.

Importantly then, the research described in the Slovic’s book makes some assumptions about the participants not self-identifying as being in-group with the hypothetical group presented in the study. An in-group is a group with which one psychologically identifies. Belonging to in-group(s) shapes beliefs, attitudes, and actions. As an example, in the United States, many African Americans have relied on, and still rely on, the scale of plantation slavery to define and make claims about their oppression. The historic petition to the United Nations We Charge Genocide (1951) by the Civil Rights Congress cites instances of lynching, state sponsored violence, legal discrimination, and disenfranchisement perpetrated against 15,000,000 African Americans in the United States, particularly in the South. To an individual who identifies as being in-group, such numbers may mean a great deal. In-group identification is determined by perceived similarities (Huddy 738). To the degree to which an individual perceives themselves as part of a group, for example, as being part of a group of historically oppressed persons, then numbers describing distant suffering may indeed feel more salient.” This makes intuitive sense because as psychologist Paul Bloom observes in Against Empathy, “it’s far easier to empathize with those who are similar to us” (30).

The preference for kin and group are evolutionary adaptations that have served us as a species. “The necessity of group coordination for human existence, including basic activities such as childrearing, food gathering, tool development, food production, and group defense,” writes Huddy, means “an internalized attachment to a small group evolved as a functional necessity for survival” (743). States Bloom:
We are constituted to favor our friends and family over strangers, to care more about members of our own group than people from different, perhaps opposing groups. This fact about human nature is inevitable given our evolutionary history. Any creature that didn’t have special sentiments toward those that shared its genes and helped it in the past would get its ass kicked from a Darwinian perspective (93 – 94).

In general, this means for the most part “we care most about people who are similar to us—in attitude, in language, in appearance—and we will always care most of all about events that pertain to us and people we love” (Bloom 91).

But in-group identification can also lead to biases that encourage an “us” vs. “them” mentality. This can result in something as innocuous as favoring a sports team or as terrible as ethnic cleansing. Regardless of perceived shared similarity the fact remains that much experience of distant others will remain alien to the person(s) attempting to imagine the other. Even when there is perceived similarity or facets of collective identity, the imagined other “lacks the vitality and vivacity of the perceived” (Scarry 102). No matter what, our ability to imagine what others must feel will inevitably fall short.

**Psychophysical Numbing in Aggregate**

The cognitive obstacle of psychophysical numbing doesn’t just occur in discrete problem sets, it also occurs broadly. When inundated with too many crises calling for our attention, we can experience compassion fade, a consequence of psychophysical numbing on a macro scale. “Our capacity to feel is limited,” observe Slovic and Västfjäll (33). Humans become “less concerned and less prone to take appropriate action as the number of lives at stake increases” and this also proves true as the number of situations in which lives are endangered increases (Slovic and Slovic 7). The cognitive limitations of being largely innumerate and susceptible to the psychophysics of brightness means that “our sensitivity and compassion tend to wane much more precipitously than we’d like to think” (Slovic and Slovic 219).

As Paul Slovic theorizes elsewhere,

constant increases in the magnitude of a stimulus typically evoke smaller and smaller changes in response. Applying this principle to the valuing of human life suggests that a form of psychophysical numbing may result from our inability to appreciate losses of life as they become larger. (“Psychic Numbing”).

Slovic and Slovic emphasize:

our moral schemes guide us to believe that the value of each life should be constant and more or less equal but our minds function otherwise, allowing a slippage in value, in salience, already with the second life in jeopardy, whether that life is on another continent or just around the corner” (219).
What this means is that even though “most people are caring and will exert great effort to preserve ‘the one’ whose needy plight comes to their attention, these same people often become numbly indifferent to the plight of ‘the one’ who is one of many in a much greater problem” (Slovic “Psychic Numbing”). The psychophysics of brightness and resulting compassion fade leads humans to “calmly [turn] away from massive losses of human lives, when we should be driven by outrage to act” (Slovic and Västfjäll 35).

Failings of Empathy

While the works included in Numbers and Nerves discuss innumeracy particularly as it relates to the big data of crises such as climate change or the large numbers describing, for example, genocide, in Against Empathy Paul Bloom explores human innumeracy from a different angle. According to Bloom, empathy works like a spotlight “directing attention and aid to where it’s needed” (30). But spotlights have a narrow focus—“they only illuminate what they are pointed at” (Bloom 30). Notes Bloom, empathy is limited as well in that it focuses on specific individuals. Its spotlight nature renders it innumerate and myopic: It doesn’t resonate properly to the effects of our actions on groups of people and it is insensitive to statistical data and estimated costs and benefits (30 -31).

Empathy directs our attention to some persons and causes at the expense of others (Bloom 36). To use a recent example, the outpouring of concern for twelve Thai boys and their coach trapped in a cave was greatly outsized compared to the attention given to the 99 children massacred in Syria on February 23, 2018—but one day in the ongoing seven-year civil war which has claimed over 14,000’ children (Gharib and Silver par. 1). It may be that the cave rescue is new news, more novel than the suffering within the protracted conflict in Syria. Such an explanation would fit with Nixon’s notion of slow violence in that it has difficulty retaining public attention and has somewhat anonymous victims. But Bloom would argue that it also has to do with the fact that empathy is innumerate. “If our concern is driven,” he writes, “by thoughts of the suffering of specific individuals, then it sets up a perverse situation in which the suffering of one can matter more than the suffering of a thousand” (89).

To get a sense of the innumeracy of our feelings, Bloom asks readers, in a similar way as did Dillard and Scarry, to exercise one’s imagination. “Imagine reading that two hundred people just died in an earthquake in a remote country. How do you feel?” he asks. “Now imagine that you just discovered that the actual number of deaths was two thousand. Do you now feel ten times worse? Do you feel any worse? I doubt it” (emphasis original 89). Empathy fails precisely because we are better, even if only partially so, at imagining one individual. “One individual can matter more than a hundred because a single individual can evoke feelings in a way that a multitude cannot” (Bloom 89). Even though many charities, political movements, and social causes implore us to “imagine how ‘they’ feel” or to “walk in
‘their’ shoes” such empathetic reaches of the imagination can actually cause humans to focus their narrow spotlight of empathy toward one, or a few, at the expense of many others.

**The Prominence Effect**

In addition to our inability to apprehend large numbers and propensity to become numb to them there is another cognitive tendency shaping our ability and desire to intervene in complex problems with innumerable victims: the prominence effect. With the prominence effect “determiners of choice are found to be hierarchical, which means choosing to achieve the most important attributes with little or no compensation allowed for lesser attributes” (P. Slovic “The Prominence Effect” 56). This echoes Maslow’s hierarchy of needs (1943), a theory of human motivation that posits that humans will seek to meet certain needs before others. Some needs take precedence over others. For example, the need for shelter takes precedence over the need to foster friendships (P. Slovic “The Prominence Effect” 56). In a similar way, proximate objectives draw attention from and reduce the importance of less prominent goals (P. Slovic “The Prominence Effect 58). This is a value-laden process.

To illustrate the point, Paul Slovic in “The Prominence Effect: Confronting the Collapse of Humanitarian Values in Foreign Policy Decisions” considers two conflicting values in United States foreign policy: national security and genocide intervention. Paul Slovic is perplexed by inconsistencies in how and when the United States chooses to intervene to save civilian lives. He asks, “Why intervene in some situations and not in others, that by the numbers, seem far worse? And how do we reconcile the immense value our society places on an individual life with our failure to respond to the plight of millions?” (“The Prominence Effect” 56). These questions bring Slovic to a question of values: “what are our true values when it comes to saving human lives?” (“The Prominence Effect” 56). Keeping in mind the existence of a hierarchy of needs, Slovic theorizes that national security is a more proximate goal and is thus valued more than humanitarian aid. While “national security and humanitarian life-saving are both vital objectives” writes Slovic, when “the basic need for security” is not met, “lofty humanitarian values are systematically devalued in the decision-making process” (“The Prominence Effect” 56 - 57). Time and again, he alleges, “when intervention to protect thousands of nameless, faceless lives in a distant land is seen to increase risks to national security, security invariably wins” (57). Because the hierarchy of objectives and goals is values-driven, the “decisions in support of security appear vastly more defensible than decisions to protect distant lives” (57).

The example above explores how the need for security usurps humanitarian goals at the national level, but it is possible to see the role of under-examined hierarchies in the prominence effect operating at the individual level as well. The prominence effect means, for example, that in relation to climate change, even though more and more Americans place high value on reducing the effects of fossil fuel use and
preserving the planet for future generations, there is little consistent action towards those goals (P. Slovic “The Prominence Effect” 60). While “we express strong commitment to both environmental protection and our obligations to future generations,” continues Slovic, “these values are likely to be nullified in decisions where the immediate comforts, conveniences, and other direct benefits we gain from climate-destructive actions are prominent” (“The Prominence Effect” 60). Too, prominence effect shapes who is in our sphere of concern. “Prominence appears likely to be aligned with immediate and certain benefits to individuals whom we care about” (“The Prominence Effect” 60).

To summarize, we are largely innumerate—we struggle to understand, attach meaning to, and feel the weight of individuals and processes described by numbers. Irrationally, we tend to allow a slippage in the value of a life as the numbers of effected persons climb. We are prone to psychophysical numbing, which causes us to turn away as more and more crises call for our attention. We are biased toward kin, group, and that which is proximate (whether it be objectives or persons). When we are called upon to perform empathetic reaches of the imagination we fall short. And our prior beliefs and emotional reactance shape how we take in and respond to new information. So, what is to be done?

**Strategizing around Our Cognitive Tendencies**

This discussion on human cognitive tendencies that inhibit our ability to apprehend and act within environmental crises began with an acknowledgement that the human brain makes decisions in two ways: fast and intuitively or slow and deliberately. Bloom points where we need to go when he says: “we have gut feelings…we also have the capacity to override them” (6). The first step argues Nixon, is to make slow violence perceptible. For this task, Nixon turns to “writer-activists” Jamaica Kinkaid, Njabulo Ndebele, June Jordan, and others and artists such as Keith Washington. Nixon theorizes that writer-activists can help us to

apprehend threats imaginatively that remain imperceptible to the senses, either because they are geographically remote, too vast or too minute in scale, or are played out across a time space that exceeds the instance of observation or even the physiological life of the human observer (15).

The representational challenges of slow violence are “at once imaginative and scientific” (10). Or as Slovic and Slovic might have it, they require numbers and nerves, head and heart. Writer-activists observe Slovic and Slovic, can serve as “sensory translators” capable of “transforming abstract information into viscerally, experientially meaningful discourse that might trigger in audiences the impulse to act individually or collectively” (219). Importantly, such works not only make the invisible visible, they create space in which a slower, conscious consideration and deliberation around distant suffering can take place.
Ecoaesthetic games offer a similar opportunity as that of writer-activists’ works. Ecoaesthetic games bring together all the facets required for “apprehension” as characterized by Nixon: “perception, emotion, and action” (15). The content of the game makes salient the large-scale, somewhat invisible, incremental phenomena of slow violence and those affected. Done well, an ecoaesthetic game can generate emotion around the topic of concern or the characters within the game, which gives the player the experience of expanding their sphere of concern. Within the relative safety of the playspace, players are invited to make metaphorically large decisions. They get to exercise their attention and decision-making within seemingly intractable problems. And because games begin with a psychological “opting-in”—players subconsciously agree to proceed together into the play experience—ecoaesthetic games may engage players in difficult topics without triggering a defensive response. Herein lies an intriguing potentiality of games for affecting environmental thought, they can actively stymie gut feelings by producing a space and play experience capable of bringing questions of biases, valuation, decision-making and consequences out into the open.

**Ecoaesthetic Art and the Power to Affect**

Artistic engagement with and intervention in pressing social concerns a distinguished history. The works created for and discussed in this dissertation are born out of an art historical legacy that can be traced to the developments of both “ludic activism” as theorized by Anne-Marie Schleiner and ecoaesthetics as described by T.J. Demos. Ludic activism points to artistic practices that adopt play or design play scenarios as tools for intervention. Ecoaesthetics draws together works in the vein of politico-ecological intervention that recognize environmental crises as questions with environmental and social, political, and economic complexity. Art can and has played a role in addressing politico-ecological questions through intervention. I focus particularly on the use of play in interventions. I will first examine this legacy of intervention and then follow its trajectory toward the intersection of art and the environment in what T.J. Demos calls ecoaesthetics. Finally, I will explore ecoaesthetic games as a form of public time or learning in public, where importantly, experience unfolds in the company of others.

**Ludic-activism: A Brief History of the Use of Play as Intervention in the Arts**

The turn to play for activist ends, what artist and game-designer Anne-Marie Schleiner calls “ludic activism” has precursors in art practitioners and artistic movements that used play in varied ways throughout twentieth century art movements including Dada, Surrealism, Situationist International, Happenings, and Fluxus. While the use of play and the reasons for its adoption are numerous,

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2 While the use of play as intervention occurred prior to the Twentieth Century (one can think, for example, of the use of parody in Greek theater to comment upon and attempt to affect social conditions)
interrelated, and sometimes divergent, there are two prevailing ways of thinking about play as it relates to the visual arts that are useful to this study. A defining question links and sometimes separates the two uses of play: Who gets to play—the artist, the viewer, and/or both? The separation of the artists and movements of the twentieth century into two neat categories of “artist as player” and “viewer as player” sets up a false dichotomy but it remains helpful for locating the power of play within particular works. A brief look at these two perspectives highlights the different ways play is deployed within artistic practices and the lineage to which my games belong.

The Artist at Play

When the artist is at play, play is theorized as a means to unlock the artist’s inner creativity, to subvert the artistic ego, to shift authorial control, and/or to return to a primitive, childlike, and seemingly less corrupted state of mind for the making of artwork. While anthropologist and play scholar Benjamin Sutton-Smith suggests that the notion that child-like play is more innocent, unburdened, primitive, or original is a simplistic and romantic notion of play, the perspective nevertheless continues to hold sway in discussions around play (Ambiguity of Play 133). This view of the ludic in the visual arts takes as its principle focus the effect play can have on the artist. Games, experiments, make-believe, and more become ways to transcend a more serious mode of art production and a way to critique or alter artistic norms. As David J. Getsy writes in From Diversion to Subversion: Games, Play, and Twentieth-Century Art, “artists imposed rules of play on their work or sought out games or play as possible means to refine or complicate art theories and practices” (xi).

A well-known example is the automated drawing and writing technique cadaver exquis (“exquisite corpse” in English) developed by the French Surrealists (1924 – 1966). To produce an “exquisite corpse” drawing, a paper is folded three or more times. Three or more artists (depending on the number of panels available for drawing) participate. The first artist draws an image on the top folded panel, being careful to extend two lines over the crease of the fold and not show their fellow artists. The second artist, who receives the paper with the first drawing folded and out of sight, continues drawing by incorporating the two lines that extend over the crease into their image. The artist drawing on the second this study is particularly interested in Twentieth Century examples. See Jude D. Russo’s reading of Aristophane’s “Acharnians” in “The Meaning Behind the Mask: Social Activism through Theater.” While most discussions of the advent of play and games in art in the West are situated within art movements of the twentieth-century, art historians have recently begun looking to earlier time periods. For example, Jennifer Milam asserts that the eighteenth century period-style excess of the Rococo was a form of the ludic within the Enlightenment. For more on this see Jennifer Milam, Fragonard’s Playful Paintings: Visual Games and Rococo Art (2007).

In the 1920s, the Surrealists emerge under the leadership of writer and artist André Breton and others. For more see Flanagan Critical Play 89.
panel then takes two lines of their drawing and extends them over the fold in preparation for the third artist. Folding the paper once again to not show the previous images, the second artist then gives the drawing-in-progress to the final artist. The third artist, as the second artist did, incorporates their predecessor’s lines into their image. The result is a collaborative drawing that usurps any singular authorial vision or goal of a unified image [Fig. 2]. This same creative practice was used as a language game to produce short, collaboratively produced, mostly nonsensical texts.

Figure 2 André Breton, Man Ray, Max Morise, and Yves Tanguy. *Exquisite Cadaver (Cadavre exquis)*. 1927. Musée National d'Art Moderne, Centre Georges Pompidou, Paris, France. *ARTSTOR University of Iowa.*

The game “exquisite corpse” is an offshoot from Victorian-era parlor games used “to amuse the members of the upper and middle classes during their newfound leisure time” says games scholar Mary Flanagan (156). The Surrealists pushed the leisure activity into a form of exploration, turning it into a way to unleash an unconscious inner creativity and to make art. VII Surrealist games, art historian Claudia Mesch notes “can be best understood as tools toward automatism, as strategies that attempt to pool a process of collective thought unmediated by the individual ego, or to short-circuit the conscious workings of the individual mind as it works its way through and applies the rules of the game to the actions at
hand” (65). Flanagan adds, “Surrealists made games in order to make art. Games were a process—an integral part of their research—not merely an outcome” (160). Extremely structured and rule-based, the game “exquisite corpse” is nonetheless capable, through its use of multiple players, that is, artists, of cultivating chance and unexpected imagery, all the while creating opportunity to respond and intervene in aesthetic conventions.

While play in this figuration may suggest the artist tinkering with her artist friends in the studio—a sort of frivolous, fun mode of production—such play is not apolitical. The insertion of chance and indeterminacy through Surrealist games was in direct response to both contemporary modes of art production, dissemination, and criticism as discussed above, and cultural and political climates of the time. The Surrealists sought to bypass reason and rationality by tapping into the unconscious and imagination as commentary and critique of rising fascism in Western Europe. They focused on myths, play, and primitivism because these were thought to lie in the realm of the non-rational and of being capable of “resist[ing] the restrictive political and intellectual conditions brought about with the rise of fascism” (Mesch “Serious Play” 61). The use of play was oppositional to and a diversion from the tenuous situation in Western Europe, a critique of their contemporary situation by way of the non-rational, and a subversion of modernist art production (Mesch “Serious Play” 60). The “exquisite corpse” is but one of the many games that became, in the words of André Breton, a founding member of the Surrealist group, “recipes” for a collective means of creativity and response within challenging times (Mesch “Serious Play” 65).

The example above shows the Surrealist group adopting play through a modified Victorian-era parlor game, which allowed them to create artwork in a new way, while giving opportunity to comment on social and political situations of their time. Julian Oliver’s ioq3aPaint (2010) complicates the dichotomy of artist and viewer as players. Oliver exploited and modified a well-known bug in the 3D videogame engine Quake 3 (id Software, 1999) (Sharp 23-29). The Quake 3 videogame engine allowed designers to create a game world in which 3D objects and spaces can be explored (Sharp 24). Oliver manipulated the game technology to create images by creating a series of software bots. But he also invited others to play as well. Gallery goers moved the bots using the WASD keys on a standard keyboard. Image stills and short films were then rendered from the software bots’ viewpoints. The resulting images, writes games designer and art historian John Sharp, are “abstract yet dimensional, a swirl of color fragmented by glimpses of digital artifacts [from] inside the gameworld” (25). The collaboration between Oliver’s modified game and the gallery goers produced what art historian and critic

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4 “W” and “S” move the bot forward and backward whereas “A” and “D” move the bot left or right respectively.
Claire Bishop has called elsewhere “a de-authored” work that encouraged the viewer to play and co-create images by flattening the “synthetically dimensional world of game engines” (Sharp 29).

The Viewer as Player: Participation and the Turn to the Social

The example above of Oliver’s manipulation of game technology to produce images, especially when said images were made in collaboration with gallery goers, brings us to the second perspective of play in the visual arts: the viewer as player. The second perspective of play in the visual arts retains some of the ludic philosophical positioning of the “artist-as-player” in play as subversive critique, means of creative exploration, and collective authorship but begins to rethink the role of the spectator. “Terms like ‘play,’ ‘playground,’ and ‘playful,’” notes artist Katarzyna Zimna, “have become part of the modern art vocabulary” (1). They are deployed to demarcate works that are “process-oriented, participatory or interactive, based on performance” and/or that use “art objects as props or environments” (Zimna 2-3). Such work uses “play as a creative tool” to be wielded for the purpose of bringing “art back to life” and as “a model for social interactions” (Zimna 27). Its use in modern art practices signals a turn towards process and experimentation for the artist on the one hand and engagement of the viewer as participant, fellow-player, and even, co-maker, on the other (Zimna 1). The interest in viewer as player is part of a broader change in the role of the spectator.

In Participation (2006), Claire Bishop considers "artistic practices since the 1960s that appropriate social forms as a way to bring art closer to everyday life"(10). Such practices strive “to collapse the distinction between performer and audience, professional and amateur, production and reception. Their emphasis is on collaboration, the collective dimension of social experience" (Bishop 10). An historical movement exemplary of this shift in arts and the role of the spectator can be observed in the works generated by the 1960s and 1970s loosely organized, international web of artists known as the Fluxus group. Artists of the Fluxus group were interested in destroying the boundaries between art and life; using their work to disrupt and affect not just art production and the art world but life itself (Owens 118 – 119). Their work was part of a “sea change” in conceptual art, notes John Sharp, which privileged ideas over form and process over product (21). “Starting in the 1960s,” Sharp begins, “the contemporary art community moved from medium specificity toward a multimodal, fluid conception of art making that relocated the material and conceptual focus from craft skill and materiality to conceptual embodiment” (21). It is in this vein that Fluxus artworks were deployed not only to divorce their work from other modes or categories of making, much in the same way as the Surrealists, but also to destabilize the separation of art and life. With play, games scholar Mary Flanagan writes, Fluxus artists found “a methodology” to create “a kind of multiplayer artistic play space and environment” that could be interacted with and sometimes enacted by the viewer (139).
Much of the Fluxus group’s artwork was not participatory, nor explicitly game-like. Works such as Alison Knowles’ *Events by Alison Knowles: Make a Salad*, (1962) or Dick Higgins’ *Danger Music No. 2* (1962) were performances delivered by Fluxus artists for spectators within art galleries or exhibition halls.\(^5\) However, the incorporation of participation and adoption of games can be seen in George Maciunas’s “fluxkits.” Fluxkits were created out of inexpensive materials, and often included a box or containing structure, game pieces and tokens, instructions, and other nonsensical, found objects. The fluxkit was a game that was impossible to play in any traditional sense, but which invited viewers to perform and initiate the piece in ways previous Fluxus performances did not (Mesch “Cold War Games” 2). “Fluxus artists displayed an interest in fashioning the art-game as a complex intersubjective situation or interaction that went beyond—or rejected— the zero-sum scenario of most games,” that is, of requiring winners and losers (Mesch “Cold War Games” 8). The fluxkits for example could be played, depending on the proclivities of individual players, their desires, and their ability to interpret and continue play despite the lack of clear directions, goals, or uses for game but the Fluxkits lacked any normative competitive or victory condition.

Another example of the incorporation of the viewer as participant can be found in conceptual artist Alan Kaprow’s “happenings.” “Happenings” were staged events that brought reality, art, and participating viewers together. In *18 Happenings in Six Parts* (1959), “guests were given instructions similar to game rules on how to interact with the environment” (Flanagan 170). For example, participants might be given an index card that told them to sweep the floor, sit on a chair, or paint a picture. While happenings were not exactly designed as forms of play, they still contain play elements: the spectator enters into the contrived world created by the artist through game-like rules. This encourages the spectator to become a participant who takes on imaginative roles and subscribes to the invented scenario generated through the instructions of the happening, not unlike entering the structure of a game. Works such as Kaprow’s and those of the Fluxus group sought, art historian Owen Smith remarks, to “deflect us back to a starting point—to the world itself with all of its vagueness, dislocations, and potentialities” (119). Play became the operative tool for creating potentialities, for undermining high art, and as Flanagan notes, for “intentionally creating everyday actions and experiences instead of sanctifying a pristine art object” (101). “Kaprow’s guidelines” within happenings writes Flanagan, “reflected the desire to prompt an artistic critical engagement with the public, to acknowledge the social role of art, and indeed emphasize the idea that artistic practice and artistic consumption can and should be closer together” (170).

Artistic work, interventions, and projects that involve participation and collaboration with various publics are part of a recent “social turn” in the arts and fall under all sorts of titles: "socially engaged art,

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^5 In *Make a Salad* (1962) Knowles chopped vegetables to the beat of music, made a salad, and then distributed it to audience members. Mesch, Claudia. “Cold War Games and Postwar Art” p. 7.
community-based art, experimental communities, dialogic art, littoral art, interventionist art, participatory art, collaborative art, contextual art and (most recently) social practice” (Bishop Artificial Hells 1). This turn to the social is actually, Bishop argues, a third “return” to the social in the West. The first two turns occurring after the major "political upheaval and movements for social change: the historical avant-garde in Europe circa 1917, and the so-called 'neo' avant-garde leading to 1968” (Artificial Hells 3). The third began after the fall of communism in 1989. "Each phase has been accompanied by a utopian rethinking of art's relationship to the social and of its political potential—manifested in a reconsideration of ways in which art is produced, consumed and debated" (Bishop Artificial Hells 3).

Bishop takes issue with participatory art because of assumptions that it can serve to restore “the social bond through a collective elaboration of meaning” (Participation 10). Writes Bishop, “participatory art is perceived to channel art's symbolic capital towards constructive social change” (Artificial Hells 13). Despite these concerns, Bishop notes that topics such as community, society, empowerment, agency, normally the domain of sociology, have new relevance to and within artists' expanded practices in this shift towards participation, collaboration, and a reworking as spectator (Bishop Artificial Hells 7).

Arguing through Jacques Ranciére’s work on theater and education, Bishop asserts, spectatorship is not the passivity that has to be turned into activity. It is our normal situation. We learn and teach, we act and know as spectators who link what they see with what they have seen and told, done and dreamt. There is no privileged medium as there is no privileged starting point (Participation 16).

In particular, Bishop is concerned that social practices sometimes align with neoliberal cultural policies, such as “creative cities” and “inclusion,” providing merely symbolic ‘feel-good’ services in the vacuum left by the withdrawal of state-sponsored social service programs (Artificial Hells 16).

While Bishop is admittedly skeptical of the political potential and aesthetic value of participatory work, the fact remains that a great number of artists have shifted their practices toward or maintained their practices of social engagement. 6 This emphasis on and commitment to collaboration, community, and political action has grown in the last twenty years, observes curator Nato Thompson (21). But why have so many artists been drawn to working with diverse publics, creating collaboratively, and producing processes, interventions, and experiences for public participation over other more traditional forms of art making? Grant Kester notes in The One and the Many, "the last two decades have witnessed the rise of a powerful neoliberal economic order dedicated to eliminating all forms of collective or public resistance

6 To be clear, Bishop’s critiques have forced the field to articulate more clearly and attend more explicitly to the role of art and the social. See more on the work within the social turn, go to Nato Thompson Living as Form (2012); Grant Kester The One and the Many (2011) and Kester Conversation Pieces (2004); Ted Purves What We Want is Free (2004); Meg McLagen and Yates McKee, ed., Sensible Politics (2012); and Suzanne Lacy, ed., Mapping the Terrain (1995).
(institutional, ideological, and organizational) to the primacy of capital" (5). And Nato Thompson observes,

since the fall of the Berlin Wall in 1989, a new neoliberal order has emerged. Loosely defined, neoliberalism as a political order privileges free trade and open markets, resulting in maximizing the role of the private sector in determining priorities and deemphasizing the role of the public and the state’s function in protecting and supporting them (29).

Just as the two previous “returns” to the social were in response to socio-political situations of that time, artists are finding themselves “response-able,” as artist Suzanne Lacy says, to the growing social inequalities, never-ending wars, environmental degradations, shrinking liberties, and more of our present moment (33).7

The two perspectives of the artist as player and viewer as player explore multiple uses of play by artists for the purposes of art making, altering aesthetic norms, generating temporary communities, and participating in the social turn. Anne-Marie Schleiner’s term “ludic activism” specifically locates the use of play within the social turn, particularly in works that attempt to exist at the intersection of politics and art. Ludic activism brings together artists’ tactics that use play and games as a form of critique and modes of creativity that seek to affect everyday life. As such, it represents both a method and philosophical stance prioritizing the use of play within artistic interventionist strategies. Schleiner notes that the use of play can challenge the appropriate or accepted modes of interacting with a problem, work against the normalization of detrimental processes, and actively shape the spaces and people who encounter it (156 – 157).

Despite her skepticism and critical stance toward participatory art, Bishop may be found to agree with Schleiner in as much as Schleiner’s ludic activism manifests as participatory art. In her conclusion, Bishop suggests that successful participatory art can be “a form of experimental activity overlapping with the world” which “may lend support towards a political project (without bearing the sole responsibility for devising and implementing it)” (284). Because such works communicate at two levels, at that of the participant and that of the spectator,8 successful participatory art is capable of eliciting “perverse, disturbing, and pleasurable experiences that enlarge our capacity to imagine the world and our relations anew” while also becoming part of the larger “public imaginary” (Bishop Artificial Hells 284). While this is clearly a quick summation of the shifting, conflicting, and intertwining, still dominant uses of play

7 Lacy has been producing socially engaged work since the late 1970s. Response-able is two-fold: the artist finds herself “response-able, that is capable of responding, and has the duty to try to make a change, to transform public consciousness.” Mapping the Terrain. 33.

8 Spectator is here understood as the person(s) experiencing the object, image, story, film, or spectacle during or after the instance of participation.
within the visual arts and the turn to the social more broadly, it locates an art historical lineage to which this study’s games belong.

**Ecoaesthetics: Growing Out of and Diverging from Art and the Environment**

In addition to the vein of “ludic activism,” the works within this dissertation are descendant from an art historical lineage of environmental art culminating in what T.J. Demos calls ecoaesthetics. Like the history of play in the arts, the history of environmental art is a vast domain but several key developments leading to ecoaesthetic works define this evolving subcategory within the arts. These developments begin with land art and restorationist art practices. Art historian and cultural critic T.J. Demos uses the term ecoaesthetic to describe works that are at the “intersection of contemporary art, environmental activism, and political ecology” (*Decolonizing Nature* 7). For Demos, the term “political ecology” “acknowledges approaches to the environment that, although potentially divergent, nevertheless insist on environmental matters of concern as inextricable from social, political, and economic forces” (*Decolonizing Nature* 7). Political ecology, a main thrust of ecoaesthetic works, writes Demos “recognizes that the ways we regard nature carry deep implications and often unacknowledged ramifications for how we organize society, assign responsibility for environmental change, and assess social impact” (*Decolonizing Nature* 8). Many of our historical, current, and looming environmental crises, notes Demos, can be “a driver and consequence of injustice and inequality—including poverty, racism, and neocolonial violence” (*Decolonizing Nature* 7-8). Therefore, separating environment from other questions of, for example, social justice, is untenable.

Ecoaesthetic works grow out of and are divergent from several art historical moments when artists engaged questions of the environment. In the United States, in Land Art of the 1960s and 1970s, nature is figured as something set apart. Artists considered nature a foil to the culturally saturated domains of the city where art was normally created and consumed. In this figuration, nature is material for and backdrop to mostly modernist sculptures (consider as example Robert Smithson’s *Spiral Jetty*, 1970). According to Demos, changes in United States political and cultural climates and a burgeoning environmental movement after the 1960s resulted in a shift in artistic practices about the environment. Nature was still seen as something set apart but now, it was in need of restoring (as in the restorationist works of Helen and Newton Harrison, for example, *Art Park: Spoils’ Pile Reclamation: 1976 – 1978*, ongoing) or it was relegated to the domain of the spiritual, as an aesthetic object of reverence (for example, James Turrell’s *Crater’s Eye at Roden Crater*, 1979 – present) (Demos *Decolonizing Nature* 38 – 42). Though many such works attempted to repair nature and our relationship to it, they were reproducing, writes Demos, “the very objectification of nature that got us into trouble in the first place” (*Decolonizing Nature* 43). In their abstraction and idealization of nature, in thinking of nature as a realm
apart, artists had managed to present nature “as an autonomous sphere of existence” divorced from “the technological, social, and economic systems that also construct the environment” (Demos *Decolonizing Nature* 44).

Out of this history of environmental art emerged a new “politico-ecological practice,” an ecoaesthetic that “relates technologies, economics, and politics to biological systems” (Demos *Decolonizing* 55). For Demos, an ecoaesthetic practice blurs “the divisions between activist visual culture, artistic forms, and the appearance of nonhuman agents of environmental change” (“Third Text” 7). Here, the “aesthetics” in ecoaesthetics has more to do with politics than notions of beauty. To make this argument, Demos points to Jacques Ranciére’s notion of “the distribution of the sensible.” The distribution of the sensible writes Demos,

> designates the mode of appearance that 'parcels out places and forms of participation in a common world,' and reaches a moment of politicization when conventional categories of and separations between the seen and heard versus the forgotten and overlooked are challenged and redistributed (“Third Text” 7).

Jean-Phillippe Deranty’s reading of the distribution of the sensible articulates this point further:

> the task of political action, therefore, is aesthetic in that it requires a reconfiguration of the conditions of sense perception so that the reigning configuration between perception and meaning is disrupted by those elements, groups or individuals in society that demand not only to exist but indeed to be perceived (95).

That is, the aesthetics of ecoaesthetics challenges designations of nature as something apart while also pushing against normal controls on who (human and nonhuman) can be seen, heard, or accounted for.
Ludic Activism + Ecoaesthetics: Two Examples

Where ludic activism and ecoaesthetics meet is when artists use play in politico-ecological works. Here I use Lillian Ball’s *GO ECO* (2005-2007) and Project 51’s *Play the LA River* to illustrate.

*GO ECO*

*Go*, or *Wèiqí*, is one of the oldest games still in continuous play (Flanagan 105). Originating in China at least 2,500 – 4,000 years ago, it is variously theorized as a forerunner to the abacus or a tool for divination (American Go Association). *Go* is played on a nineteen-by-nineteen gridded board [see Fig. 3]. Two players take turns placing black and white “stones” on empty spaces in an attempt to capture territory. The conflict over territory is an abstract representation of war; the bounded, limited playing field of the board represents “the territory over which battle is waged” (Salen and Zimmerman 432).

The artist Lillian Ball created *GO ECO*, (2005 – 2007) as an interactive ecological video game installation based on *Go*. The work was on display in 2007 at the Queens Museum of Art, Queens, NY (Ball). *GO ECO* takes as its primary topic the disputed territory of a 12-acre “maritime freshwater interdunal swale” on Long Island, New York (Ball par. 1). Unlike in traditional *Go* where two players compete, in *GO Eco*, one, three, or five players take turns placing a white or black stone. A camera tracks the placement of a stone and narrates the meaning of the move through still image or video of the site. The player learns that each move represents a perspective from one of four stakeholders—builder, neighbor, scientist, or government. Each has a vested interest in a particular future for the wetland area. By changing the number of players, the game makes it impossible to maintain a singular, strategic identity. During one move a player finds himself or herself making an attempt to gain territory aligned with the desires of a scientist, and the next, they may be “winning” from the perspective of the developer. This shifts the quality of the conflict from one of pure adversary to one that encourages, at least metaphorically, collaboration [see Fig. 4].
Go Eco alters Go in order to illustrate the conflict between vested interests in real estate development. Ball’s modification of Go is in line with one of the speculated reasons the game was originally developed: divination. The game becomes an eco-divination tool to answer the question: What shall become of 12 acres of “maritime freshwater interdunal swale” on Long Island, NY? In altering the number of players, incorporating multiple perspectives, and overlaying video and stills of the site, Ball invites participants to contemplate the ways in which spaces are produced by a multitude of actors and factors.9

Play the LA River

Play the LA River, 2014 – 2015, was a multiphase, multi-site, 51-week invitation to play along the LA River created by the art collective Project 51. It is, in their words, a “come-one-come-all project…that invites Angelenos to enjoy, explore, reclaim and reimagine the mighty LA River” (“About Play the LA River”). Project 51’s Play the LA River has two key components: a deck of cards and 51

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9 Interestingly, while Ball discusses the work as capable of illustrating “parallel webs of interdependence” between plants, wildlife, and predators on the one hand and human stakeholders on the other, the game does not allow the human player to inhabit the position of nonhuman actors (Ball par. 3).
weeks of site-specific public programming which incorporate a variety of forms of play. At each one of the 51-week site-specific public events locals, officials, university students, and many others were invited to come to the river, play games, experience different entertainment such as music, races, and art activities. Both the interactive deck and the events are used to help reimagine the 51-mile LA River as a grand civic space that can connect LA communities. As a whole, *Play the LA River* incorporates play, recreation, discovery, and citizen science in order to garner visibility and a new type of accessibility within the on-going LA River revitalization movement.

Project 51 built a custom deck of 52 cards plus 4 wild cards for their “game of urban exploration and imagination” (“About Play the LA River”). Each card contains a map of the location, directions for access points, tidbits of information about the site, neighboring points of interest, and suggestions for how to play at the site. For example, the card “Bowtie Parcel” encourages players to explore “a post-industrial scrap” that tends to the grittier side. If a person wished to play the area, they are prompted to “ballroom dance,” “Finally learn to tie that bowtie,” and “sing songs.” Importantly, the artists insert a demand “We want a footbridge to Marsh Park!” [see Fig. 5]. Whether Project 51 is speaking for themselves, the players involved in the urban exploring, or the community on the southwest side of the river with the statement “We want a footbridge…” is unclear. But such statements abound within the deck—allowing for both a critique of the space as it is currently configured and speculative dreaming of possible futures for the areas.
The information on the cards are attendant to social, environmental, economic, and historical factors that produced the LA River, while also keeping a critical eye on the uneven ways the revitalization of the LA River continues to re-inscribe inequality and environmental justice issues. *Play the LA River* uses playful tactics to critique fifty years of “concrete worship and zero public access.”

Incorporating play activities in spaces not designed for such activity temporarily alters the space through embodied action and allows individuals to imagine what could be. Participants are, by being on site and playing, enacting what art critic Jennifer Allen calls the “art of the plausible” by temporarily replacing what is with what could be (qtd in Lambert-Beatty). Speaking elsewhere about a different activist artwork, art historian Carrie Lambert-Beatty asserts that “by providing opportunities for belief, however fleeting and no matter how often stymied, tactics of plausibility provide especially rich, emotional experiences of ‘What if’” (284).

Too, Project 51’s approach practices what T.J. Demos calls a “politics of legibility” (*Decolonizing Nature* 97). Engaging with a site in an unlikely manner, that is, through play, is also a way to participate in the ongoing production of the LA River outside more dominant, official forms of engagement such as policy, planning, and engineering. Both art and urban planning can be exclusive and opaque. In creating a work that prioritizes legibility and accessibility—which requires no specialized expertise—*Play the LA River* engages directly with the LA River as art and urban planning practice.
language or official, sanctioned methods of participation—Project 51 invests in the potential of ecoaesthetic works to do two things: reach a wide audience (at 51 weeks of on-site events throughout the city) and “contribute to social transformation in the present” (Demos, *Decolonizing Nature*, 97). Both “the art of the plausible” and the “politics of legibility” are evident in the way Project 51 discusses the project: “playing at the river helps us think about what we want from that space,” says Catherine Gudis, Associate Professor of History at UC Riverside and a founding member of Project 51. “The more people engage on their own, the more likely it is that there will be a continuum of usage. The public becomes agents in an act of civic engagement with the river. Even the act of playing the river is political—it’s a claim to space” (Kilston par. 10).

In the examples of *Go ECO* and *Play the LA River*, artists use play to engage a diverse public and to create temporary communities of people around questions of the environment. Through their art, they create opportunity to think through and engage a set of complex problems at the nexus of environment, society, politics, and the economy. Both are interventions that harness the ludic for the purposes of capturing attention and empowering players, as viewers and participants, to dwell and make metaphorically large decisions within a politico-ecological problem. While the questions and problems, histories and possible futures of a 12-acre wetland in Long Island or the 51 miles of the LA River are different in scale as compared to global warming or worldwide genocide, they are complex nonetheless. Admittedly, part of the power of these play-based ecoaesthetic works is that they draw on local commitments, communities, and histories already in place. Nevertheless, as Slovic and Slovic argued, while scientists, policy makers, planners, and engineers can generate immense amounts of data around, for example, the LA River, we humans lack the ability to fathom and feel the meaning of such information. The works of Ball and Project 51 harness the power of play in order to generate affect around problems normally described through data. By doing so, they point to a strategy that lends itself to getting people to reflect upon, deliberate around, and engage with seemingly intractable problems.

**The Power to Affect: Imaginative Expansion and Action**

In the introduction to *Living as Form*, Nato Thompson considers socially engaged art practices and their ability to affect. “As art enters life,” begins Thompson, “one must consider the powerful role of affect in the production of meaning” (32). According to Thompson, the concept of affect “derives from the understanding that how things make one feel is substantively different than how things make one think” (32). It is from a similar vantage that Slovic and Slovic write of cultural producers, such as literary and visual artists, as bringing numbers and nerves together, of creating “evocative humanizing modes of expression” that generate meaning (170). Such works are, Slovic and Slovic suggest, essential to triggering in audiences “the impulse to act individually or collectively” (219). In her brief essay in *Living
as Form, dancer Jawale Willa Jo Zollar connects affect and action explicitly. “The arts,” Zollar writes, “connect people not to how they think about social issues, but to how they feel about them. Once you’re clear about how you feel, then action becomes more of a possibility” (236). Being “clear about how you feel,” ties back to, though Zollar doesn’t make this connection, the practice of slow thinking, of reflection, introspection, and deliberation required to interrogate gut feelings.

Play-based interventions like Ball’s or Project 51’s not only connect people at the individual level to how they feel about an issue; they also use play to structure interactions between people. This touches on what games scholar Mary Flanagan identifies as one of the potentialities of play as structured through games: games create space. Games can create spaces where social and political transformation can occur precisely in an age when public space in parks, streets, town squares—all former sites of political change—are increasingly privatized (Flanagan 253). This ability to create a space and time for collective activity is an important one. In her discussion on artist-induced critical daytrips, artist Sarah Kanouse discusses the importance of “collective time” on a tour. The tour can be a rare time of slowing down and working through, of “thinking and perceiving in public with others” (Kanouse 53). The same can be said of ecoaesthetic games. While the content and method of delivery may differ greatly between critical day tours and ecoaesthetic games, they share their capacity to generate space and time for people to perceive together, their intention to affect, and their ability to create meaning around difficult to apprehend problems.

The Ludic: Defining Play and Games

Wherever there is play there is also meaning...the aim of play is the modulation of human experience. 
—Hector Rodriguez (15).

Games are first and foremost about play. 
—Celia Pearce “Players, Games, and Culture,” Keynote Address.

I have, up until this moment, been using the terms games and play somewhat interchangeably. And while art historian David J. Getsy suggests that restating well-worn taxonomies of games and play “often distracts attention from the actual deployment of games and inadvertently shuts down their complexity and polyvalence,” here I explore definitions of play and games to give readers a shared base understanding of how the terms relate to ecoaesthetic game production. Games are a formalized production of play and play is an element in all games (Salen and Zimmerman 303). This relationship between play and games becomes clearer through an exploration of the power of play as structured through games because, as game designer and artist Celia Pearce notes, “games are first and foremost
about play, the act of play, the process of play, the experience of play, and the intersubjective construction of shared play space” (3). So, what is play?

**Play**

Play is notoriously difficult to define. Play appears to be immediately recognizable—children “play” house, dogs “play-fight,” adults engage in “playful” banter. To witness any one of these activities, is to witness players absorbed by their activity, isolated in their imaginary world(s), and intently focused on the scenario between them. And while play is often theorized as a form of non-seriousness, of leisure separate from the everyday mundane, the outcomes and repercussions can be real enough. The emotions we feel during play are real. And there are dark and serious sides to play; one only has to think of bullying or the high stakes of gambling (Sutton-Smith *The Ambiguity of Play* 86 – 87). Game scholars Katie Salen and Eric Zimmerman observe in *Rules of Play*, the seminal text for students in game design, that

the psychological and anthropological study of play has resulted in a range of definitions, from a formulation of play as ‘activities not consciously performed for the sake of any result beyond themselves’ to a conceptualization that ‘play refers to those activities which are accompanied by a state of comparative pleasure, exhilaration, power, and the feeling of self-initiative’ (302).

It seems that, as psychologist J. Barnard Gilmore quips, “certainly everyone knows what play is not, even if everyone can’t agree on just what play is” (qtd in Salen and Zimmerman 302).

There are a great diversity of play forms, experiences, and players. The concept of play is both a culturally and socially specific idea (Flanagan 5). Also, there are competing disciplinary interests in the definition of play. The leading Twentieth Century play scholar Brian Sutton-Smith observed:

—Biologists, psychologists, educators, and sociologists “focus on how play is adaptive or contributes to growth development, and socialization”;
—Communication theorists focus on “play as metacommunication far preceding language in evolution because it is also found in animals”;
—Sociologists focus on “play as an imperial social system that is typically manipulated by those with power for their own benefit”;
—Mathematicians focus on play as models for war and strategy;
—Anthropologists focus on play as ritual, customs, and festivals;
—Folklorists focus on play as game traditions;
—Art and literature practitioners and scholars focus on “play as a spur to creativity” (*Ambiguity of Play* 6).

Indeed, Sutton-Smith suggests that perhaps the only thing that links all the forms of play is the primary function of “adaptive variability”:

In looking for what is common to child and adult forms of play, to animal and human forms, to dreams, daydreams, play, games, sports, and festivals, it is not hard to reach the conclusion that what they have in common, even cross culturally, is their amazing diversity and variability. The
possibility then arises, that it is this variability that is central to the function of play throughout all species (*Ambiguity of Play* 221).

Despite this variability, diversity of forms and experiences, and competing disciplinary rhetoric Sutton-Smith consistently defined play as “an activity that is fun, voluntary, intrinsically motivated, incorporates free choices/free will, offers escape, and is fundamentally exciting” (Flanagan 4).

Most studies on play begin with Dutch philosopher Johan Huizinga’s, *Homo Ludens: A Study of the Play-Element in Culture* (1938) and its primary interlocutory text, Roger Caillois’s *Man, Play, and Games* (1958). In *Homo Ludens*, Huizinga explores play as “a ‘significant form’, as a social function” inherent to human society and essential to the structure of culture (4). “Genuine, pure play,” Huizinga writes, “is one of the main bases of civilization” (5). The “play impulse” is everywhere apparent; it generates and shapes culture through ritual and social customs (Huizinga 10). Huizinga defines play as a “function of the living, but is not susceptible to exact definition either logically, biologically, or aesthetically” (25). Despite this loose definition, Huizinga offers key insights on play from which much scholarship on play springs. According to Huizinga, play is:

> a free activity standing quite consciously outside ‘ordinary’ life as being ‘not serious,’ but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings, which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means (13).

Following Huizinga, interdisciplinary software artist Hector Rodriguez succinctly defines play as “a free and meaningful activity, carried out for its own sake, spatially and temporally segregated from the requirements of practical life, and bound by a self-contained system of rules that holds absolutely” (1).

This concept of “spatially and temporally segregated” is in Huizinga’s words, “a closed space” that is “marked out for [play], either materially or ideally, hedged off from the everyday surroundings” (10). This is what he later refers to as “the magic circle.” The notion of the magic circle is illustrated in the following from Eric Zimmerman:

> Outside the magic circle, you are Jane Smith, a 28 year old gamer; inside, you are the Level 62 Grand Mage Hargatha of the Dookoo Clan. Outside the magic circle, this is a leather-bound

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10 Art historian Claudia Mesch argues that any consideration of Huizinga’s theories on play should not be divorced from the cultural and political milieu in which Huizinga was writing. Huizinga, writes Mesch, “mourned the dissipation of play in the twentieth century, and with it a code of ethics and a corresponding quality of human decency” (“Serious Games” 61). His lectures and the subsequent publication of his book *Homo Ludens* (1938) were, Mesch argues, a “resounding condemnation of the cultural and intellectual perversions of Nazism” (“Serious Games” 61).
football; inside, it is a special object that helps me score -- and the game of Football has very specific rules about who can touch it, when, where, and in what ways (“Jerked Around” par. 2).

The concept of the “magic circle” has been bandied about within game design and academic circles as being both problematic and useful. For its detractors, the magic circle is often conceptualized as a spatio-temporal space that is too narrow, rigid, exclusionary, and oppressive. Taking down, dismantling, and ‘breaking’ the magic circle has become “a rite of passage for game studies scholars: somewhere between the Bachelor’s Degree and a Master’s Thesis” jests Zimmerman (“Jerked Around” par. 5). Others, such as Arsenault and Perron, consider it a useful term that mirrors the “psychological frame” that “delimits a set of messages or meaningful actions” (112). By their theorization, the concept of the magic circle is a frame around a “situation or activity” in which “we act differently or follow different rules” than “in our ordinary-life psychological frame” (Arsenault and Perron 112-113). That is, to finish with Huizinga, the magic circle carves out “temporary worlds within the ordinary world, dedicated to the performance of an act apart” (10).

What I find useful about the concept of the magic circle is the fact that entering the magic circle represents a psychological “opting-in” that delineates the conceptual space of a game. “With or without physical boundaries, self-contained or open activity, routinized practice or ritualized events, playing a game always requires the understanding and voluntary adoption of certain behaviors enforced through the game’s rules” (Arsenault and Perron 111). The magic circle is a conceptual frame willingly adopted. Crossing the permeable boundary of the magic circle marks the beginning of a temporary social contract that once entered, shifts players’ identity, social relations, and time and space (Zimmerman, “Jerked Around” par. 3). It is “a context from which meaning can emerge” (Zimmerman, “Jerked Around” par. 3). In the context of ecoaesthetics games then, this voluntary entrance into the game and play experience may temporarily suspend or override other in-group identities which may otherwise forestall an individual’s interest in engaging with a topic.

In contrast and partly in response to Huizinga’s somewhat loose definition of play, the French sociologist Roger Caillois developed a taxonomy of ludic activities in *Man, Play, and Games* (1958). Like Huizinga, Caillois considered play and games to be markers of civilization (Mesch 72). Through his study on a wide range of play behaviors, Caillois theorized “cross-cultural patterns” of play as occurring

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11 Two important things to note of Caillois and his work: Caillois was affiliated with the Surrealists until the late 1930s when he broke with André Breton and Georges Bataille. Also, Caillois was critical of, what Claudia Mesch says was Huizinga’s “decontextualized and teleological narrative of play-as-drive” because it did not engage games within a capitalist economy. For more on the relationship of Huizinga and Caillois writings as they relate to Surrealist games, see Claudia Mesch “Serious Games: Games and Early Twentieth-Century Art”
on an axis between free-play \textit{[paidia]} and rule-bound complexity \textit{[ludus]}\textsuperscript{12} \textit{Paidia} is what one witnesses when observing children create a fantasy world using only cardboard boxes. It is the spontaneous, uncontrolled imagination. “It represents,” emphasize Salen and Zimmerman, “wild, free-form, improvisational play” (308). \textit{Ludus}, on the other hand, is what one witnesses in the rules-bound and restricted game space of, for example, Chess. Caillois explains, “such a primary power of improvisation and joy, which I call \textit{paidia}, is allied to the taste for gratuitous difficulty that I propose to call \textit{ludus}, in order to encompass the various games to which, without exaggeration, a civilizing quality can be attributed” (27). \textit{Paidia} and \textit{Ludus} are bound together and appear, to different degrees, in all forms of play.

According to Caillois’s theorizations of play, all play can be found not only on a spectrum between \textit{paidia} and \textit{ludus}, but also falls into one of four “fundamental categories” (12):

1) \textit{ilinx}: play seeking vertigo or altered states of perception. Such play is heavily imbued with adrenaline, thrill seeking, and risk-taking. Two examples include a child spinning until they fall down and the activity of dancing.

2) \textit{agôn}: games of competition. \textit{Agôn} is play that requires skill, exercised on an artificially leveled playing field. One might think of any number of sports, such as soccer, or games such as Chess.

3) \textit{mimicry}: games of make-believe. \textit{Mimicry} play involves the imagination in role-playing. In adults, this points to activities such as theater, and in children, “playing” house.

4) \textit{alea}: games of chance. \textit{Alea} play is permeated with luck. The person engaged in this form of play has no control and wins not by skill but by fate. The classic example is the lottery.\textsuperscript{xiv}

Caillois’ taxonomy is more comprehensive than Huizinga’s formulation of play in that it deemphasizes the role of competition in order to include a wider array of behaviors that incorporate play.

Nevertheless, together Huizinga and Caillois represent starting points for the definition of play from which game design texts begin.\textsuperscript{13} In \textit{Critical Play}, games scholar Mary Flanagan explores play as it relates to her definition of what she calls \textit{critical play}: To play critically “means to create or occupy play environments and activities that represent one or more questions about aspects of human life” (Flanagan 6). Flanagan generates her definition of play by exploring the characteristics of play as outlined by Huizinga, Caillois, and Sutton-Smith. Flanagan suggests that the study of play routinely falls into two

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\textsuperscript{12} “Patterns of play” is not explicitly used by Caillois; rather it is Chris Batemen’s useful term in “Roger Caillois’ Patterns of Play.”

\textsuperscript{13} Some writers on game design look elsewhere for their canonical texts. This is primarily because both Huizinga and Caillois predate the advent of digital gaming and are therefore found to be less helpful in the formulation of definitions of play. In \textit{Gaming: Essays on Algorithmic Culture}, Alexander R. Galloway argues that in regards to the study of games in modern and contemporary culture, Huizinga’s work “is so far removed from the medium that it can merely gesture a way forward, not provide a core approach” Galloway, Alexander R. \textit{Gaming: Essays}, p. 20.
“camps”: “those who see play as voluntary, intrinsic, and important to class structure (leisure and socialization), such as Huizinga and Caillois; and those who look more to ritual, to communication, and who study play in natural settings” such as Sutton-Smith (4 – 5). Instead of opting for one or the other perspective of play, Flanagan chooses to pull together the strengths of both camps to complete her analysis of critical play. She argues that play is “one of the most fundamental aspects of the human condition,” playing a role at both the inter- and intrapersonal level (4). Looking to the writings of Sutton-Smith, Flanagan asserts that “by playing together, people form close communities and develop a group identity and a sense of belonging. Play can also function as a tool to understand the self” (5). It is her definition of play, through her reading of Huizinga, Caillois, Sutton-Smith and others, that I use for the purposes of this study:

[Play is] central to human and animal life; is generally a voluntary act; offers pleasure in its own right (and by its own rules); is mentally or physically challenging; and is separated from reality, either through a sanctioned play space or through an agreed upon fantasy or rule set (Flanagan 5).

Games

Games have emerged as a major topic of scholarly inquiry in large part thanks to the popularity and prevalence of video, computer, and online gaming as well as the burgeoning scholarly field of Game Studies. The games industry is comprised of four primary sectors: PC (ex: Destiny 2, 2017 by Bungie), mobile and social gaming on a smartphone or tablet (ex: apps such as Angry Birds, 2009 by Rovio Entertainment and Words with Friends, 2009 by Zynga), console games (ex: Grand Theft Auto IV, 2013 for Sony Playstation), and virtual reality (ex: Oculus Rift, 2018 by Insomniac). Combined, these four sectors have enabled the games industry to outpace both movies and music in annual revenue since 2016 (Nath par. 1). The Serious Games industry, which uses video gaming technology for industry training in automotive, education, aerospace, and defense has also seen growth and is expected to be worth $5448.82 Million by 2020 (“Serious Games Market”).

But it’s not just digital gaming that has grown. Interest in gaming has also led to “the golden age of board games.” A growing number of games such as Settlers of Catan have sold more than 20 million copies and cafes and bars in metropolitan areas dedicated to board game play have opened (Cross par. 3). This resurgence of board games alongside unprecedented technological advances and growth in the gaming industry is accompanied by a “simultaneous proliferation of alternate practices that deploy the tactics and technologies of video games for cultural critique and activism,” observes art historian David J. Getsy (xi). Such points broadly outline trends related to games, game tactics, and game spaces but

14 The growth of the Game Studies field in academia is here differentiated from the branch of applied mathematics known as Game Theory. For more on the points of intersection between Game Theory and Game Studies, turn to Jan Simons, 2007 “Narrative, Games, and Theory.”
distinctions among games matter, of course. Games scholar and designer Katherine Isbister reminds us in *How Games Move Us: Emotion by Design* that “we would never lump Hollywood action films, Sundance winners, and nature documentaries together when discussing the impact of film” (xv).

Like play, games are notoriously difficult to define. Looking at the relationship of play to games brings one closer to understanding how interdependent games and play are. Let’s begin with an example: Playing on a seesaw is a form of play, but not a game. Playing dodge ball is formalized play; it is also a game. Additionally, to engage in dodge ball is to undergo an experience of play. The contrast between play on the seesaw and play in dodge ball illustrates what Salen and Zimmerman determined are two relationships of play and games: games can be both a subset of play and contain play (72).

The difficulty of defining games is, like play, in part due to interdisciplinary differences. Also Getsy observes, “the task of taxonomy in many respects is bound to fail with regard to a topic like games, which mutate and morph depending on who plays them, when they are played, where they are played, and why they are played” (xi). For definitional specificity, Getsy turns to Ludwig Wittenstein’s concept of games’ “family resemblances”:

> we see a complicated network of similarities overlapping and criss-crossing: sometimes overall similarities. I can think of no better expression to characterize these similarities than ‘family resemblances’; for the various resemblances between members of a family: build, features, color of eyes, gait, temperament, etc. etc. overlap and criss-cross in the same way—And I shall say: ‘games’ form a family (xi).

While “family resemblances” may allow one to begin to categorize and study games from a number of perspectives, for example game format, game mechanics, player experience, player intent, designer intent, education goals, entertainment, and more, it doesn’t go far enough to define game. “The ‘game,’” Greg Costikyan writes in “I Have No Words & I Must Design,” “is an amazingly plastic medium...adaptable to any and every technology, from the neolithic to the high tech” (9). Costikyan continues,

> Boardgames, wargames, tabletop roleplaying games, computer and console roleplaying games, massively multiplayer online games, live-action roleplaying games, MUDs, MUSHes, MOOs, card games, collectible card games, play-by-mail games, play-by email games, miniatures, sims, flight sims, vehicle sims, text adventures, graphic adventures, action adventures, shooters, sneakers, dancers, drivers, real-time strategy, turn-based strategy, god games, platformers, fantasy sports, sidescrollers, maze games, trivia games, puzzle games, wireless games, location-based entertainments, gambling, paintball, sports, and the horses….They’re all games (3).\(^\text{15}\)

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\(^\text{15}\) MUD: Multi-User Dungeon and variants Multi-User Domain/Multi-User Dimension is a text-based, multi-player, real-time virtual world; MUSHes: Multi-User Shared Hack/Habitat.
As Costikyan’s extensive list illustrates, there are many different types of games and the elements that constitute a game vary game to game—some involve a contest, others not, some are goal oriented, others not, some are an event, others not, some involve make-believe, others not, some require strategy, others not, some incorporate winning and losing, others not, and on and on. A “family resemblance” makes it possible to consider similarities and nuances between game families. It makes it possible to determine how the artist-made ecoaesthetic games of this study differ from a vehicle simulation or how an online PC game such as Destiny 2 differs from other ecoaesthetic games like Ball’s Go ECO and Project 51’s Play the LA River. But a definition necessarily goes further.

Definitions of the term “game” have been debated in over 150 years of scholarship on games and play and have been greatly informed by the recent surge of digital games and Game Studies field (Flanagan 6). The pioneering computer game designer Chris Crawford begins The Art of Computer Game Design, 1984, with a comparison of puzzles and games in order to arrive at a distinction at the level of interactivity inherent in games. According to Crawford, puzzles are “static,”—they present a logical problem that the player can solve through clues or deduction. Games on the other hand can evolve. By thinking through computers as a gaming platform, Crawford argues that games have rules and actions that change during play and in relation to the players’ actions (64). Costikyan, also a digital game designer, fleshes out the definition for what constitutes a game even more. Games are, he writes, “a form of art in which participants, termed players, make decisions in order to manage resources through game tokens in pursuit of a goal” (qtd in Salen and Zimmerman 78). Like Crawford, Costikyan’s definition focuses on interactivity and decision-making within game play.

Crawford and Costikyan both avoid defining games through game end-states that require a win/loss dichotomy. This is where Salen and Zimmerman differ. They assert “a game is a system in which players engage in artificial conflict, defined by rules, that results in a quantifiable outcome” (80). For Salen and Zimmerman, the quantifiable outcome is what differentiates a game from less formal play activities. Interestingly, in contrast to Crawford’s foundational delineation between puzzles and games, Salen and Zimmerman bring puzzles into the category of games. A crossword puzzle, by their estimation, contains all of the elements of a game. A crossword puzzle is a rule-bound, artificial system, in which a player engages in conflict (against the puzzle designed by the puzzle maker), and which results in a quantifiable outcome (one can be said to “win” by finishing a puzzle or to “lose” for failing to complete it) (Salen and Zimmerman 80).

16 Destiny 2, 2017 is an online, multi-player, first-person shooter game, created by Bungie, published by Activision. www.destinythegame.com/.

17 “Artificial” here refers to the fact that “games maintain a boundary from so-called ‘real life’ in both time and space” as theorized in the concept of the magic circle. Salen and Zimmerman argue that, “although games obviously occur within the real world, artificiality is one of their defining features” (80).
While these definitions of games from canonical authors in the field of digital game design are useful, they don’t quite capture the spirit or works of artist-made games. Take as an example, Lillian Ball’s Go ECO. The game certainly satisfies, to some degree, Crawford and Costikyan’s definitions. It is interactive, it evolves, and players move game tokens to capture resources. And, it meets some of Salen and Zimmerman’s criteria for a game. It has rules, it has conflict, and it is artificial. But the modification of Go ECO, in both the number of players and the taking of turns, upsets any regular notion of conflict and winning/losing. Additionally, the context of reception, the incorporation of video, and the installation qualities complicate its definition as a game. I find that the most useful definition of games for the purposes of this study comes from Mary Flanagan. Flanagan’s definition is necessarily broad because it is made to incorporate questions such as context of reception, the possibility and capabilities of spectators, and the role and intent of the artist. According to Flanagan, a game is a “more-or-less constructed play scenario”—a situation “with guidelines and procedures” (6 – 7).

Making Meaning in the Space of Possibility

With a working definition of games and play, it is possible to consider games as an artistic medium of expression and explore the potentialities that games afford for artists and player(s). While each chapter of the dissertation dives deeper into several facets of play and game theory relevant to the game under consideration, it is important to first discuss meaningful play as discussed by Salen and Zimmerman as it relates to critical play as theorized by Flanagan. In short, where artistic methods, activism, and game design meet is in critical play (Flanagan 252). The goal of critical play is to generate meaningful play around a specific humanistic topic or set of values and/or towards specific prosocial ends. Both concepts are essential for understanding how play, structured through games, gives opportunity to shape not only social relations but also emotional and psychological experiences around a topic of concern. Herein lies the powerful potentiality of games to affect environmental thought.

Meaningful Play

To begin a discussion on play and its ability to produce meaning requires a return to Huizinga for two reasons, firstly, his example from the opening pages of Homo Ludens is immediately recognizable to

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Here “intent” is understood as the goals the designer sets with regards to critical games. Recall that to play critically “means to create or occupy play environments and activities that represent one or more questions about aspects of human life” (6). Intent represents the designer’s content target whether that be, for example, a social justice topic, a public health topic, or an environmental topic. Flanagan Critical Play p. 9.
most everyone and secondly, his work serves as the point of departure for Salen and Zimmerman’s concept of meaningful play (32). To quote Huizinga at length:

    We have only to watch young dogs to see that all the essentials of human play are present in their merry gambols. They invite one another to play by a certain ceremoniousness of attitude and gesture. They keep to the rule that you shall not bite, or not bite hard, your brother’s ear. They pretend to get terribly angry. And—what is most important—in all these doings they plainly experience tremendous fun and enjoyment. Such rompings of young dogs are only one of the simpler forms of animal play. There are other, much more highly developed forms: regular contests and beautiful performances before an admiring public.

    Here we have at once a very important point: even in its simplest forms on the animal level, play is more than a mere physiological phenomenon or a psychological reflex. It goes beyond the confines of purely physical or purely biological activity. It is a significant function—that is to say, there is some sense to it. In play there is something “at play” which transcends the immediate needs of life and imparts meaning to the action. All play means something (1).

    From this and other theorists Salen and Zimmerman develop a two-pronged definition for meaningful play that articulates play as being capable of both conveying and generating meaning. Meaningful play, they offer, has a discernable outcome from an action within a game (Salen and Zimmerman 34). That is, when I create a fist in rock, paper, scissors, it signifies something—it means something. And meaningful play is, in the more semiotic construction of meaning (as in, how meaning is made), the relationship between actions and outcomes (Salen and Zimmerman 34; emphasis mine). The first emphasizes how players interact with the game design, the second on how meanings are developed between players, and beyond. Consider again the two dogs play-fighting from Huizinga’s example. Hector Rodriguez draws attention to the intuitive understanding the two dogs share (par. 4). They recognize that their actions are only make-believe. This understanding is essential to the pleasure derived within play (Rodriguez par. 4). To discuss the “meaningfulness” of play, theorizes Rodriguez, is to consider the lived quality of play from the player’s experience. “Playing is thus closely akin to aesthetics, in that experience is irreducible: it constitutes an essential aspect of the phenomenon” (Rodriguez par. 4). Where there is play there is meaning. Games are just a structured form of play; they are contexts in which meaning emerges.

    Meaningful play is an emergent quality that is a result of interactions between players, players and the game system, and the context of game play (Salen and Zimmerman 33). This can be understood through an example. In a game, players make choices and each choice results in an outcome. Take chess. If a player moves a piece, the action changes the relationship of all the pieces on the board. The results of the action are discernible to the players—they are meaningful. But the singular, mathematically strategic move is just one layer of meaning that accumulates. Meaning also accrues between the two players, at the
level of social interactions. And as Salen and Zimmerman observe, it can occur on a larger scale “where championship Chess matches can be used as occasions for Cold War political propaganda, or in contemporary philosophical debates about the relative powers of the human mind and artificial intelligence” (36).

Importantly, one cannot directly design play. Play and meaning are emergent qualities dependent on particularities of how instances of play with a game, with specific persons, in distinct time, places, and cultures is experienced and interpreted. Rather, one can create the context where play, and thus meaning, can emerge (Salen and Zimmerman 41). This is where Salen and Zimmerman speak of games as a *space of possibility* (67). The space of possibility represents “future implied action” within the designed contexts and structures of a game (Salen and Zimmerman 67). Write Salen and Zimmerman, the space of possibility “is the space of all possible actions that might take place in a game, the space of all possible meanings which can emerge from a game design” (67). Ecoaesthetic games create spaces of possibility in order to, in the words of Salen and Zimmerman, “sculpt experiences of meaning” around politico-ecological problems. Through game design, emergent meanings within play can “help people understand the world in new ways” (Salen and Zimmerman 46).

Because Salen and Zimmerman were writing a text for students of game design, the bulk of their analysis on games and its potential to produce meaning focuses primarily on mechanisms of design for implementation at the game’s systems level (for example on building in opportunities for action and learning or on how to create discernable outcomes), and less on layers of meaning achieved between the game, player interaction, and broader cultural patterns. For this, a closer look to Flanagan’s concept of *critical play* is essential.

**Critical Play**

For over a century, artists have created games for several reasons—as a way to spur creativity, as a form of art criticism, as a type of research, and as a means to engage participants. Games are a particularly rich medium for artistic expression because they offer opportunity to work within the representational and experiential realms. “Games are, at base, representational activities” (Getsy x). They *can represent* by creating depictions of “characters, stories, settings, ideas, and behaviors” and they *are representations*, for example, *Go* is a representation of territorial conflict (Salen and Zimmerman 364). Artists creating games traffic in the world of representation—the game becomes the medium with which they work. “As with other media,” writes Flanagan,

*games carry beliefs within their representation systems and mechanics. Artists using games as a *medium of expression*, then, manipulate elements common to games—representation systems and styles, rules of progress, codes of conduct, context of reception, winning and losing paradigms,*
ways of interacting in a game—for they are the material properties of games, much like marble and chisel or pen and ink bring with them their own intended possibilities, limitations, and conventions (4).

Artists who use games as a medium of expression to create play scenarios around a topic or questions of human life are engaged in what Flanagan calls critical play. Flanagan states, “critical play is characterized by a careful examination of social, cultural, political, or even personal themes that function as alternates to popular place spaces” (6). The artist designing critical play attempts, adds Flanagan, to make “compelling, complex play environments using the intricacies of critical thinking to offer novel possibilities in game, and for a wide range of participants” (6). Such work exists as both critique and drivers of change (Flanagan 61). It is this potential to generate meaning and transform social relationships that connects activism, artistic methods, and game design (Flanagan 252).

To produce a game is to concern oneself with the “materiality of play as much as that of the ideas or the objects themselves” (Sharp 105). As John Sharp puts it, the game is, in part, a coauthored creation—the artist designs a play scenario and the spectator, player activates it (Sharp 105 – 106). The end result cannot be known in advance and the play experience has the potential to change from game play to game play. Thus, designing a game “is not about the creation of a fixed object. It is about creating a set of possibilities” (Zimmerman “Gaming Literacy” 28 – 29). Writes Sharp, “games, when approached with artistic sensibilities, explore an aesthetics located somewhere between the conceptual and the experiential” (106). So while one can consider the material and aesthetic choices in the production of a game, what various representations mean, and the game as an object, as material artifact, one also considers the ephemeral potentiality and quality of play generated within and from the game.

The space of possibility inherent to games is also home to potentialities for constructing and shaping a set of social relationships (Flanagan 9). In the end, games are representational, affective, and relational systems. The goal of critical play isn’t to produce experts on a given topic but rather to “[design] spaces where diverse minds feel comfortable enough to take part in the discovery of solutions” (251). Games become a relatively safe space for players to make metaphorically large decisions. Such a space allows for the negotiation of real-world concepts, ideas, and problems, and can facilitate “the exploration of innovative solutions for apparently intractable problems” (Flanagan 251).

Critical Making: Thinking-through-Practice in the Space of Possibility

Two additional questions remain unanswered: Why produce my own games for this dissertation rather than analyze or write about any number of other environmental humanities projects that seek to
To answer the question of “why produce my own games” is to consider what games designer and scholar Patrick Jagoda has termed critical making. Although Jagoda’s use of the term is in relation to creative output within the emerging field of the digital humanities, his projects at the University of Chicago’s Game Changer Chicago Design Lab (GCC) repeatedly demonstrate his investment in the iterative design process, including analog game forms and the interactive potentialities of game design specifically. Critical making states Jagoda, “refers to a diversity of practices, techniques, and collaborative projects that privilege experiences of making to acts of interpretation” (357).

Critical making offers a different sort of learning potential for the researcher than other forms of scholarly output. Designing games is a generative mode focused on creating and testing rhetorical strategies, affective experiences, and interactive contexts. Such a practice argues Burdick et al. in Digital Humanities, to whom Jagoda’s argument is indebted, is “an entirely different activity than forming an argument within existing structures that have been codified and naturalized” (12). I do not wish to suggest that producing analog games is exactly like producing a work in the digital humanities. However, there are commonalities. Like other design fields, game design shares a “propositional orientation” whereby, through an iterative design process it becomes possible and necessary to ask, “what if…” and “what happens when…” (Burdick et al. 12). Additionally, the practice of designing games is a form of “thinking-through-practice” (Burdick et al. 13). For Burdick et al., thinking-through-practice is “a production-based endeavor in which theoretical issues get tested in the design and implementations, and the implementation are loci of theoretical reflection and elaboration” (13). And like other arts-as-research projects that use arts practice as means of investigation, designing games “artfully poses questions regarding important social and cultural issues—by allowing them to be seen in previously unavailable light” (Barone and Eisner 123). Such work offers an “interrogative disposition” that can be highly useful to a researcher (Barone and Eisner 16).

There is a growing body of literature on the benefits of games for education, almost exclusively from the perspective of potential learning benefits gained by players themselves. This scholarship is most notably coming from the serious-games movement, which seeks to use games, and gaming technology in traditional educational spaces to improve learning objectives. But Paolo Pedercini argues that the next step in the advancement of the serious games’ field is not more advanced technology or more complex play scenarios but rather to get more people involved in the game design process itself. Games are, according to Pedercini, objects that are good to think with (CologneGameLab 3:31). Game design is a

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There are, of course, a great many types of digital and non-digital game formats. For the purposes of this study, given the popularity and ubiquity of digital games in entertainment, education, and academia, I think it the most important contrast possible to make.
form of critical making that enables one to pose a different set of questions and gain different insights than can be achieved in analyzing someone else’s project.

Of special relevance to the argument for game design as a form of critical making is the notion of what Zimmerman calls “systems-thinking.” A systems-based approach privileges process over answers and “stresses the importance of dynamic relationships, not fixed facts” (Zimmerman “Gaming Literacy” 25). A game designer strives to translate their thinking and knowledge into a specific artifact through an iterative design process. All the while, they are engaged in their own experiential learning as they consider a network of interconnected parts: content, audience/participants, representation, context of reception, medium of expression, reach, and abstract concepts such as competition, collaboration, and more. The process of making a game allows one to reflect upon the minute choices within and underpinnings of the game, on how players negotiate the boundaries of the game, and on the meaning that is made. For the game designer in the environmental humanities, designing critical play requires the analysis, synthesis, and translation of politico-ecological problems. The process is steered by humanistic goals and concerned with the interactive, representational, and affective space of the game. It requires close consideration of the interconnections of a game and its environment, and around every facet (design, rules, topic) that has the potential to affect players and through the critical making process, the game maker.

Materiality and Seduction or Why Analog Games

In Rules of Play, Salen and Zimmerman write that games require a double seduction—to entice players to enter the game and to get them to continue playing (333). They offer a set of strategies available to the designer that circle primarily around questions of design and imagery. But there is another way to think about the seduction of games, that is, “the call” that some objects make upon us as theorized through Jane Bennett’s notion of vibrant matter. Bennett offers a new materialist philosophy that recognizes the vitality of materiality and nonhuman agents. Dissolving the binary between subject/object, animate/inanimate, Bennett proposes that nonhuman assemblages have the capacity to “not only impede or block the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendencies of their own” (viii). Objects are not, Bennett argues, inanimate things. They are, in the words of anthropologist Kimberley Tallbear “agentic in our human world” (“Disrupting Life/Not Life” 21:30). In her interview “Artistry and Agency” with the New School, Bennett identifies

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20 Concepts of “new materialism” of which Bennett’s theories on vibrant matter belong are not of course actually “new.” Anthropologist Kimberly Tallbear recalls one to the fact that within many Indigenous cultural views, the divide between life and not life never existed. See Kimberley Tallbear’s keynote address “Disrupting Life/Not Life” esp. minutes 21:30 – 37:00. DOPE Conference, Lexington, KY.
hoarders and artists as being particularly sensitive to the sensuous calls of “thing power,” “a non-linguistic expressivity of things” which calls out and acts upon some humans. This concept of vibrant matter is useful in making the claim that analog games may emit a “sensuous enchantment” to which some humans are drawn, which differs from that of digital games.

Part of the sensuous enchantment of non-digital games may have to do with how we have encountered (and perceived) analog games over time and how that perception shapes our experience. In 2013, Geoff F. Kaufman and Mary Flanagan created an empirical study to measure how translating an analog public health game into a digital game affected player perception and game affectivity. Even though the digital version of the game was a near identical translation of the analog version, the digital version was perceived as being more difficult and therefore was less effective in shaping participant attitudes. Kaufman and Flanagan posit two important reasons for these cross-platform differences that may be used in support of decisions for analog game production over digital for ecoaesthetic games. Kaufman and Flanagan observe that digital and analog games activate different cognitive states and engender different play styles.

The first assumption suggests that digital and analog games may “mentally activate, or prime, different mindsets or emotional states” (5). Kaufman and Flanagan propose that participants enter the game play experience with pre-conceived notions of digital as being “complex” or “difficult” and analog as being “uncomplicated” and “straightforward” (5 – 6). Kaufman and Flanagan share that psychologists have shown that the traits or attributes that are incorporated in individuals’ schematic representations of categories (such as ‘analog’ versus ‘digital’) can be automatically – and subconsciously – activated upon exposure to a general category or a specific exemplar from that category and subsequently influence perceptions, judgments, and behaviors (6).

This example demonstrates that “divergent associative patterns” may cause individuals to automatically and unconsciously perceive a game as being more difficult or too complex merely because it is, to them, associated with the digital and technological.

Kaufman and Flanagan’s second posited reason for differences between analog and digital platforms is that analog and digital games “encourage typical play styles that differ in their pace of play as well as their levels of between-player collaboration, discussion, and reflection” (4). In the same way that

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21 Bennett, Jane. *Vibrant Matter*, p. xi. Bennett’s notion of sensuous enchantment is further developed in her book *The Enchantment of Modern Life*, in which she argues that enchantment is a perceptual openness to the unusual in everyday life. A sensibility attuned to moments of enchantment, is according to Bennett, a crucial step in proceeding ethically in a world of many actants, see Chapter 7: Ethical Energetics, esp. “The Ethics of Enchanted Materiality” pp. 156-158.

22 The study involved students in Grade 5 from within a randomly selected set of schools in the Boston public school system.
pre-conceived notions about digital or analog games can “activate different mindsets and emotional states”, individuals enter game play with expectations of the game play experience (6). For example, Kauffman and Flanagan suggest that players of digital games are more accustomed to digital play and technology in general. Additionally, they may expect digital games to be a solitary activity with lots of action, a fast pace of information delivery, and “a lower requirement for sustained attention or concentration” (6). Meanwhile, players of analog games “are likely more inclined to expect an experience shared with at least one other player (and, consequently, one involving more between-player conversation) that is more slowly and deliberately paced” (Kauffman and Flanagan 6).

I chose an analog over a digital format because as artist, I believe in “the call” of materials. When I witnessed gallery-goers delicately pick up and study the pieces to the first puzzle-map I made, watching them assess the weight in their hands and trace the contours of the block with their fingers, I knew that others respond to the “sensuous enchantment” of the object as well. I opted for analog because analog games draw from a different history and come with different connotations, baggage, and expectations than a digital game format. And finally, I chose to make analog ecoaesthetic games because I have formal training as an artist in sculpture, printmaking, bookmaking, and drawing. I prefer to work with materials such as paper, paint, and wood. For me, the process of designing, testing, and making games in a non-digital format is consistent with my skillset and interests.

**Observing Play: Iterative Design, Playtesting, and Game Play Events**

Games are table-based mini laboratories for the examination of choice, chance and social interaction. —Mary Flanagan, *Critical Play* 116.

I orchestrated two types of game play between fall 2015 and fall 2017: playtesting and game play events. *Playtesting* is the unofficial game play instances, with preliminary participants, held prior to game play in formal game play events. Initial playtesting was completed during the design phases of each game. Playtesting is an essential component of game design. The *traditional iterative game design* cycle is as follows: set a design goal, develop rules, develop a playable prototype, playtest, revise goal(s), and repeat (Flanagan 255). Playtesting allows one to get developed prototypes in front of players and receive granular feedback about game functionality, mechanics, difficulty, pacing, and more. Playtesting allows the maker to ask questions such as: does the game function? Do the pieces and imagery communicate what they should? Are objectives within the game clear? Is the rule set and instructions understandable? Do various tasks have the right amount of difficulty? And are action and outcomes discernable? Often the
most helpful aspects of playtesting are when players push the game to breaking point or play outside expected parameters, thus helping the designer understand how and where to tweak the game.

Additionally, after-playtesting interviews with preliminary players gives opportunity to see how the players perceive the values and topics embedded in the game. This is an integral aspect of the critical play iterative design method outlined by Flanagan and explored more extensively in this dissertation. In brief, the critical play iterative design method, in contrast to the traditional iterative design method, revolves around “a constant reflection on the humanistic themes, or values, during design” (Flanagan 255). I did not record the results of game playtesting in any formal way, but they are evidenced in the completed iteration that players experienced during sanctioned game play events.23

In addition to playtesting, various publics played the games during game play events held at the Iowa City Public Library, the Johnson County Senior’s Center, and The University of Iowa. Game play events were open to the public for individuals aged 5 – 99. The goal for observing game play events is different than the goal for playtesting. In game play events, I sought to understand something about the quality of the play, the affective potentiality of the game, and the tenor of the game play experience. Throughout the game play event, I took note of several aspects of player response including physiological registers of emotion, for example, a player’s audible sighs of frustration; participant engagement, that is, a player’s continued participation with the content within the game; and in-game conversation, that is the extent to which the players’ conversations revolved around the politico-ecological topic of the game. Additionally, I held post-gameplay interviews and discussions with willing participants. Though my project bears some resemblance to social science projects, I constructed the game play events as a form of participatory art that creates space for a range of affective responses. I observed those responses as an artist and environmental humanist interested ecoaesthetic ends.

Game playtesting and observing game play events gives access to play from two different perspectives. Playtesting resulted in valuable feedback on the functionality of a game and allowed me to witness excess play—play that is unanticipated and/or alternative to the original design. Such play occurred outside of my design parameters and highlighted blind spots and potentialities for future iterations of the game. Watching, taking notes, and talking with participants during game play events allowed me to understand the experiential quality of play within the game, including user experience and affectivity. It enabled me to formulate theories around how the game made players feel and gave me a window into understanding these games within the players’ larger cultural contexts and narratives of environmental crises. Attention to the affective experience of play within the games produced insights

23 All game play events and attendant qualitative analysis were approved through the University of Iowa’s Institutional Review Board (IRB), project ID 201605714 under the title “Playing within the Trouble: Critical Art Games and Environmental Thought” [available upon request].
into how the games comment upon, contribute to, or critique the environmental discourses already in circulation within players’ lives. Both playtesting and game play events are essential to exploring if and how ecoaesthetic games may serve as platforms for affecting environmental thought.

The Chapters

In the chapters that follow I understand play and game in the following ways:

[Play is] central to human and animal life; is generally a voluntary act; offers pleasure in its own right (and by its own rules); is mentally or physically challenging; and is separated from reality, either through a sanctioned play space or through an agreed upon fantasy or rule set (Flanagan 5).

A game is a “more-or-less constructed play scenario”—a situation “with guidelines and procedures” (Flanagan 6 – 7).

The remainder of this dissertation is composed of four chapters, three of which are dedicated to the exploration of three ecoaesthetic games I created—Tether, recollect, and Fringe-assay—and the politico-ecological predicament around which they center. The final chapter offers a brief summation of my observations of the design phase, playtesting, and game play events and maps future steps for my game design practice. Each of the games explored in chapters 2 – 4 are mods (modifications) of three popular games: Scrabble (Tether), Memory (recollect), and Snakes and Ladders (Fringe-assay). In the gaming world, mods can be officially distributed, such as a developer-delivered modification that fixes a bug in a digital game or they can be player-generated forms of resistance (Salen and Zimmerman 559). “Resistance” is understood through Salen and Zimmerman as “any act of play that creates friction within a more rigid structure” (559). Mods create a productive friction between the existing games and their altered forms. In this dissertation, the mods of familiar games connect the historical game structures and their making to our present moment of politico-ecological crises, transforming the games, the ways they produce meaning and experience, and their potential to affect environmental thought.

Modification alters the form and content of the game by changing the game’s representational and interactive structures (Salen and Zimmerman 563). In doing so, a mod can alter not only game play but also the understanding of the relationship between the original and the mod, and its role in culture writ large. Mods that reinvent games, write Salen and Zimmerman, “aggressively engag[e] symbolic spaces beyond their borders” by “calling attention to the typically invisible magic circle” (564). They continue, “when a game enacts cultural resistance, the seamless transition between the space inside and outside the game is interrupted; players are made aware of aspects of the game which usually pass unnoticed” (Salen and Zimmerman 564). This interruption is not merely a critique of the game itself; it is an action in conversation with the larger cultural forces and beliefs that produced the game in the first place and in
which it is played in the present. In the case of the games in this study, the mods of Scrabble, Memory, and Snakes and Ladders highlight how the games reflect, normalize, and reinforce some cultural ideals over others and how such ideals potentially inhibit our ability to think and act in a more meaningful way around politico-ecological crisis, who is affected, and by what means.

The decision to reinvent three games well known to most Westerners was a deliberate maneuver to tap into a base familiarity inherent to the games. This base familiarity is part of the seduction of my game mods—an enticement to enter into play (Salen and Zimmerman 333). The threshold for entry is lower on games that one already knows than with games one has never experienced. Consider a player who has played Scrabble. When a player begins to play my mod of Scrabble, called Tether (which uses a Scrabble board and pieces), they already have some understanding of how the letter tiles and the board interact, for example, or how the game generally proceeds. This base familiarity offers a great opportunity for generating a level of comfort for the player and striking contrasts between the game and its modification. Modding well-known games also reduces the need for additional, specific, art or gaming experience in order to “get” the works. In each chapter that follows, I explore the historical instance of a particular game, my modification of it, and several theories of play, affect, and games relevant to the mod.

In chapter 2, I explore the game Scrabble and my mod Tether. Tether is a game-kit that adopts and adapts Scrabble. In it, players attempt word construction as multispecies configurations. Word construction as it would occur in Scrabble is constrained by species losses in Tether. By considering language as a human habitat and overlaying the word-world of Scrabble with chance operation that represent species diminishments, I am able to bring together both material (habitats, species, cultures) and immaterial (memories, languages, ways of being) loss in the age of climate change. I explore how the incorporation of constraint produces repeating emotion-eliciting opportunities that generate affect within the player. I examine how the insertion of a meaningful choice alters the victory conditions of the game and forces both a reflection on and a calculus between explicit in-game desires and implicit outside-of-game valuations.

I turn to human memory, commemoration practices, and species extinction in chapter 3. recollect is a mod of the game known variously as Memory, Concentration, or Pairs. In recollect, I purposefully withhold objective information in order to generate opportunities for negotiation and collaboration that shift the quality of conflict inherent to Memory. I look at how we humans think about and understand extinction, both historically and in this moment of mass extinction. I consider “the call” that nonhuman species make upon us. Too, I investigate the role of strategy, pleasure, and mystery for retaining player attention despite the potentially unpleasant content of the game.

In chapter 4, I examine the way in which the Hindu game Snakes and Ladders was made legible to Victorian era players when it was brought to England. I consider the role of the inhabitable protagonist
in my mod *Fringe-assay* for the potential to generate affect and I incorporate research on hazards and vulnerability within the field of Geography to explore differential effects of climate change. I show that by modifying the game board into four quadrants and by substituting a spinner with differential ratios for a die, I am able to achieve a game capable of communicating some of the nuances inherent to shifts in human vulnerability in the age of climate change.

To conclude, in chapter 5 I share some of my “thinking-through-practice” within ecoaesthetic game design by reflecting on what I learned from each of the three stages of the process: the iterative design process, playtesting, and the game-play events that took place in 2015-2017. I appraise each mod, share several key decisions, explore how decisions manifested and changed through the process, and identify potentially rich considerations for future iterations.
Notes

i For more on what’s being called a “slow industrial genocide” see Indigenous Environmental Network. “Tar Sands.”

ii See Kristen Iversen’s Full Body Burden, 2013. Print.

iii This notion of climate change as a hyperobject is taken up more extensively in Chapter 4 Snakes and Ladders and Fringe-assay: Designing Consequential Differences beginning on page 121.

iv See for example Leonie Huddy’s discussion on the transition from personal experience to the collective and the ways group identity become part of one’s self-concept, esp. pp. 738 -746.

v Doucelf, Michael. “Why So Many Children have been Killed in Syria.”

vi For more on the association between play, primitive, and childlike in the arts, see Katarzyna Zimna, Time to Play, esp. pp 31-36.

vii Flanagan, Mary. Critical Play, pp. 88-94.

viii Bishop, Claire. Ed. Participation, pp. 11.

ix For a more in-depth consideration of Fluxus group, see Ken Friedman, Ed. The Fluxus Reader, 1998.

x For more on the conceptual art movement, see Alberro and Blake, Conceptual Art: A Critical Anthology, 1999.


xii Kanouse is working off of Phaedra Pezzullo’s use of Henry Giroux’s term “public time.” Toxic tours are creative, cultural performances, and a noncommercial tactic of resistance for raising awareness through affect, the conceptualization of pain, and embodied experience to the uneven distribution of pollution and harm. They usually demand time, a willingness to learn, and collective experience. For more on Pezzullo’s use of “public time” see Toxic Tours, esp. p. 182.

xiii For works on the limitations of the magic circle, to which Zimmerman’s article “Jerked Around by the Magic Circle” is in response, see Mia Consalvo’s “There is No Magic Circle.”; Jesper Juul’s “The Magic Circle and the Puzzle Piece.”; and for an historical review of the use of the metaphor, see Jaakko Stenros’ “In Defense of the Magic Circle: the Social, Mental, and Cultural Boundaries of Play.”

xiv For a more in-depth summary of each of these categories as they pertain to games, as well as a discussion on the terminological issues related to the translation from French to English, see Salen and Zimmerman, Rules of Play, 307-308.

xv Settlers of Catan is now known as Catan was originally created by the German media publishing house KOSMOS. It is now licensed to Mayfair.

xvi For more on the exciting projects at the Game Changer Chicago Lab, which Patrick Jagoda co-founded with Dr. Melissa Gilliam, go to Jagoda’s website: www.patrickjagoda.com/projects/game-changer-chicago-design-lab.

xvii For more on learning and serious games, see Johannas S. Brueur and Gary Bente “Why so serious?” 2010; David Michael and Sande Chen Serious Games, 2005; and for a closer look at game-based learning, see Tarja Susi et al., “Serious Games: An Overview” 2007.
xviii See Jane Bennett, “Artistry and Agency in a World of Vibrant Matter.”
www.youtube.com/watch?v=q607Ni23QjA.

xix For a discussion on the need for a baseline literacy in artists’ games, see John Sharp, *Works of Game*, 107-110.
CHAPTER 2: SCRABBLE AND TETHER—MULTISPECIES CONFIGURATIONS IN A WORD WORLD

This chapter explores affect and meaning making within the word world of Scrabble and my modification of it called Tether. Tether brings together the explicitly human dilemma of language extinction together with the life dilemma of species extinction, manifesting both in the design and playing of a game based on language. By considering these two types of growing absences together, including how they differ, I bring questions of immaterial and material loss to bear on game design. I begin by looking at the cultural centrality of language and mechanisms of language endangerment. I then turn to species endangerment and species extinction. By thinking about language as human habitat and exploring the ethos of species, I make an argument about what can and cannot be captured as we rush to archive audio of the last speakers of a language or to capture imagery of the last of a species. All of this is crucial to understanding what exactly is being lost in this moment of accelerating extinctions and for attempting to make the immaterialities of extinction (loss of culture, knowledge systems, identity, and ways of being) tangible to players.

Then, turning to language play in humans, I look at how language construction under forms of constraint can contribute to a certain kind of ludic language fluency. This turn to constraint and fluency is important to my argument that crafting constraint within the game aids my efforts to get players to think through multi-species entanglements and (bio)cultural losses. The introduced constraints frustrate individual player’s language expertise and generate player identities as multi-species configurations that create rich moments for critical play. I evaluate the way that Tether introduces emotion eliciting opportunities and a meaningful choice, both of which prove essential to affecting the way players think about if and how human language and nonhuman species are enabled to flourish. And finally, I analyze key changes to the core mechanics between Scrabble and Tether to demonstrate that Tether produces a productive friction between in-game evaluations and cultural expectations from outside the game.

Language as Human Habitat

Scrabble is a game in which humans can play within the rules of language. The affective potential of modding a language game would seem to hold especially vibrant possibilities given the cultural centrality of language. By considering language as a human habitat, the sole domain of humans, I explore the potentiality of a game mod that upsets the dominion of language through unexpected constraints. But first, what does it mean to talk of language as human habitat?
When a human child reaches the age of toddlerhood, if they are developing normally, they will be able to speak many words, perhaps even produce sentences. Their words and sentences will follow, with little exception, the grammar rules of the language of their caregivers. They will learn upwards of a dozen words a day at this age and understand, without being instructed, how to use the past tense.\(^{24}\) The mechanisms for and reasons why language acquisition took place in *Homo sapiens sapiens* are debated. Two prevailing camps exist: the genetic determinist view and the functional/emotional view. In the genetic determinist view, put forth by linguist Noam Chomsky, it is believed that a genetic mutation occurred sometime in the last 100,000 to 40,000 years, which allowed humans a particular species advantage of language. Like our ability to walk upright on two legs, language is understood within this theory to be innate and learned (Dovey). Such a theory places most of its emphasis on natural selection and genetic mutations for the result of language in the human species. Stanley Greenspan and Stuart Shanker, in contrast, advance a functional/emotional theory. The functional/emotional theory is an extension of a continuative, interactive model favored by behavioral scientists, which argues that language coevolved with anatomical and human cognitive abilities. They suggest that early humans’ ability to express and respond to emotion lead to the development of language (Greenspan and Shanker 193 – 194). This view places emphasis on the relational aspects of the human species, on language within cultural systems. By their estimation, language is “a dynamic, social process and not an endogenous, maturational phenomenon” (Greenspan and Shanker 195).

Whatever the final decision on how humans come to language may be, it remains a strictly human ability. It is a tool humans use for communication. It is intrinsic to human identity and meaning. It is the way in which the knowledge of humans is passed on to the next generation(s). While apes can be taught sign language, and other species such as dolphins and whales are observed communicating with one another, no other species can do quite what we can do with the abstract signs and symbols that constitute language. Historically, this ability to wield language has been used to uphold a binary between humans and other species. It bolsters a belief in human superiority that sets us apart from, and above, all other nonhumans on the planet.

Language is, unlike the rest of the material world, a uniquely human-built environment in which we do a great deal of our living. Language is here understood as the suite of communicative modalities that enable us to interact with one another. This includes forms of writing and speech as well as the facial expressions, bodily movements, and gestures used when speaking. This broad categorization of language accounts for languages that take written form such as English, Spanish, Arabic, and Chinese, and those

\(^{24}\) There are some exceptions. For example, children spend time learning how to apply the past tense rule to irregular verbs. One may hear a young child saying “I holded the rabbit,” rather than “I held the rabbit” (Gotts).
that remain strictly oral, such as many Indigenous languages. Language is our inherited “cognitive
toolkit,” containing “a way of perceiving, categorizing, and making meaning in the world” (Boroditsky 65). Taken together, language in all its modalities makes it possible for humans to live almost anywhere
in the world, to observe and make sense of their environment, to work together, and to develop and
transmit their culture. Language shapes everything one knows, from worldview to spatial and temporal
knowledge, from kinship systems and rituals to plant and animal names.

Languages in Peril

An immense edifice of human knowledge,
painstakingly assembled over millennia by countless minds,
is eroding, vanishing into oblivion.
— K. David Harrison, (When Languages Die 3).

Despite the cultural centrality of language, a great number of languages are disappearing from the
world. Since the 1990s, the plight of minority languages, and language death more specifically, has
gained more attention. Unfortunately, many linguists fear that this attention comes too late, as it is not
nearly enough to slow the rapid pace of language extinctions.” Language extinction, also referred to as
language death, is a phenomenon that has always occurred; however, the rate at which languages are
disappearing from the world currently is unprecedented in human history. The total number of languages
in the world is debated owing primarily to differences in how distinct languages are determined and
quantified (Anderson pars. 5 – 6). Not knowing exactly how many languages exist in the world makes it
difficult to ascertain the rate and quantity of language death historically and in the present moment.
Despite this ambiguity, most linguists are willing to accept that, as an estimate, the total number of
languages in the world is close to 6,909, as published in Ethnologue by the Summer Institute on
Languages International (Anderson pars. 5 – 6).

While the total number of languages in the world remains an argued upon guestimate, the general
trend of language loss is not disputed. “Whatever the world’s linguistic diversity at the present,” states
Stephen R. Anderson in “How Many Languages are there in the World,” “it is steadily declining, as local
forms of speech increasingly become moribund before the advance of the major languages of world
civilization” (2). Languages become moribund when the total number of speakers is in decline, when
those who speak the language are elderly, and when the younger generations are not learning the language
(Crystal Language Death 11). Importantly, a younger generation may choose not to learn the language or
the opportunity to do so may be withheld. Nearly half of the languages in world today are expected to
perish within the next century (Anderson par. 2). Proclaims linguist David Crystal, “the world is facing a
linguistics crises of unprecedented proportions” (Language Death viii). By some estimates Crystal
argues, only 600 of the nearly 7,000 languages in the world today are “safe” from the forces that cause language extinction (Language Death viii).

Though a language may be recorded in written, audio, or video form, and a great many have not, a language is only considered living when there are speakers who share it. A living language is “an accretion of many centuries of human thinking about time, seasons, sea creatures, reindeer, flowers, mathematics, landscapes, myths, music, infinity, cyclicity, the unknown and the everyday” (K. David Harrison 4-5). Language is both something we wield and something that shapes our every thought and being. Language is, as linguist Michael Krauss emphasizes, “a supreme achievement of uniquely human collective genius, as divine and endless a mystery as a living organism” (qtd in Crystal Language Death 36). But once there is no one to speak with, “language transmission breaks down,” resulting in “a serious loss of inherited knowledge” (Crystal Language Death 34).

Language death affects individuals, cultures, and all of humanity. For many individual, last speakers of minority languages, being the last speaker of a language can leave one feeling isolated and invisible. The gravity of this loss, observes linguist K. David Harrison, is expressed with profound sadness and dismay (4-5). When a language dies, the connection to that culture’s history, its ability to express its identity, and continue its ways of being in the world is lost. This is not just a loss for that culture but for humanity. Anthropologist Genese Marie Sodikoff laments “the problem with the eternity of extinction is that when species and languages die, so do the repertoire of genetic and cultural information that has long enabled life to overcome the challenges of survival” (13). The loss also forecloses on the future because it terminates “possible trajectories of evolution” (Sodikoff 13). In truth, writes Harrison, scientists still do not know exactly what is being lost when a language dies because there is still much we do not know about humans, the brain, cultural lineages, and more (7).

Producing Peril: Mixtures of Aggressive Circumstances

The mechanisms that produce last speakers and endangered languages are complex and varied. “Languages do not literally ‘die’ or go ‘extinct,’” states Harrison, “rather, they are crowded out by bigger languages” (5). This “crowding out” puts pressure on minority languages through two primary ways: factors which threaten a people’s physical existence and factors which change a people’s culture.

The physical wellbeing of a language’s speakers can be threatened through a mixture of catastrophic natural and human causes. In the case of natural causes, hurricanes, tsunamis, floods, earthquakes, and volcanic eruptions can greatly reduce the number of language users. In his book Language Death, David Crystal shares an example of an earthquake that occurred on July 17, 1998, off the coast of E. Saundaun Province in Papua New Guinea. The earthquake killed over 2,000 people and displaced another 10,000 from four different villages, each with its own distinct language. The
devastation of the earthquake directly affects the viability of the separate languages in the area. In the village of Arup, 30 percent of its inhabitants were killed, and the village was destroyed. The remaining survivors were scattered to care centers and other villages. Under these circumstances, notes Crystal, “there must now be a real question-mark over whether these communities (and thus their languages) will survive the trauma of displacement” (Language Death 71).

Natural causes are sometimes compounded by social conditions. Take for example, the Irish potato famine of 1845-1851. Crystal discusses how natural and human causes combined to the detriment of the Irish language. The Irish potato famine was caused by the potato blight (natural) and rural poverty (economic). Over 1 million people died and even more left in a large-scale population emigration. These effects hastened the decline of the Irish language (Crystal Language Death 72). Additional human causes that threaten minority language speakers’ physical wellbeing are civil strife, imported diseases, economic exploitation, political instability, legacies of colonialism, and genocide. These “mixture[s] of aggressive circumstances,” as Crystal calls them, combine and contribute to a “significant mortality of people, and short-term community disintegration,” that endangers ever more languages (Language Death 73 – 76).

Intertwined with natural and human caused “mixtures of aggressive circumstances” are cultural changes, including political or social discrimination of a people and their language. The “crowding out” mentioned by Harrison, is predated by a “swamping,” according to Crystal, where cultural assimilation, sometimes voluntary, sometimes violent, allows one culture to exercise dominance over another (Language Death 77). Looking at the pressure exerted by the English language illustrates the point. Crystal notes that the English language combines with other factors pushing more and more languages into endangered status:

The world has never had so many people in it, globalization processes have never been so marked; communication and transport technologies have never been so omnipresent; there has never been so much language contact; and no language has ever exercised so much international influence as English (Language Death 70).

Historically, in Australia and North America, English was “an emblem of dominance” and quickly became the standard or official language (Crystal Language Death 77). The coercive cultural assimilation programs targeting Native Americans in the United States during the nineteenth century and early

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25 While Crystal uses this example in his book, it should be noted that Irish peasants, restricted to expensive, small parcels of land, resorted to growing the potato because of its high yield and storage ability. So, while Phytophthora infestans, or late potato blight, is indeed natural, the circumstances for its unprecedented success (as there were earlier, less devastating instances) in Ireland, in the mid-1800s are thanks in part to a dependence on a limited variety of potato varieties. For more see mycologist Tom Volk, “Phytophthora infestans: Fungus of the Month.”
The twentieth century illustrates this point. Children were removed from their families and cultures and placed into boarding schools under strict “English Only” rules. Students were taught exclusively in English and were punished for speaking their ancestral language (J. Crawford 27). This of course was a major part of the “mixture of aggressive circumstances” exerting tremendous force towards the endangerment of some Native American languages.

The pressure for people to speak a dominant language continues to be immense. People adopt a language that is not their own for a variety of reasons. Possessing the ability to speak English may elevate one’s status, may mark a person as ‘educated’, and may allow a person access to “a global citizenry” that the English language seems to connote (Mydans par. 6). These perceptions of English, and the desire to adopt the English language are shaped by cultural attitudes of value. Minority languages are perceived as belonging to old or backwards cultures, and thus less valuable. Such cultural attitudes make people feel that “their first language is less relevant,” which unfortunately is, writes Crystal, “often accompanied by a feeling of shame about using the old language, on the part of the parents as well as their children” (Language Death 79). In all cases, languages decline when positive attitudes toward their value and continued use are missing (Crystal Language Death 81).

Accumulating Absence: (Bio)Cultures in Peril

In the introduction to her edited volume The Anthropology of Extinction: Essays on Culture and Species Death, Genese Marie Sodikoff opens with a discussion on grammar, on the future anterior, a grammatical tense used to describe “an action that will be finished in the future” (1). That this grammatical tense should fall out of regular use is ironic to Sodikoff, for this moment, she asserts, calls for such temporal specificity (1). She observes that “at some point in the near future […] 16,928 still extant species will have vanished” and “of the 6,700 extant languages—already reduced by two-thirds since pre-colonial times—experts estimate that three thousand will have gone silent within thirty years” (1). The future anterior is an exacting tense that is capable of gathering together two different kinds of accumulating absence—language loss and species extinction. This moment of loss requires attention. “Extinction is a process and moment of loss,” writes Sodikoff, “that compels thought about the moral relationships among humans, nonhuman species, and habitats, as well as among social groups with varying degrees of power and autonomy” (10). By considering language and species extinction together, one can begin to witness patterns of valuation and types of entanglements that render some languages and species in peril.

Just as the total number of languages in the world, and therefore the exact rate of extinction of various endangered languages, is at best an educated guess, the total number of species and their rate of extinction are debated. In her recent exploration on the cultural meanings of endangered species, Ursula
Heise explores the on-going debates around how to define categories such as endangered species and
types of ecological change. Heise determines that the fact for how humans measure and define categories
such as species, background rates, and biological diversity, coupled with the fact that many species (and
their relative statuses) remain unknown to us, means that it is nearly impossible to come to an agreed
upon number for extinction rates (21). But, like language extinctions, one thing is for certain—the
extinction rates are high. While species extinction is a normal aspect of the evolutionary process, this
particular extinction event has extinction rates in orders of magnitude higher than baseline levels. The
estimates for extinction rates vary from 50 times to 1,000 times background levels. Many biologists lean
toward the upper limit of 1,000 times background level because, they reason, many species may have
already and will likely go extinct before description (Pimm et al. 988). “What is not in dispute,”
concludes Heise, “is the general trend toward higher extinction rates; neither are its causes, mainly habitat
destruction, invasive species, pollution, human population growth and overharvesting (the list is
sometimes abbreviated HIPPO)” (22). To use Crystal’s phrasing, a “mixture of aggressive circumstances”
are producing species in peril. Added to this is climate change, which can exacerbate and compound
stressors on ecosystems with negative effects for some threatened and endangered species (Hannah 4).
Unlike the five previous mass extinction events, this sixth extinction is human-caused (Sodikoff 2).

Thinking species and language extinction together is both important and complicated for they are
not the same but are connected through analogy, interdependency, and/or reciprocal effect (Sodikoff 9).
Ecological metaphors are used in abundance with regards to language. Languages can be “threatened,”
“extinct,” or “invasive.” Languages, like species, are considered evolutionary developments; they have
lineages, mutations, and variations and change through a sort of natural selection. Dominant forces, such
as colonialism, have the power to shape them both. As Sodikoff argues, “the world economic system that
has led to the overexploitation of species also contributes to the marginalization of subsistence-based
societies” many of which have unique languages (8). In biocultural hotspots, where some of the greatest
number of endangered languages and species now reside, there may be overlap when it comes to
conservation possibilities (Tersey 597). It is hypothesized that conservation efforts sensitive to local
cultures and threatened species can be developed to sustain both biological and cultural diversity (Tersey
596).

But there are differences between biotic and social extinctions. One of these has to do with scale.
The estimated animal and plant species who have gone extinct since the 1600s make up less than 7
percent of the total number of identified plant and animal species, whereas an estimated 40 percent of
languages are endangered (Harrison 7). Also, while language extinction is permanent, in many cases (but
not all) the humans belonging to an extinct language continue to persist/exist, whereas, for species, extinction is an absolute finality.26

Despite these differences, Sodikoff wonders if, in this moment of accumulating absences, “we might strive to dissolve the distinctions between the cultural and the nonhuman, and between material and intangible loss, such as the memories enshrined in language” (4). By considering commonalities and divergences between cultural (language) and genetic (species) loss, it becomes possible to ask questions about our unquestioned assumptions and hierarchies of valuation that create or contribute to language and species loss. Being forced to “ponder the meaning of life in its material and immaterial forms” can illuminate how we think and feel about extinction, expose problematic rationalizations for the continued diminishment of both species and minority languages, and force consideration on what can or should be done about these losses (Sodikoff 4).

The Rush to Record the Last __________________.

Pondering the meaning of biotic and cultural extinctions requires knowing what’s in danger of being lost. “Linguists and scientists are undertaking discovery and recovery missions, recording for posterity the last words of Indigenous language speakers and the characteristics of rare and ‘living dead’ species, ones destined to die out as a result of habitat degradation” (Sodikoff 2, quoting Harrison 2007; Tilman et. al. 1994). Such efforts begin to give “a panoramic view of mass extinction” (Heise 55). With regards to nonhuman species, online databases such as ARKive.org, the Encyclopedia of Life (EoL), and All Species Foundation, attempt, says Heise, “to inventory the totality of biological life on Earth, at least in terms of the 1.8 million species that have been scientifically named and classified” (62). Some of these databases, such as the International Union for the Conservation of Nature’s (IUNC) Red List of Threatened Species, delineate degrees of endangerment and help steer policy decisions regarding endangered species. Similar efforts are taking place within the world of language endangerment. “The voices of the last speakers of many languages are now fading away, never to be heard again,” bemoans Harrison. “Linguists, like me,” he continues, “too few in number, rush to record these tongues, while a few native communities struggle to revive them” (vii). Digital Talking Dictionaries, online language libraries, and endangered languages’ Youtube channels are all representative projects and products from the rush to archive moribund languages.xxii

26 This remains true at the time of this writing despite recent advancements in species revival or de-extinction techniques such as cloning, see for example the story of the extinct Pyrenean ibex in Carl Zimmer’s “Bringing Them Back to Life.”
Archive vs. Repertoire: Embodiment and Ethos

In this rush to record the last species or the last utterances of a language, it is necessary to contemplate the value and potential shortcomings of the archive. In her book *The Archive and the Repertoire*, Diana Taylor explores performance and embodied action as modes of knowledge transfer. While Taylor’s specific interest is in the political power of performance, especially in forms of dance and performance events where political resistance is enacted through bodily action, her exploration on differences between knowledge production within the archive and that of the repertoire informs my discussion on the importance of the embodied quality of human language and its role for thinking through language extinction.

For Taylor, the archive is filled with “supposedly enduring materials (i.e., texts, documents, buildings, bones),” whereas the repertoire is composed of “embodied practice/knowledge (i.e., spoken language, dance, sports, ritual)” (19). A degree of legitimization and power has historically been given to the archive because of its perceived enduring quality (Taylor 18-19). Embodied, nonverbal practices, “such as cooking, hunting, rituals, and dance”—all of which serve “to preserve a sense of communal identity and memory” were devalued as modes of knowledge transmission because they were ephemeral acts, inferior to the written word (Taylor 16). The supposed ephemerality of performance, conceptualized as something that disappears and which cannot be adequately captured within ‘legitimate,’ that is archival, forms, contributes to the misconception that the archive alone can provide an historical consciousness (Taylor 22). According to Taylor, this belief contributes to narratives of disappearance and is used to maintain practices of dispossession and dominance. Writes Taylor, “Early colonial writings were all about erasure either claiming that ancient practices had disappeared or trying to accomplish the disappearance they invoked” (41).

While text-based works have historically been awarded more legitimacy than performative works, Taylor argues that there is much to be gained in exploring the ways that “embodied and performed acts generate, record, and transmit knowledge” (21). The repertoire takes into account communication, presence, and exchange within performance (a “ritualized, formalized, or reiterative behavior”) and takes seriously the way “forms of embodied acts…reconstitute themselves, transmitting communal memories, histories, and values from one group/generation to the next” (Taylor 20 – 21). Memories, traditions, and claims to history are bound up in languages and the embodied performances they support and are made up from.
Taylor, quoting theater historian Joseph Roach, points out the ways performance participates in the continuance and transference of knowledge:

Performance genealogies draw on the idea of expressive movements as mnemonic reserves, including patterned movements made and remembered by bodies, residual movements retained implicitly in images or words (or in the silences between them), and imaginary movements dreamed in minds not prior to language but constitutive of it (Joseph Roach, qtd in Taylor 5).

There is, Taylor asserts, “an advantage to thinking about a repertoire performed through dance, theatre, song, ritual, witnessing, healing practices, memory paths, and the many other forms of repeatable behaviors as something that cannot be housed or contained in the archive” (Taylor 36-37). Looking at the performative nature of language as a communicative suite demands the recognition of the live, embodied experience of communication and knowledge transference.

By considering the embodied performance of language and its role in any matter of rituals, ceremonies, daily activities, and more, it becomes possible to understood language death as a loss, in part, of the accumulated and potential future embodied interactions of a people (and nonhumans and their environments), which are co-constituent in and sustained by the multiple communicative modalities of language. Foregrounding embodied performance, or reiterated actions, highlights deficiencies of the archival practice. The video of a performance is not the performance. It belongs to the archive. From a different disciplinary perspective, K. David Harrison and Karim Sariahmed further this point in their discussion on the need for collaboration between ethnobiologist and linguists.

“Most ethnobiological knowledge,” Harrison states, “is orally transmitted, not written down, and is stored only in human memory. The act of transmission involves speech (typically between native speakers and in an Indigenous language), as well as demonstration (e.g. of hunting, gathering, processing, and other technologies)” (Harrison and Sariahmed 219) [emphasis mine]. “Demonstration” is a performative embodied action. It is an exchange, coupled with language, where memory is held and through which knowledge is transferred. It belongs to the repertoire. Thus, what is lost when a language goes extinct is not just the words for plants or animals but also a suite of specific embodied ways of learning, storing, and transmitting knowledge which are expressed through a combination of words and the lived experience of communication, action, and exchange.

Deborah Bird Rose and Thom van Dooren offer another avenue into this discussion on the archive and the repertoire in their consideration of nonhuman species’ ethos. An ethos argues Rose and van Dooren, “is an embodied way of life: a way of reproducing, of forming social groups, of advertising

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27 Ethnobiology is a multidisciplinary field that explores relationships between people, biota, and environment in order to better understand the dynamic interactions between human and natural systems. For more on this, see “About Ethnobiology.” Society of Ethnobiology.
to pollinators, of swimming upstream to spawn, for example. It is all of this and more, everything that
together constitutes a distinctive ‘way of being’” (“Encountering” 122). Ethos, normally reserved for the
domain of the human, is here used to bring attention to the ways groups or “kinds” become distinct (Rose
and van Dooren “Encountering” 121). Paying attention to distinctiveness allows us to identify and
respond to differences, to understand diverse inheritances, and to recognize ethos—ways of being—as
that which “cannot be formed and sustained in isolation” but rather “are emergent, performative co-
becomings” (Rose and van Dooren “Encountering” 122).

Ethos and embodiment, though not explicitly stated as such, are what K. David Harrison is
getting at when he brings extinct dodo birds and extinct languages together in When Languages Die:

An extinct dodo bird can be stuffed by taxidermists and displayed in a museum after all its kind
are dead and gone. But a stuffed dodo is no substitute for a thriving dodo population […] Like
dodo birds in museums, languages may be preserved in dictionaries and books after they are no
longer spoken. But a grammar book or dictionary is a dim reflection of the richness of a spoken
tongue in its native social setting (7).

This is not to say that archiving activities should not take place—they are absolutely imperative to our
understanding of the problem of extinction, to efforts towards holding endangered languages and species
in the world, and to various species and language recovery attempts. Rather, the exploration of aspects of
human knowledge that cannot be captured within the archive gestures toward a depth to the losses
occurring now. If one can understand how a stuffed dodo bird is not the same as the living, interacting
colony of birds, or comprehend how a dictionary is something much less than a living language, (and if
one can question how and to what degree they are different), one might also appreciate the ethical stakes
such losses truly represent and apprehend the subsequent claims that are made on us in the midst of so
much loss.

Ludic Language: Play and Fluency

While language enables the serious work of cultural transference and identity, cooperation, and
survival, it is also one of the “great archetypal activities of human society” that Dutch play theorist Johan
Huizinga identified as being “permeated with play from the start” (Homo Ludens 4). There is, he
observes, a malleability and pleasure to wielding language. To quote him at length:

Take language, for instance—that first and supreme instrument which man shapes in order to
communicate, to teach, to command. Language allows him to distinguish, to establish, to state
things; in short, to name them and by naming them to raise them into the domain of the spirit. In
the making of speech and language the spirit is continually ‘sparking’ between matter and mind,
as it were, playing with this wondrous nominative faculty (Huizinga 4).
The human use of language, Huizinga argues, allows for “a second, poetic world alongside the world of nature,” developed through a quintessential form of play (4). Huizinga draws attention to the inherent playfulness of language in general; however, there are specific language-based activities that are more explicitly ludic.

As an example of language and play, Huizinga considers poetry. Poetry conforms to Huizinga’s broader characterizations of play: it takes place in a limited time and space, it is rule bound and its rules are freely accepted, it is “outside the sphere of necessity or material utility,” and it produces a “play-mood […] one of rapture and enthusiasm” (Huizinga 132). According to Huizinga, poetry is different than regular, utilitarian language. It is a type of “art-language” that “employs special terms, images, and figures” and whose goal is to bridge “the eternal gulf between being and idea” through “the rainbow of imagination” (Huizinga 133). Play, in Huizinga’s estimation of poetry, occurs for both author and reader. For the writer, “the rhythmical or symmetrical arrangement of language, the hitting of the mark by rhyme or assonance, the deliberate disguising of the sense, the artificial and artful construction of phrases—all might be so many utterances of the play spirit” (Huizinga 132). For the reader, the play-element is at work in a willingness to be enchanted; to enter the imaginative space the writer creates (Huizinga 133 – 134).

Language as an expression of play continues to be an object of study. Linguistics scholar David Crystal offers as the opening line to his book *Language Play*: “Everyone plays with language or responds to language play” (1). In *Language Play*, Crystal expands the sphere of ludic language play to include riddles, puns, crosswords, anagrams, lipograms and much more. In language play, language becomes more than a means to communicate or a mode of knowledge transference. Though language play continues to do that too. The activity of language play is in excess to utilitarian needs. “We take some linguistic feature—such as a word, a phrase, a sentence, a part of a word, a group of sounds, a series of letters—and make it do things is does not normally do. We are, in effect,” offers Crystal, “bending and breaking the rules of language” (1). In all cultures, in all languages, humans manipulate language as a source of enjoyment, for the pleasure of it.

Language play takes place at the smallest units of words, phrases, sounds, and letters, as Crystal notes, but it can also be found at the superstructure of language rules. In the example of poetry from Huizinga, play takes place within the structuring rules of an iambic pentameter that govern the sonnet. The poet chooses and fits words into the rigid framework of the total number of stressed and unstressed syllables. The pleasure of such play is the bending and molding of language to adhere to an adopted constraint. For the (mainly) French writers and mathematicians who formed the group *OuLiPo* (an acronym for *(Ou)vrior de (Li)tterature (Po)tentielle* or Workshop for Potential Literature), in the 1960s, creating and manipulating new rules for composing and using language opened the door to creative dexterity and ludic language fluency (Symes 87 – 88).
Play within a regulated system of imposed constraint was a key aspect to OuLiPian processes. They were interested in all kinds of constraint for literary creation, including recreational forms of word play such as crosswords and cryptograms. Crosswords and cryptograms constrain word formation through grids and codes respectively. OuLiPo’s use of the lipograms is perhaps their most well-known constraint adopted. In a lipogram, a writer composes a work while intentionally omitting a letter or group of letters. Georges Perec’s 1969 La Disparition is written in French, for example, without the use of the letter ‘E,’ the letter with the most frequency of distribution in that language. This constraint is markedly more difficult than another, which might lipogrammatize, for example “X,” a letter with a much lower frequency of use. For members of OuLiPo, the aesthetic value of the work was tied to the degree of difficulty or the perceived triviality of the constraint (Symes 98).

This deprivation of language, Colin Symes surmises in “Writing with Numbers,” “provides a mechanism for harnessing linguistic creativity in more efficient ways, resulting in increased fluency and verbal accomplishment” (104). Constraint, according to Symes’ assessment, changes the way one thinks and writes. Looking to recent developments in cognitive science, Symes posits that a type of fluency, particular to the mode of production one is continually undertaking, occurs through processes of continued exposure to and word selection within the imposed structure (104). The end result is “a degree of linguistic clustering” within the brain, below the level of consciousness, which provides “an organizing principle for language selection and organization, which marshals the linguistic resources of the mind in such a way as to meet the demands of the constraint” (Symes 104). Thus, constraint can promote creativity and in the case of OuLiPo, facilitate ludic language fluency.

**Play and Constraint: Towards a Fluency in (Bio)Cultural Multispecies Loss**

The current state of mass extinction forces us to become witness in a world where so many of the earth’s living kinds (material/biotic and immaterial/language) are slipping away (Rose et al. *Extinction Studies* 1). Such a moment leads one to reflect not only on the acceleration of biotic and cultural extinctions but also to explore forms that might make it possible to apprehend what such losses mean. I wish to offer ecoaesthetic games as meaningful spaces for becoming-witness to and being affected by extinction. While the object of the game may belong to the archive, game making and playing, especially the play experience and emergent meanings, belong to the repertoire. A key question arises: how to address and make tangible biotic (material) and cultural (immaterial) extinctions in the playspace? Looking to the ways in which constraint through the lipogram creates a form of fluency that aids writing, I argue that carefully crafted constraint within the game *Tether*, creates the conditions for a new type of fluency in thinking through and about multispecies webs of interdependence. *Tether* brings together the explicitly human dilemma of language extinction and the life dilemma of species extinction, manifesting
both in the design and playing of a game based on language. More specifically, by producing a game where players make meaningful choices as multi-species configurations and by altering the conditions for victory within the game, I bring our present moment of species and language loss into sharp contrast with normative concepts of winning. This addition of constraint, brought about through player positions as multi-species configurations within the game, creates the emotion eliciting opportunities necessary to amplify and generate meaning around these (bio)cultural losses.

**Scrabble: a Playful Manifestation of Language as Human Habitat**

Architect Alfred M. Butts, later affectionately known as the “Lord of the Letters,” created the crossword-like word construction game *Scrabble* (originally known as “Lexiko”) in the 1930s (Faber and Schwartz 95). Copyrighted in 1948, it made its way into the New York department store Macy’s and in 1952, with the advertising power and reach of Macy’s, became an instant classic. New York, and later the entire USA, were “seized by a veritable *Scrabble* fever” (Faber and Schwartz 98). *Scrabble* is arguably one of the most successful board games in human history and remains immensely popular. In 2008, on the occasion of *Scrabble*’s 60th birthday, it was reported that an estimated 150 million *Scrabble* games have been sold worldwide, in 129 countries; it is offered in 29 languages; and national and international *Scrabble* championships are held yearly (“Scrabble: 60 Facts”). The game’s format options have also expanded. It now exists in both digital and non-digital platforms, and in travel, deluxe, and junior editions. Over 4,000 *Scrabble* Clubs play it on a regular basis (“Scrabble: 60 Facts”). Its success has created an entire suite of language-based games offered by a variety of companies wishing to capitalize on the human interest in language and play as demonstrated in *Scrabble*. And it has become a tool for the classroom. Educators in both English speaking and English as a Foreign Language classrooms use *Scrabble* to strengthen vocabulary and critical thinking skills (imagining, planning, decision-making, evaluating) as well as interpersonal skills such as team play and friendly competition (Warner and Brown 55 – 57).

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The app *Words with Friends* offered by Google Play is an example: play.google.com/store/apps/details?id=com.zynga.words3&hl=en.
Scrabble Gameplay

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>The first player combines two or more of his or her letters to form a word, and places the word on the board to read either across or down with one letter on the center ☆ square. Diagonal words are not allowed.</td>
</tr>
<tr>
<td>2.</td>
<td>Complete your turn by counting and announcing the score for that turn. Then draw as many new letters as you played, always keeping seven letters on your rack, as long as there are enough left in the pouch.</td>
</tr>
<tr>
<td>3.</td>
<td>Play passes to the left. The second player, and then each in turn, adds one or more letters to those already played to form new words. All letters played on a turn must be placed in one row across or down the board to form at least one complete word. If, at the same time, they touch other letters in adjacent rows, those must form complete words, in crossword fashion, with all such letters. The player gets full credit for all words formed or modified on his or her turn.</td>
</tr>
</tbody>
</table>
| 4. | New words may be formed by:  
   a. Adding one or more letters to a word or letters already on the board.  
   b. Placing a word at right angles to a word already on the board. The new word must use on of the letters already on the board or must add a letter to it.  
   c. Placing a complete word parallel to a word already played so the adjacent letters also form complete words. |
| 5. | Ending the Game: The game ends when all letters have been drawn and one player uses his or her last letter, or when all possible plays have been made. |

Figure 6 Scrabble: Rule Book. Hasbro, 2007. pp. 1 & 2 [abridged].

To play the game involves both chance and skill. Played with two to four players, or sometimes in teams, each player scores points by placing tiles bearing a single letter onto a 15 x 15 gridded board. Players form words, using seven letter tiles drawn at random, and place the words in crossword fashion, left to right in rows, or top to bottom, in columns [see Fig. 6]. Skill is required to play strategically—either offensively or defensively, for example, using your opponent’s words to form your own or blocking potential future plays with word position.

There is a marked difference between “living room players” and professional players. Living room player is the term used to delineate casual players from those who have played in a North American Scrabble Players Association (NASPA) sanctioned tournament. While word formation is a constitutive

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29 Note that some consider “living room player” to be a somewhat condescending term used by professional Scrabbler. However, in two of the most popular memoirs about playing Scrabble (within which both authors write of their beginnings as living room players) the term is used. See Stefan Fatis’ Word Freak or John D. Williams Jr.’s Word Nerd. For more on the gendered and competitive landscape
factor of the game, *Scrabble* is only partially a game of linguistic challenge. As players move to the level of expert, Katie Salen and Eric Zimmerman point out in *The Rules of Play*, “words are reduced to sequences of letters—they literally do not have meaning as *words*.* Rather, the letters are signs that have value as puzzle pieces that must be carefully arranged according to the rules of spelling” (43). For professionals like New Zealander Nigel Richards, generally referred to as the number one player of *Scrabble* in the world, the game is less about vocabulary expertise and more about mathematics and memory. This point is made especially clear when considering Richards, an English speaker, won the French *Scrabble* championships in 2015. Richards memorized a vast number of sequences of letters that are permissible based on the rules of French spelling, without being able to speak French. Richards won despite only being able to say numbers (which is required for tournament play) and basic pleasantries of “hello,” “thank you,” and “may I have a coffee” (Wilsher par. 8). Richards also employs statistics to analyze the letters played and frequency of distribution in order to calculate the potential letters and sequences his opponent has available and he is likely to get as the game proceeds.

The differences between expert and non-expert play go even further—playing *Scrabble* at the expert level changes the way the brain is used. When a non-expert player engages in *Scrabble*, she will comb her brain for the possible meaning of the word in order to determine if a word played is a word. This is a linguistic task. Expert players, on the other hand, have thousands of words memorized and practice a lot; this stimulates the activation and de-activation of portions of the brain. A recent study using fMRI determined that expert players use an altogether different part of their brain than the non-expert, the part used for visual recognition (Dvorsky par. 4-5). Repeated play creates new knowledge structures in the brain, making the recognition of and ability to form a word by rearranging the sequence of letters easier (Dvorsky par. 7). Much in the way that *OuLiPian* practices created a fluency within lipograms, that is, within an imposed system of constraint, the expert *Scrabble* player becomes fluent within the *Scrabble*-rules and spelling constraints. This renders them capable of composing sequences of letters far more complex and with more ease than the living room player.

At the same time that many languages are disappearing from the world, professional *Scrabble* players are working very hard (sometimes several hours a day) to memorize words that originate from minority languages. Words like “umiaq,” the word for an Eskimo canoe, and its multiple spellings: “umiaq,” “oomiac,” and “oomiack,” give excellent opportunities to score points. These words are memorized for their potential to generate points and may be completely divorced from meaning of professional *Scrabble* play where ‘living room player’ is considered patronizing, see Kate Gavino, “Nice Rack: How to Enter the Professional Scrabble Scene.”
in the expert’s memory. In this way, the Scrabble dictionary, of which there are two—the North American Tournament Word List and the Collin’s Dictionary—becomes a strange, partial archive of the English language and some of the words it has absorbed. This archive is still growing. The Collins Dictionary added 6,500 new words in 2015, many of which demonstrate the speed at which social media is shaping human language. Added, for example, were slang words “twerking,” “emoji,” and “hashtag” (Tan).

Figure 7 Tether Game Kit. 2017. Personal Collection.

The North American Tournament Word List, published by Merriam Webster for Hasbro (the copyright holder in the United States) has 187,639 words. The Collins Dictionary, published by Mattel (the copyright holder outside the United States) contains over 276,000 playable words that include formal and informal English as well as foreign words.
**Tether: Adapting Scrabble**

*Tether* is a game kit that adapts *Scrabble*. The *Tether* game kit requires an existing *Scrabble* board and letter tiles in order to be played. The kit consists of a handcrafted box containing one, 6-sided die, an order of operations, 26 species letter cards, a species letter description book, and a pamphlet introducing the rules and meaning of the game [see Fig. 7]. The box is composed of book board, polyvinyl acetate glue, and paper with a gold metallic pearlized finish. The species letter cards measure 2.5” x 3.5.” They are letterpress printed original drawings of nonhuman species accompanied by a letter of the alphabet. The letterpress process was completed using polymer plates, a Vandercook proofing press, and French satin rag paper in an off-white color. The face of the cards, that is the side with the species imagery, is printed in a purple-based off-black. The backs of the cards are printed in a burgundy and metallic gold [see Fig. 8]. Each of the 26 species letter cards features a species whose Latin binomial begins with the letter it represents. The species letter description book shows the illustration of the species and a brief description of that species [see Fig. 9].

![Figure 8 Species Letter Card: Front and Back. 2018. Personal Collection.](image)

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31 The order of operations card is labeled as “Quick Play Legend” for a better user experience but will be discussed as an order of operations in this chapter in keeping with its functionality within the game design.
Just as in traditional Scrabble, the goal of Tether is to create words in crossword-like fashion in order to obtain points. Each player’s turn and attempt toward word construction is tethered to a species letter card and constrained by the fate that befalls the depicted species and its webs of interdependencies more broadly. Tether uses the playful constraint of the lipograms by removing letters from the game—each letter being joined with a species and each species experiencing diminishments that reflect real-world species peril. The first page of the Tether rules booklet has a quick play legend that outlines potential effects a roll of the die may have [see Fig. 10]. When players open the Tether Rules booklet, they are instructed to distribute a play space to each player. The place space serves as a place mat that helps players keep track of the species in their hand (also known as a queue) and their status, including which species are still in play and which are extirpated [see Fig. 11]. Extirpated species cannot be used for word construction for the player for the duration of the game. Extirpated species are also next in line, so to speak, for going globally extinct (as achieved by rolling a 6 with the die). Players are instructed to first familiarize themselves with the rules and objectives of Scrabble and then are given additional instructions specific to Tether [see Fig. 12].
Tether Rules

Quick Play Legend

Position 1 diminished for one turn. If already diminished, affects position 2.

Position 1 extirpated.

Player to your left, position 1 diminished.

Position 1 and 2 diminished. If already diminished, remains so.

Position 1 diminished and player to left, position 1 diminished.


Important: After your turn, be sure that you have two species-letter cards, and if game allows, seven letters.

Figure 10 Tether Rules: Quick Play Legend. 2017. Personal Collection.
Extirpation, or local extinction
— a species is destroyed or completely removed from a geographical region or habitat.

Letter Tray

Oculina varicosa
Large ivory coral

Vallonia pulchella
Lovely vallonia snail

Figure 11 Tether Play Space, featuring Species Letter Card "O" & "V." Personal Collection.
Object of the Game: Create interlocking words in standard Scrabble fashion with the new elements introduced by Tether. Players compete for high score in traditional Scrabble fashion but with one exception: **Triple Word Score Amendment**.

Triple Word Score Amendment: When a player lands on a triple word score square on a Scrabble board, they must make a decision between taking the points or bringing a species from the globally extinct pile back into play. If the player chooses the latter, the player receives only the points as shown on the letter tiles. Any letter tiles belonging to redeemed species that have been sequestered from earlier play are returned to the letter pouch prior to the individual reloading her tray. The species letter card that is no longer globally extinct is returned to the bottom of the species letter deck.

To Play: Before each turn, the player rolls the die. The number rolled determines what happens to the player’s species letter card and can alter the player’s ability to play that turn.

**Species Diminishment**: You cannot use the letter shown on the species letter card for play.

Species Diminishment—Diminishment of species’ ability to flourish, in some cases even to exist occurs in many different ways through often very distributed means. Diminishment in Tether is a stand-in for a multitude of actions that inhibit a species’ success, such as habitat fragmentation, human exploitation or predation, urban development, changing agricultural practices, pollution, climate change, and a hundred other ways in which species’ life ways are disrupted.

Other important notes: **Refilling letter tray and species letter card**—After a player completes their turn, they are to refill their letter tray (if letters remain available) and their species letter card (if need be) prior to the next player’s turn. If upon drawing letters, a player draws a species that is extirpated in their play space, return the tile and draw another. If they draw a species that is globally extinct, place that tile with the globally extinct species letter card and draw an additional tile.

Figure 12 Tether Rules: Species Diminishment and Triple Word Score Amendment. 2017.

There are three important ways that Tether modifies traditional Scrabble that will be explored in closer detail in what follows: Firstly, the introduction of species letter cards produces a player position as a multispecies configuration. By metaphorically tying together the human domain of language and the
material reality of species diminishments, *Tether* dissolves the binary between human and nonhuman and explores the possibilities of using constraint to develop a fluency in thinking around (bio)cultural multispecies loss. Secondly, as a mod, *Tether* incorporates additional emotion eliciting opportunities through a change in the core mechanics of the game. Considering both durational and lateral effects (explained in detail below) enabled by a secondary layer of chance highlights mechanisms for both heightened emotional attachments and more meaningful understandings of interdependent webs of becoming. Thirdly, by re-evaluating the purpose of modifiers in traditional *Scrabble*, *Tether* allows opportunity for a productive friction to develop between in-game evaluations and external social expectations. This results in a shift in the overall win/loss paradigm that typically governs the game and represents a powerful critique of normative calculations for “winning-at-all-costs.” Taken together, these three effects generated through the mod *Tether* represent significant steps towards generating critical play around (bio)cultural multispecies loss.

Before continuing on it’s important to define several key terms. While each of these terms will be taken up in more detail in the remainder of this chapter, starting with basic definitions will clarify my use of the terms.

*Mods/Modding*—Mod means modification. Mods alter the form and content of a game, bringing forth a productive friction between the original game and the altered game. Mods transgress the boundary line between *inside* and *outside* of the game by bringing some aspects of the original game into new light, and exposing the conditions, mindsets, and beliefs under which the original game was created and/or under which it is played in the present. As an example, in the original version of the video game *Quake*, the only avatars available to players were male characters. Players who desired female avatars developed mods that mapped female “skins” [a graphics layer that alters the visual appearance of a game character] to masculine figures. The new, gender ambiguous “frag queens” challenged not only the representations of gender within the game but also male-centric design within gamer culture writ large (Salen and Zimmerman 562).

*Constraint*—In many forms of games and play, constraint plays a central role (Salen and Zimmerman 330-331). For example, runners in a race agree to adopt the following constraints: they wait behind a line, in their lane, until signaled to run. Once signaled, they run as fast as they can, in their lane, toward a predetermined line, some specified distance away. These constraints, introduced by rules, enable a type of play that is different from that of say, jogging in one’s neighborhood. In short, constraints make some aspect of the game more difficult, more challenging to obtain, and are a

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32 *Quake* is a first person shooter game developed by id Software first released in 1996.
constituent part of the pleasure derived from the activity (Salen and Zimmerman 331). In Tether, constraint is layered onto players’ attempts to produce a word through the introduction of species letter cards. Player attempts are constrained by the degree of diminishment of the species, which lipogrammatizes a letter, as outlined in the rules and determined by the roll of a die.

**Durational and Lateral Effects**—Durational and lateral effects are my terms used to describe two different ways that constraint is manifested in Tether. Durational effects are constraints that affect player actions for either one turn or the entire game. Lateral effects are restrictions on future play that affect opponents’ play rather than the player whose turn it is. Durational and lateral effects are both analogies for specific forms of species diminishments to be discussed in further detail below.

**Emotion Eliciting Opportunities**—Throughout game play, if the player is invested in the game, there are moments that are emotionally resonant for players. Such moments can be purposefully added to games in order to repeatedly evoke player affect. Within an interactive gaming experience, various stimuli can serve as emotion eliciting opportunity. For example, in Tether, every time the die is rolled, and the player’s fate is determined by the degree of diminishment that befalls their species, they experience a roller coaster of emotion from anticipation and fear, to relief, frustration, disappointment, or happiness. Designing for emotion eliciting opportunities within games is one way to tap into the affective potential of a game toward humanistic and prosocial goals.

**Order of Operations**—In games, the order of operations, like in mathematics, outlines the sequence of events or operations. It hierarchizes the actions to be made by saying, in effect, “do this first, then do that.” In Tether, the rule set has an order of operations that includes instructions to, first, roll a die, then apply the effect (constraint) as outlined, and only then to attempt to play a word. For ease of player understanding, the order of operations is incorporated into the “Quick Play Legend” housed in the rules pamphlet accompanying the game.

**Building Emotion Eliciting Opportunities: Altering Core Mechanics**

The first thing to consider when creating a mod is if that modification will affect the game’s core mechanic, and if so, to what extent. A core mechanic is the activity that a player repeats over and over again within a game. It is, according to Salen and Zimmerman, “the essential moment-to-moment activity of players” that “create patterns of behavior, which manifest as experience for the players” (317). As such, it represents, “the essential nugget of game activity, the mechanism through which players make meaningful choices and arrive at a meaningful play experience” (Salen and Zimmerman 317). The core mechanic of Scrabble is to make words with tiles. Players repeat this action repeatedly until someone has
won. However, the core mechanic “make words with tiles” involves a much deeper experiential process that includes a player’s internal decision-making and actions (inputs), as well as the game’s materiality. As Salen and Zimmerman note, “a word game such as Scrabble forces players to think strategically and linguistically, scanning the board for openings, rearranging letters in their head and in their hand, making language tactile by manipulating smooth wooden tiles” (316). The core mechanics of Scrabble thus include forming words, analyzing the board, internally generating several distinct word possibilities, strategizing and building hierarchies of possible words, and more.

*Tether* alters the core mechanic of “make words with tiles” by introducing constraint through species letter cards. The core mechanic is still to make words with tiles but the possibility of making words is now tethered to the status of the species in your hand. This produces a player position of player + nonhuman species cohorts (i.e. species letter cards in the player’s hand). At any given moment, players have two species letter cards in their queue and possibly more in the extirpated area of their play space [see Fig. 13]. The player + nonhuman creates a player position as a *multi-species configuration*—a player with their language skills, the species cohort in the player’s hand, and the predicaments and statuses of the species. For living room players and expert players alike, this configuration contributes to difficulty. Expert players, especially, find that their analysis of their opponent’s tiles and their mathematical tracking of personal chances at drawing specific tiles are completely thwarted. This configuration brings into view and calls into question the human/nonhuman divide, a dichotomy commonly upheld by pointing to human’s ability to wield language. The species in one’s queue become integral to one’s performance. No longer is a player just themselves, their intellectual abilities and their command of language; instead they each become human player plus their nonhuman species cohorts’ material realities. The fate of one affects the other. The player’s affordances and chances to win are entwined and circumcised by what befalls the species in their hand. Their ability to flourish in the game, or not, is bound up in their species’ flourishing, or not.
Durational and Lateral Effects

Shifting the core mechanics produces an opportunity to generate new emotional experiences. The emotions experienced within games are real and can be significant. A statement by emotion theorist Keith Oatley, quoted in Aki Jarvinen’s “Understanding Videogames as Emotional Experiences” serves as a starting point for understanding players’ emotional experiences within games:

To be a participant is to take on the goals of the game as one’s own. Only as a participant will one experience emotions. Only as a participant will one be excited by the possibility of an attack on the queen’s side, feel glad to start putting up hotels on one’s property, or feel anxious to avoid serving another double fault. Emotions that occur in relation to goals we have adopted are real. One may be engaged in a role, experiencing what happens in it as happening to oneself, and indeed shaping one’s selfhood (86).

Working from Oakley’s and other emotion theorists’ research, Jarvinen argues that a player’s emotional experience can be mapped onto the “significant events in the often cyclical continua of games in which
players repeat the same actions over and over” (88). In Scrabble the cycle of play allows and requires that a player observe the board and their opponent’s play, evaluate their opportunity to produce a word from their letter tiles, and ready themselves for action. All these actions are laden with emotion. Within a game, at various stages, a player may feel anxious, excited, frustrated, delighted, anticipatory, defeated, triumphant, saddened, thrilled, joyful, scared, and more. All these emotions, though they take place in a game supposedly set apart from real life, are real and have the potential to affect a person deeply (Jarvinen 89). Importantly, the actions ensconced within the core mechanics of the game are all potential emotion triggers precisely to the degree to which the individual player has attached their goals to the outcome of a moment within the game and the end of the game generally.

In Tether, two primary emotion eliciting opportunities were achieved through the addition of the species letter card and the attendant order of operations. These opportunities were made through the incorporation of constraints in the form of durational and lateral effects. Durational effects can inhibit the use of a letter for one turn (short term) or for the entire game (long term). At the start of play, prior to first attempts at word construction, a player is dealt two species letter cards. The species letter cards remain with that individual player for the entirety of the game unless the species on the card becomes globally extinct. When it is a player’s turn, they roll the die. The die doles out, by chance, one of six possible outcomes. For example, a roll of a 1 results in “Position 1 diminished for one turn. If already diminished, affects position 2.” Or a roll of a 2 results in “Position 1 extirpated.” In the former, the player attempts to produce a word but the letter in position one, in their playspace is not available to them for that turn—a short-term durational effect. In the latter, the player attempts to produce a word but the letter in position one is first moved to extirpated status and therefore cannot be used by that player for the remainder of the game—a long-term durational effect. This sustained engagement with specific species letter cards produces repeating opportunities for players to align their personal goals for constructing a word, scoring points, or winning the game to what happens to their species during each turn through the roll of the die. So, in contrast to traditional Scrabble, while the player is observing the board and other’s moves, evaluating their letters and preparing to make attempts, they are also invested emotionally in what happens to the species in their hand.

Lateral effects within the newly added order of operations operate differently than durational effects because they represent a significant state change that the player does not directly participate in. A “state change” represents a moment, usually when advancing levels or with the advent of new information, when all players in the game are aware of their status relative to one another and to previous positions (Jarvinen 88). State changes occur in Scrabble when a player makes a word. In that moment, the player knows how they did during that turn and how they are doing in the game as a whole. Conversely,
their opponent knows what new opportunities or challenges were made available to them through their opponent’s play.

In *Tether*, at each player’s turn, they roll a die. The number on the die corresponds with an outcome for the species in the player’s species letter queue. State changes are two-fold—occurring when a player rolls the die before their turn and learns of the effect(s) for their species letter cards and when they create a word. The potential state changes doled out by the die and its attendant order of operations are divided into neutral, positive, and negative outcomes, as well as, single player, two player, and whole game consequences that vary in the duration of their impacts, that is, as single turn effects (short term) and remainder-of-game (long term) effects. In this way, a roll of the die might affect your species-letter card, another player’s, or both, and it might do so for just this turn or for the remainder of the game. In the example above, the player rolls a die to see what happens to their species. They are acting and responding to the chance. With lateral effects, the player’s roll of the die has the potential to create a state change for their opponent. For example, if player A rolls a 3, player B’s species experiences a diminishment, meaning player B cannot use the species letter in Position I for word construction in the following turn. Meaning also, that when player B rolls the die, seeing as their species in position I already diminished, the potential effects from the die roll affect his or her Position II species. This greatly compounds the constraints on the player and contributes to the difficulty in word construction. A consequence of this is that players become invested in what their opponent does not just in terms of friendly competition but also out of fear for their species letters.

With a six-sided die, I created six possible state changes, allowing for something to happen that could affect one, two, or all players. The incorporation of lateral effects allowed for a tying together of fates of species letter cards and their players regardless of whose turn it is. For example, the temporary diminishment of a species letter card, as achieved through a roll of 5 during a turn, causes both the person who rolled the die and the player sitting to their left to experience a temporary species letter diminishment (resulting in one turn without the letter on that species letter card). The other possible shared consequence is global extinction (a species letter no longer available to anyone for the remainder of the game). This process of one roll of the die affecting more than one player’s species letter card is built into the game to point to two things in particular: how webs of interdependencies start to unravel with far reaching effects and a related but different angle to that same issue, how some fates are intimately tied together and determined by human interventions.

There is one instance where the roll of the die does not cause a state change for the player who rolled the die but instead affects a neighboring player only—a roll of a 2. This is an analogy of the phenomena of violence to one or more species that arises when humans intervene to try to save a species. These are complicated situations. An example, well known in conservation circles, is the captive breeding
program used to save the Whooping Crane (*Grus americana*). Reduced through hunting and wetland destruction to fewer than twenty birds, the Whooping Crane is held in this world through an elaborate, sometimes-violent form of care, coercion, and collaboration between humans, Whooping Cranes, and other species (van Dooren 90). That the Whooping Crane is still with us and seen as a conservation success story nearly glosses over the other species caught in the fray: individual female birds whose lives, as egg producers, are relegated to captivity, and other nonhuman surrogates, such as the adult Sandhill Cranes, who are marshaled to raise the baby Whooping Crane in the absence of their own.\(^{33}\) By shifting the core mechanics of the game to a more nuanced set of consequences and effects, *Tether* makes explicit the ways in which the fates that befall species do not occur in a vacuum but rather take place in a web of interdependencies. As the diminishment of nonhumans occurs, the ability to construct words erodes. This erosion reverberates at each state change, setting up repeating and effective emotion eliciting triggers throughout the game.

The lateral effects built into the order of operations shift the core mechanics by inserting a repeating moment of reflection on and evaluation of varying types of diminishments that affect the species letter cards in players’ queues. The emotions generated from this design change are best described through a category in the OCC (Ortony, Clore, and Collins) model called “Fortunes-of-Others,” as observed by Jarvinen (90 – 91). Lateral effects introduce emotional triggers for “fortunes-of-others emotions,” emotions including “good-will emotions, such as being happy or feeling sorry for somebody, or on the other hand, a display of ill will in the form of resentment or gloating” (91). These emotions are felt in gameplay contexts with multiple players and are closely tied to empathy and counter-empathy.\(^{33}\) But these “fortunes-of-others” emotions extend beyond the players in the game. While the species letter cards are a form of constraint on word formation, they are also depictions of living species who are, throughout the game, experiencing diminishments or, on occasion, dodging diminishments through a particular roll. Because the players receive their species letter cards at the start of the game and are required to play through the game as (human + nonhuman) multi-species configurations, they become invested in what happens to those species, including expressing sadness when they go extinct or feeling happiness for them when they have made it through another turn without experiencing a diminishment.

By introducing constraint as a function of the game via the species letter card, I created opportunities for sustained reflection within metaphorical multispecies entanglements, which leads to meaningful emotion eliciting opportunities throughout the game. In normal *Scrabble* play, the core mechanic of making words with tiles is made both challenging and exciting for players through the element of chance in the tiles they will draw and what possibilities the letters on the tiles may allow. In

\[^{33}\] Counter-empathy is an empathic failure where another’s pain gives one pleasure (Jarvinen 91).


Tether the introduction of the species letter card and roll of die adds a secondary layer of chance to word construction through an order of operations card that doles out effects for player’s species. Sustained interaction with one’s species letter card(s) and the tying of personal goals to in-game characters and effects are key to creating emotion eliciting opportunities that have the potentiality to shape how players perceive and are affected by the relationships of humans and nonhumans within the in-game multi-species webs of interdependence. Such moments represent a slower and deliberate consideration of nonhuman species, one that has the potential to enable players to exercise their compassion and expand their sphere of concern to include the nonhuman. It is in line with efforts to get players to push back against gut feelings and worldviews where quick, intuitive valuations of others, human and nonhuman, take place.

**Simulation vs. Provocation: Lateral Effects and Species Assignments**

The roll of the die and its effects as just discussed do not match the true-to-life circumstances as observable in science. Many of the species on the species letter cards have no real or demonstrable bearing on one another, being separated by continents and environment types. Less a simulation than a provocation for thought, Tether makes it possible to think broadly about the patterns it echoes rather than situations it illustrates. As an example, imagine a player with the species letter card “O,” for *Oculina varicosa*, or Large ivory coral, which occurs in the deep-water Oculina Banks stretching from Florida to North Carolina [see Fig. 14]. When it is their turn, they roll the die, and they roll a five. They learn that their species is diminished and consequently, as stipulated in the order of operations, their neighbor’s species is also diminished. Their neighbor has “H,” *Hyla wrightorum*, or Arizona tree frog, which lives in the mountains of central Arizona along the Mogollon Rim southeastward into central New Mexico. Both experience species diminishment that constricts players’ attempts to produce words. In this example, it means that “O” is unavailable to the player during this turn and when it is their neighbor’s turn, “H” will be unavailable to them. Out in the messy world beyond the board game however, the links connecting the fate of *Oculina varicosa* and *Hyla wrightorum* are stretched too far to be immediately plausible or meaningful.
Species Letter Assignments

The logic for choosing species for their species letter cards is independent from the core mechanisms for the game. Determining which species will be assigned to which letters is part of a rationale to steer clear of pitfalls of valuation that render only certain types of species, such as charismatic megafauna, as important, while others are rendered invisible. Instead of polar bears, pandas, and rhinos, the game features species such as fungi, beetles, minnows, and rushes. The selection of species for species letter cards is also affected by the underlying logic of letter distribution and scoring in Scrabble. When Alfred M. Butts designed “Lexiko” he sat down with the newspaper and dictionary and hand tabulated the number of times a particular letter of the alphabet appeared. In this way, he mapped out frequency of use and determined how many tiles of each letter should be included in the English language version of what would become Scrabble. In the English language some letters are used more frequently and are thus more
valuable to word construction. In *Scrabble*, letters that are most difficult to use or used the least in the English language hold higher point values than those that are used most frequently. There is a higher distribution of letter tiles carrying lower points but being very valuable to word construction than those with high points. For example, there are twelve “E” tiles, each worth one point, but only one “Q” and one “Z,” each worth ten points.

Letters that occur frequently in the English language, that are high in importance and frequency but low in point value, are matched in *Tether* with species who occur in the world in great numbers (frequency), whose status at the base of food chains and nutrient cycles suggests that their loss would be problematic for many others (high importance), and whose character type (base of food chain) is common to many ecotones (low point value). For example, “E,” *Euphasia superba*, or krill, are shrimp-like crustaceans that form the basis of the Antarctic food web [see Fig. 15]. Correspondingly, those letters that carry the most points but are assigned the fewest tiles in *Scrabble* do so because of their limited or difficulty of use in the English language. In *Tether*, for example, “Q” is paired with a cyprinid minnow (no common name) endemic to a small stream in the Pearl River drainage in Guizhou, China (Zhang and Chen 25). This is not to insinuate that some species are more valuable than others but rather to reiterate that they are all valuable in specific, contextual and entangled ways.

While there are countless online repositories listing species, I consulted the USGS *BISON* site most frequently for North American species in order to assign species to species-letter cards. For more, go to bison.usgs.gov/#home. Other species were selected from ARKive.org, “The Encyclopedia of Life,” and “The IUCN Red List.”
Meaningful Choices: Triple Word Score and the Win/Loss Paradigm

*Tether* cannot be played without the use of a *Scrabble* board and tiles. It uses these game parts in the same exact way as they were originally intended with but one exception: the Triple Word Score. The *Scrabble* board is made up of a 15 x 15 grid whose squares are either blank or have a modifier. Modifiers take the original letter or word score potential and multiply it by the modifier posted on the square.
Possible modifiers, called “Premium Letter Squares” and “Premium Word Squares” in *Scrabble* terms, include double letter score, triple letter score, double word score, and triple word score. In *Tether*, when a player reaches a triple word score square, they are given a choice: they may either take the points as normally stipulated or they may bring a species back from the globally extinct pile.

If a player rolls a six in *Tether*, the species that has been in their queue the longest goes “globally extinct,” meaning none of the players can use the letter on the species letter card for the remainder of the game. In initial playtesting, there were instances where, by chance and in a short amount of time, too many species letter cards were removed from the game to allow for the game to continue. While this may be a powerful metaphor for the stakes of lost diversity and our human roles in that loss, it negated other goals for the game such as sustained reflection on and attachment to species letter cards and pleasure of play. Creating an opportunity for one of the letters relegated to the globally extinct pile to be brought back into the game solved the problem of a too-quickly eroding play while also adding an opportunity for meaningful choices and thus emotion.

Game theorist Katherine Isbister argues that games move us because, unlike other forms of media like film or literature, they allow us opportunity to influence outcomes through our actions (Isbister 2). Action and outcomes, or put another way, a series of interesting choices, are powerful generators of emotion. Isbister says, “because our feelings in everyday life, as well as games, are integrally tied to our goals, our decisions, and their consequences,” in-game actions and outcomes affect players (2). Shifting the triple word score from an automatic modifier to a choice resulted in a shift in the quality of the conflict within the game and a reworking of the win/loss paradigm. In a multiplayer game, each player plays a role. In *Scrabble*, one might be a competitor or an unwitting, accidental ally (as when one inadvertently sets up another player’s exceptional opportunity to place a word). To bring back a species is to become a purposeful ally. It is a sort of savior role that brings back a species letter, potentially benefiting one’s opponents in future rounds, but most absolutely benefitting continued game play as a whole. This upsets normal characteristics of conflict within the game. Choosing to take the points, however, is not so simple a decision as it may appear.

In games, the “balance of power shifts…roles change and fluctuate, reaching an endpoint in which one player assumes the role of winner” (Salen and Zimmerman, 464). But in *Tether*, the interesting and meaningful choice that is the triple word score sets up a conundrum where potential gains and personal goals are evaluated and appraised against both internal game system and external (social) expectations. The triple word score amendment presents an opportunity where a productive friction is created between normal desires to win and social cues and expectations derived from outside the game (Salen and Zimmerman 334). Players find themselves torn between personal desires to achieve the most points possible and other implicit expectations tied to “being a good sport” and thus bringing a species
back in order to assist the continuance of the game. But also, because endangered species play such a visible role in our culture, taking the points may be unpalatable to the player because they either feel personally compelled to do something about species extinction or fear reprisal from fellow players who care about species extinction. The meaningful choice is not just whether to take the points in the game but symbolically, what types of calculations and valuations one is willing to make in order to win at all costs, the very mindset that contributes to a “mixture of aggressive circumstances” hostile to the flourishing of species and languages in the world outside the game.

Problematic Metaphors: Triple Word Score and Bringing Species ‘Back’

The speed at which the ability to produce words erodes is important for expressing the direness, the scale and rate, of extinction. It is also crucial to sustained reflection—the given length of time an individual can dwell with their species letter card increases potential attachment and the heightening of the emotional triggers within repeating emotion eliciting opportunities. But “bringing back” a species is a problematic metaphor for the hopeful, future technological fixes imagined as being capable of bringing a species back. This hope for technological fixes gives wholesale permission for maintaining the status quo currently threatening species and is part of the problem causing inaction in our present moment (Haraway, Staying with the Trouble, 2). Another interpretation of “bringing back” a species letter card could be the rare instances when scientists believe that a species is extinct but later find a few individuals or a colony still in existence in a place that had, yet, remained undiscovered. Both are problematic in the way they allow us to skirt responsibility for ongoing actions in favor for some supposed future science or nature miracle.

In Closing: Creating Spaces for Affect

The aim of this chapter has been to think through two types of extinction—language and species—as they inform my game modification of Scrabble called Tether. First, I explored language as a human habitat and considered the mechanisms that produce languages in peril. Language is found to be the human cognitive toolkit that shapes everything we know. The ability to wield language has contributed to our species’ ability to thrive in almost any environment and has historically set us apart from other nonhuman species. Second, by thinking about differences in the archive and the repertoire I outlined how thinking about language as embodied and species ethos as ways of life can gesture toward the depth of what is lost in this moment of mass extinction. Game making and playing are embodied practices where meaning emerges. As such, they belong to the repertoire. By thinking language extinction and species extinction together, we can begin to ask important questions about who is being lost and what claims, if any, such losses make upon us. Then, I turned to language as a form of play and the power of
constraint to create new ways of thinking. Finally, by looking at the game mod Tether as it compares to traditional Scrabble play, I argued that the incorporation of constraint and meaningful choices contributes to repeating and effective emotion eliciting opportunities that have the potential to affect the way players think about multispecies configurations and unexpected webs of interdependency. In the end, despite problematic metaphors, the modification brings me closer to my stated goal of using play, as structured through games, to create spaces for affecting environmental thought. The design and play of Tether illuminate a potential pathway for other environmental humanities scholars to travel. While it may be more customary to think about language loss from a social science or historical perspective, or nonhuman extinction from a science or animal studies perspective, play as structured through constraint can bring new salience to the topic for students and researchers alike.

To read about the iterative design and playtesting process, and the results from game play events, turn to page 159.

Notes

xx For detailed discussion on uptick of interest in minority language statuses, see David Crystal, (2002) Language Death. For a brief synopsis on the difficulty of pinpointing exact numbers of languages in the world and languages lost and soon to be lost, see Stephen R. Anderson, “How Many Languages are there in the World?”.

xxi For more on how such policies were met with resistance, see James Crawford “Endangered Native American Languages.”


xxiv “Muzjiks” is worth 128 points. For more on unique words with high scores see, Stefan Fatsis’ Word Freak, 141-153.

xxv For a more thorough understanding of what constitutes “the violent-care of captive life” of the Whooping Crane breeding program see Thom van Dooren’s Flight Ways, pp. 87-124.
CHAPTER 3: MEMORY AND RECOLLECT—
PLAYFUL MNEMONICS AS
COMMEMORATION

This chapter explores species extinction and commemoration practices in the context of a game adaptation of Memory called recollect. First, I look at how we humans understand and think about species extinction both historically and in this moment of the sixth mass extinction. Second, I consider the ethical imperative of extending commemoration practices to nonhuman species in peril. Third, I explore the history of the game Memory and the ways in which the game engenders mystery and requires strategy, both of which contribute to pleasure within the game. Finally, I consider recollect and the specific ways it contributes to reflection on and connection to nonhuman species extinction. I demonstrate that by shifting the imagery of the game to include species of the Midwest US, by changing the objective information, and by incorporating tracing as a way of expressing “void,” I can create a game that can help players push against normal powers of avoidance when it comes to thinking about species extinction.

The Story(s) of Species Extinction

The Great Auk, Tasmanian tiger, Steller’s sea cow, Honshu wolf, Passenger Pigeon, Western Black Rhinoceros, and Dodo bird. Without any explanation, most readers immediately identify the common element between all the animals on the list—extinction. Thinking about, and indeed worrying about, species endangerment has been a human preoccupation for at least the last two centuries (Heise 4). How and why we think about species endangerment has changed over time and exploring our history with extinction tells us something about who we are, as humans, in all of this. The story we tell about extinction often starts with the Dodo bird. While the Dodo bird is likely not the absolute first species extinction for which humans are to blame, it has become iconic to the story we tell about extinction and our role in it (van Dooren 4). As Ursula K. Heise elaborates in her book *Imagining Extinction: The Cultural Meanings of Species Endangerment*, “the dodo looms large in many books on extinction because it was the first species whose end came to be clearly attributed to human intervention: it signals an historical turning point where the deadly ecological consequences of exploration and colonization become visible” (36). In the dodo bird, we humans began to understand ourselves as a species capable of ending not only the life of hundreds or thousands of individuals through hunting, fur trade, and habitat encroachment, but also as capable of ending entire biological lineages.

The story of the Dodo bird becomes a template for stories about extinction in two important ways—we continue to focus on singular animals and we use these singular animals as “shorthand” for the
story of extinction we tell, which often prefigures extinction as inevitable and only important when involves certain charismatic species. Take the list of animals from the beginning of this chapter. There is not a plant or fungi among them. While plants, fungi, and invertebrates do go extinct, they are rarely used to conjure the drama of human involvement in mass extinction. In the story of endangerment, we focus on charismatic megafauna to the detriment of other species. “The focus on a single species that is selected for its obvious anthropomorphic qualities or its aesthetic appeal,” Heise says, “blocks from view other species, lacking those qualities, that may be more endangered or more crucial for ecosystem functioning” (24). This shorthand of the singular “flagship” species also becomes integral to a dangerous “proxy logic” that presents a narrow, seemingly inevitable story about how biodiversity and our communities are declining—one that obscures the nuances and differences necessary to understand humanity’s varied roles in this moment of extinction (Heise 23). This is what allows Heise to claim that "biodiversity, endangered species, and extinction are primarily cultural issues, questions of what we value and what stories we tell, and only secondarily issues of science" (5).

The Dodo and the story humans tell about it is also a great bookmark for a particular type of lamenting that began in the sixteenth and seventeenth century with European colonization and persists today—a regret for what has been lost on the path to modernization. The discourse of extinction, Genesee Marie Sodikoff notes, “emerged as Europeans waxed nostalgic over the ‘primitive races’ killed by firearms and foreign germs, as well as by the more gradual effects of cultural imperialism, population displacement, and economic and social marginalization” (5). This is the paradox of “imperialist nostalgia” identified by Renato Rosaldo. In his words: “A person kills somebody, then mourns the victim…In more attenuated form, someone deliberately alters a form of life, then regrets that things have not remained as they were prior to the intervention” (Rosaldo 1993, 69 – 72 qtd in Sodikoff, 6). This imperialist nostalgia around cultural extinctions extended to the disappearing flora and fauna that Europeans were encountering at the time. As Heise states, “European travelers and explorers sometimes expressed regret at the destruction of nature that their own arrival brought about” (37). The Dodo’s extinction, Heise adds, “has turned into a recurrent symbol of the destruction of nature wrought by the imperialist expansion of European modernity” (37). The move to use a species as a shorthand to communicate human regret over the loss of a fictionalized nature is practiced to this day as demonstrated when extinct or possibly soon-to-be-extinct species are used to motivate conservation efforts and express anxieties about modernization and colonization more broadly (Heise 19).
Earth’s Living Kinds Slipping Away

Extinction is not just a matter of how we think about it and what it says about us; it is also very much about actual beings, and lots of them, on the “dull edge of extinction.”35 The first line of Deborah Bird Rose et al.’s book *Extinction Studies: Stories of Time, Death, and Generations* states clearly “at this very moment, many of Earth’s living kinds are slipping away; sometimes quietly, sometimes in bright bursts of controversy, chaos, and pain” (1). This is, the authors (and many others) tell us, the sixth mass extinction event. While all mass extinction events share several main qualities, namely a large number of species from a vast range of types, lost over a short duration, the sixth mass extinction event is of a different kind (Rose et al. 1 - 2). “Unlike the first five extinctions” anthropologist Genese Marie Sodikoff says in *The Anthropology of Extinction*,

the sixth extinction is neither abrupt nor spectacular. No smashing asteroids or giant volcanic eruptions. No global pandemics as yet. Only the slow, cumulative effects of greenhouse gases, rain forest depletion, and a brand of imperialism that extols the virtues of high mass consumption (2).

Humans are central to this moment of mass death in varied ways. Rose et al. summarize a few of them: “we eat animals, log their forests for housing, cull their numbers for convenience, destroy and transform their homes and lives through unyielding systems of development and security” (1). These “slow, cumulative effects” are sometimes identified as HIPPO: “habitat destruction, invasive species, pollution, human population growth, and overharvesting” (Heise 22). Added to this, extinction risk is changing through anthropogenic climate change. As the edited volume *Saving a Million Species* demonstrates, climate change can compound already existent ecosystem stressors. Take as an example that small-range endemic species are often restricted to relatively unique micro-climates, regions that will undergo change with global warming (Hannah 21). Take as an example the Sierra Nevada blue, *Polyommatus golgus*, a small butterfly endemic to small-range areas at the summits of the Sierra Nevada Mountains, in Spain. The snow cover in their high-altitude habitat is cooler than surrounding areas and provides protection from winds and supplies water (Munguira et al. 12). This rare habitat is representative of “interglacial relict areas where cold-adapted species have been able to survive unusually warm periods in the last ca 10,000 years” writes Ohlemüller et al. (568). Such regions are expected to “disproportionately shrink under future climate change” (Ohlmüller et al. 568).

35 “The dull edge of extinction” is Thom van Dooren’s term for the slow unraveling of multispecies relationships and loss that is extinction: “As a concept, [the dull edge] is an attempt to articulate a notion of, and focus attention on, extinction as a prolonged and ongoing process of change and loss that occurs across multiple registers and in multiple forms both long before and well after the 'final' death” of a last individual (58).
Who or what, exactly, is being lost in this moment of mass dying? Extinction and adaptation are normal components to the evolutionary process. But the “background rate” of extinction, often figured as either the number of extinctions per million species years or “the time intervals during which species survive,” is much lower than our present rate of extinction (Heise 21). Heise tells us “biologists estimate that we may be losing species at about 50 to 500 times the background level. If one adds to this figure species that may have gone extinct but whose status is not known with certainty, the extinction rate rises to 100 to 1,000 times the background level” (21). In their introduction to The Arts of Living on a Damaged Planet, Tsing et al. concur, adding that “some scientists argue that the rate of biological extinction is now several hundred times beyond its historical levels.” They surmise that “we might lose a majority of all species by the end of the twenty-first century” (G4).

But there are important distinctions to be made within these estimates of loss. Sodikoff calls our attention to the sixth extinction as “a species-bound perception of reality” (4). The sixth extinction, she clarifies, “is not defined by a steep reduction of all life on Earth but rather by a reduction in the abundance and diversity of macroscopic life” (4). And Heise reminds us that within the stories of catastrophic loss sometimes seemingly competing narratives are ignored. “Less catastrophic consequences,” Heise begins, “such as increases in local biological diversity, range expansion for certain species, hybridization, and the emergence of new species, are rarely mentioned” (22). All of this is not to belie the fact that there is much to lose. In “an entangled world,” as Tsing et al. have it, “where bodies are tumbled into bodies, extinction is a multispecies event” that represents an irreparable loss (G4). Rather it calls attention to specific species of interest caught in this moment but also to the types and ways humans choose to tell stories about them. In thinking through the discourse of extinction then, it is both the ongoing negotiation about what it is and the opportunity for reflection on the ways we craft stories of extinction that interests me in the context of game design.

A Poetics of Memory: Multispecies Commemoration

In a brief essay on memory, Tom Bristow considers the ways in which "public repositories of human and non-human memory" can offer, what he calls, a “poetics of memory” (307). Bristow is looking at and thinking about institutions and exhibits that have the power to shape our memory of past events and our ability to imagine the future. While he acknowledges that archives are “at once structuring our thoughts on the subject, and censoring and indexing an approach to a topic,” he calls on these very same institutions to find ways to bridge history and memory—memory here understood as “the continuity of what is lost.”

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36 Heise also points out the fact that the exact numbers are in dispute among biologists. She directs readers to ongoing conversations in Science in 2013 (Heise 21).
between the past and the present" but almost always within the domain of the human (Bristow 309). Bristow presents two divergent, but prevalent, ways of thinking about time, which organize our thoughts on memory and the archive with regards to the Anthropocene. According to Bristow, anthropologist Deborah Bird Rose sees the Anthropocene as a phenomenon that is "hailing us from the future into our now,” whereas, historian Libby Robin considers the Anthropocene as "an epoch that spans the past and the future" (310). So, which is it? A continuous flow of time we find ourselves in OR a future, taking shape and calling to us, in the present? Bristow’s “poetics of memory” demands that it be both. A “poetics of memory” requires institutions and exhibits to "affectively disclose a political tension between the idea of memory as recollection or witness of a forgotten past and memory being used to imagine or create a present or future community" (310). It is this concept of a “poetics of memory”—of recalling past events as a way of forging present or future community, a both/and—that interests me.

What (and why) we humans choose to remember, what we actively try to forget, and what we unknowingly let slip away, tells a lot about who and what we value. As cultural memory scholar Kirk Savage points out in his essay “History, Memory, and Monuments,” asking who, what, and how we remember brings us to a central question on “how commemorative practices actually shape social relations and cultural beliefs (rather than simply reflecting them)” (3). This is where commemoration reaches into the future. Commemoration is, Savage says, a “call to remembrance,’ to mark an event or a person or a group by a ceremony or an observance or a monument of some kind. Commemorations,” he adds, “might be ephemeral or permanent; the key point is that they prod collective memory in some conspicuous way" (Savage 1). It is customary to think about memory and commemoration in relation to humans. One key aspect of commemoration, of “prodding collective memory,” agues Savage, is that these practices directly “relate to the more everyday practices of schooling, reminiscing, and unconscious habit that carry knowledge and tradition from one generation to another” (3). And as the recent boom in memory studies since 1980s has shown, and the ongoing debates about Civil War Monuments in the U.S. have demonstrated (Silva), it is increasingly necessary to be critical of how collective memory is shaped and to reflect upon whose stories have been left out and by whom. Commemorative practices have so much power to shape the narratives of the future.

With this knowledge of commemorative practices and poetics of memory in place, several questions come into focus: Within this moment of the sixth extinction what do commemorations of the nonhuman look like, who are we called to remember? What might it mean to turn our observance, a “call to remembrance,” toward the non-human? How might these practices of remembrance, whatever form they take, shape future discourses on who is of value? And how might multispecies commemorative practices shape how humans see themselves? I wish to argue that a practice of multispecies commemoration is a form of Bristow’s “poetics of memory.” Such a practice helps bridge a gap between
a history of extinction, where non-humans are separate from humans and thus expendable, to our present, and through to a future, where “communities” are composed of entangled humans and non-humans, where questions of livability, flourishing, and extinction take place within new valuations of multispecies communities.

Facing Others: Ethics and Community

In her essay “Monk Seals at the Edge: Blessings in a Time of Peril,” Deborah Bird Rose outlines a concept of community that articulates why turning “poetics of memory” towards multispecies commemoration is an ethical imperative. The story that Rose tells is about Monk seals and the humans who guard them. It is about new ways of defining community. Monk seals “haul out” on the warm beaches of Hawaii to spend much of their day(s) sleeping. There they are vulnerable to humans who wish to do them harm but also, and perhaps more so, to curious humans who want to interact with the seals. The draw to the animals can be powerful because, as Rose attests, “entering into such close proximity with wild animals is a great and rare privilege for us humans” (“Monk Seals” 120). The targeted and unwitting harassment of monk seals on beaches, in conjunction with historic overharvesting and habitat loss, has led to the decline of monk seal populations. This prompted a number of efforts attempting to buoy the remaining population of seals, including the formation of a group of volunteers who watch over the sleeping seals. Volunteer responsibilities include cordoning off the area around the seal, keeping curious humans at bay, and sometimes, educating humans about seals (and interspecies etiquette) (“Monk Seals” 120 -124).

But why, Rose asks the volunteers, would you spend your free time, sometimes in foul weather, to guard the seals? The volunteers, Rose notes, are reluctant to justify their reasoning, often offering only brief statements such as “Because I can” or “Who wouldn’t?” (“Monk Seals” 133). In these statements, Rose identifies a refusal of justification, a decidedly ethical stance. The reason(s) the volunteer does the work he or she does will not, the volunteer seems to be saying, be subject to any regular logic. Rose suggests that on some level, the volunteer understands that “a justification within the rational community would bring the discussion back around to what is good for the human community” (“Monk Seals” 133). It is at the refusal to justify that Rose identifies a nexus of ethics and a new, nonrational community. Though the volunteers have no shared values, religion, or language with the seals, no chance of reciprocity—a few of the makings of a traditional, rational community—the volunteers find themselves compelled and called upon to respond. This is an important factor in the building of multispecies communities. “We often do not, and may never, understand others with whom

37 Specifically, Rose asked her interviewees: “Why do you do this?” (133).
we do not share the qualities of the rational community,” says Rose, “and yet we recognize that they, too, inhabit worlds of meaning. We acknowledge our shared vulnerability, and it follows that although our ethical responsibilities have no clear rational command, they make claims on us” (“Monk Seals” 134).

For Rose, this moment of “being called to” and the human “turning towards” is paramount—it is where community is articulated. Following Emmanuel Levinas, Rose argues that the volunteers in her story are claimed by, called to, and awakened toward the other (“Monk Seals” 134-135). This is connected to Levinas’s understanding of “the face,” which she writes elsewhere is the basis of face-to-face interactions, a mode of ethical encounter (Rose, *Wild Dog Dreaming* 13). Writes Rose: “In the face of the other I am always responsible. To ask to whom, or to what, does one come face-to-face is to ask to whom or to what am I responsible?” (*Wild Dog Dreaming* 13). For Levinas, “the face” is “the other who asks me not to let him die alone, as if to do so were to become an accomplice in his death” (Levinas qtd in Rose “Monk Seals,” 2017, 135). While Levinas was clear in his philosophy that animals do not have a face, Rose disagrees, saying “one experiences a face, an ethical call, a command from others, and it is only later that someone might ask whether it counts as ethics because the one to whose face one responded was an animal” (“Monk Seals” 135). The face of the seal, amid, to use Edith Wyschogrod’s term, the “death event”—human-caused mass death—that is extinction, calls out and makes a claim on us, drawing us into new forms of community (qtd in Rose “Monk Seals,” 2017, 136). This is why the volunteers’ initial refusals to justify their involvement as “guardians of the sleepers” is so crucial to Rose (“Monk Seals” 122). It constitutes, according to Rose,

a multifaceted refusal: the refusal to justify the suffering of others, the refusal to abandon, the refusal to translate ethics into the rational calculus—which is to say, the refusal to allow the integrity and beauty of ethical call and response to become fodder for rational discourse (“Monk Seals” 137).

**Turning Towards: A Multitude of Faces**

In the example above, extending the concept of community to the human/non-human entanglements of seals and the humans who guard them is perhaps easy to do. But most of humans will never have the privilege (or obligation) to come into regular or prolonged contact with wild animals. Too, there are a whole host of species that exist outside the charismatic-megafauna-purview as well as species that humans have yet to encounter. What claims, if any, do species we may never meet make on us? Are we capable of response to those we never face? In her essay “Encountering Leatherbacks in Multispecies Knots of Time,” philosopher and environmental humanist Michelle Bastian seems to say yes—species we never meet do make claims on us but it takes work to remain open to their call.
In “Encountering Leatherbacks” Bastian explores what it means to write in the time of extinctions. For Bastian, the activity of writing is a way to practice Deborah Bird Rose’s imperative of “turning-towards:”

An ethical practice that acknowledges histories of distance and disaster, and yet still seeks to be responsive to others’ suffering and joy, and to others’ life and death. Always situated in history and in relationship, turning toward seeks to mend relationships, to make worlds that are hospitable to life (Rose, *Wild Dog Dreaming* 12-13).

The species to whom Bastian turns, the face to which she responds, is the leatherback turtle. She wishes to understand the threatened extinction of the leatherback turtle “as something more than a crisis happening in a wide blue elsewhere” (Bastian 149). The work of entangling herself and leatherbacks takes, she admits, “a circuitous route” that includes “clocks, filing cabinets, conference deadlines, journal articles, fellow commuters, YouTube videos, and a walk along Edinburgh’s Water of Leith” (Bastian 150).

What follows in the rest of the essay are short vignettes tethered together by shared time with leatherbacks. In one, Bastian is returning home with groceries while far distant from her Sydney home, on the beach of Playa Grande in Costa Rica, a leatherback turtle by the name of PTT ID 56280 hauls up to lay a clutch of eggs (154-155). Finding herself “in-sync” with the leatherback leads her into all sorts of relationships—with jaguars who are learning to eat turtles and so have to switch their sleep cycles to match leatherbacks’ cycle, to jellyfish blooms off the coast of Ireland (and the turtles that eat them) where jellyfish were previously not known to aggregate (Bastian 161-165). Bastian’s goal is to practice a mode of response that, in the words of Rose and van Dooren, “hold[s] on to a curious attentiveness to the lives and deaths of others in a world in which so much is slipping away” (“Encountering” 126).

It is through writing and thinking about time and space that Bastian synchronizes herself with the leatherback’s way of life in perilous times, but it takes imaginative work to do so. Bastian—a professor of architecture, an environmental humanist, and a trained philosopher—thinks about animals and is engaged in extinction studies. Without question, she is primed to do the work required to connect herself to others and thus respond to their call, probably more so than most humans. Importantly, Bastian is actively seeking to retie knots of care and commitment, to reacquaint herself with entangled beings and processes of becoming and becoming undone. This practice requires two fundamental moves—a move to connect and a move to sustain that connection. The first requires a negation of a human/nonhuman divide. The human/nonhuman binary makes it possible to ignore nonhuman deaths; it marks some beings as worthy of care and consideration and others not (Rose *Wild Dog Dreaming*, 21 – 22). Dissolving this divide and thinking species as beings in interdependent entanglements, of which humans are a part, is the first and fundamental step to “becoming-witness” to nonhuman others. The second move of sustaining connection
requires that one not look away. To quote Rose, “on all of us death makes this claim: that we look into the eyes of the dying and not flinch, that we reach out to hold and to help” (Wild Dog Dreaming 20). To make and sustain connections is to actively work against a culture that has historically removed itself from the death and dying of others, especially nonhuman others.

The phenomenon of species extinction, how we think it and how it comes to register with us in a way that produces action, is a task that various authors have suggested modes for approaching, particularly modes of writing. Deborah Bird Rose calls for “slow writing,” a practice that works against “rationalization, fragmentation, and separation,” that requires “taking time, slowing down, doing things carefully, but also […] living in the present temporalities, localities, and relationalities” (“Slowly: Writing” p. 3). Thom van Dooren stresses the importance of telling “lively stories,” of using narrative to “make thick” the lives and deaths of species so that people might be brought to care (9). Tsing et al. gather narratives from scientists, writers, artists, and scholars to show readers “how to pay better attention to overlaid arrangements of human and nonhuman lives” (G1). Their hope, they write, “is that such attention will allow us to stand up to the constant barrage of messages asking us to forget” (G1). These practices, of slowing down, making thick, and bringing attention to are necessary for remaining open to and sustaining connection within extinction.

To these writing practices that draw and sustain attention I would like to add the underexplored possibilities of games. In particular, I want to investigate how games move us and how affect might be harnessed for a sustained reflection on species extinction. Thinking through the possibilities of games leads me to these questions: How might a game’s mechanics be altered to allow for an opportunity for negotiation around the meaning of extinction? How can a game’s imagery communicate loss and to what end? Might a game be designed as a mnemonic device, helping players to remember and calling players into remembrance, as a form of multispecies commemoration? Might a game meant to strengthen our recall of both visual and spatial information be remade to help strengthen our powers of observation and attentiveness toward nonhumans in peril? I explore all these questions through a game adaptation of Memory that I made called recollect.

**Kai-awase and Poetry: History of the Game Memory**

In “‘Karuta’: Sport or Culture?” artist David Bull recounts an evening observing the game “Karuta” played in a dimly lit community space in Japan. A chanter sits in the front of the room and

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38 Bull does not recall the specific location of the game he observed. Bull, David. “Reply: Requesting Information about Karuta Game.” Message to Erica Damman. 2 Feb 2018. E-mail. Bull has studied and created traditional Japanese inspired woodblock prints since the early 1980s.
begins to call out the first lines of a poem. The players in the room attempt to complete the poem. The poem snippets are printed onto cards. One card has the beginning of the poem on it, and another card, its matching card, has the second half of the poem on it. Historically, a deck of cards, 200 cards, that is 100 pairs, would have been hand painted or wood block printed. The goal of the game is to match the beginning of the poem to its second half, which the chanter has in card form and the players may have memorized. Because the Karuta set (game) is composed of 100 poems written by well-known writers, some dating back to 1,300 years ago, knowing these poems is a demonstration of one’s status (Bull 81). Karuta serves as both mnemonic device and temporary community builder. The cards that make up the Karuta game serve as flash cards enabling the memorization of the historical poems. But also playing them encourages the formation of a temporary community organized by the call and response initiated by the chanter and answered by audiences’ responses.

Figure 16 *Shell Game (Kai-awase) Set*. 18th Century. The Metropolitan Museum of Art. ARTSTOR University of Iowa.

The game of Karuta is contemporaneous with and closely related to the game of Kai-awase, which translates to "matching" or "joining" in Japanese. Kai-awase consists of up to 360 pairs of clamshells, each containing hand-painted interiors with matching imagery or sometimes snippets of literary texts. To make these sets, artisans selected the exteriors of a clamshell (top and bottom of the clam shell) to match as closely as possible in size and color to hundreds of other clamshells. Each clamshell was split into top and bottom and the interiors were painted with matching images of objects, places, and species, for example, a tree, a vase, a boat, or a person [see Fig.16]. To play Kai-awase, the
exteriors of the shells were arranged so that they were visible or up and the painted images were hidden, face down on a table. Matches were attempted through successive turning over of shells. These sets were fashionable among nobility of the Heian period (794 – 1185 C.E.) (Bull 72).

In the 16th Century, European trading cards were introduced to Japan through Portuguese traders and the game of Kai-awase, formerly, strictly a game of nobility, became e-awase—a card-based version of Kai-awase. More easily mass produced than hand-painted clam shells, the cards were quickly adopted by the warrior class as a method of gambling and only later became a pastime for women and children in the early years of the Edo period (1603- 1867 C.E.) (Bull 73). Since its arrival in the United States in the mid 1940s, the game variously known as Memory, Concentration, Match Match, pairs, or by many other names, and is now available in hundreds of different versions. The game exists in both analog and digital forms; it is marketed to young children for various purposes including: as a way to teach the taking of turns, to help with memorization of multiplication tables, and to assist in the learning of important figures of U.S. History (“American History Memory Game”). It is also touted as a fun way to keep one’s memory sharp, as one ages (Shutterfly).

Clinical Trials: The Role of Strategy

It is commonly held that children are better at the game Memory than adults. There are, however, conflicting opinions on whether or not this belief holds true in clinical studies. In one study, children were found to have a slight advantage in making “perfect pairs” once the two cards had been seen by a player on the board. Children were better able to remember and produce a match with more regularity than adults (Baker-Ward and Ornstein). This “perfect” task performance had to do, the researchers believed, with children’s developmental stage and preference for visual over verbal encoding (Baker-Ward and Ornstein 331). Another later study both supported and refuted these findings by determining that children did indeed record fewer spatial errors, that is, they remembered where they had last seen a card, but had less efficient strategies for information gathering within the game than adults (Schumann-Hengsteier). Despite performing less well on “where” a card was (the location of a specific card), adults were better at knowing what moves to make next (Schumann-Hengsteier 79).

Interestingly, the game is not just a means to test human visuospatial memory. Researchers at Georgia State University used a version of the game to look at species differences in visuospatial memory between humans and Rhesus monkeys. David A. Washburn and Jonathan P. Gulledge showed in “A Species Difference in Visuospatial Memory in Adult Humans and Rhesus Monkeys: The Concentration Game” that Rhesus monkeys are not good at the game. The monkeys “were susceptible to perseverative errors—repeated commission of the same error or small subset of errors in a problem—that were as debilitating as they were inexplicable.” They continued, “it was not apparent why the monkeys would...
occasionally perseverate on an error, resulting in dozens or even hundreds of errors on a single problem” (300). This, the researchers concluded, “reveals something meaningful about the capacity, code, or control of visuospatial working memory across primate species. Exactly what these patterns mean, however, must be the subject of further investigation” (302).

**Game Scholars: Perspectives on Memory**

While Memory and its precursors may seem simple, its potential for generating meaningful play is evident upon closer inspection. The threshold into the magic circle of Memory is very low because the “artificial rules and rituals,” the entry point for being in the game and momentarily exiting reality, are very easily adopted and relatively simple (Salen and Zimmerman 332). Too, the turning over of cards in preparation for attempts at matching—the “initial set of chores” that constitute the ritual of entry—could not be simpler (Salen and Zimmerman 332). Because the game is well known, there is also an added familiarity and approachability in the format of the game and of the cards. A low threshold of entry is one part of the “seduction” of the game, meaning it’s easier to get players to begin, and continue, playing (Salen and Zimmerman, 333).

Games with cards are always, at least to one extent, games of imperfect information because one side of a card reveals its identity, while the other side conceals it (Salen and Zimmerman 203). At the beginning of the game Memory, all cards are face down. No players know ‘where’ or ‘what’ cards are. This means that initially there is a low chance of making a match because information is hidden from players. This starting point, enabled by the imperfect information of cards, helps to “add an element of mystery and uncertainty to the game” (Salen and Zimmerman 205). As more matches are made, and more information is learned through failed attempts, all of the information gradually becomes known. However, because players are required to store all of that information in their memories, the information is often lost or misremembered in the process. It is not until much later in the game, when the number of cards still requiring matches has been greatly reduced that the possibility of holding the location and identity of the cards in one’s memory becomes more plausible. In the meantime, individual players are keeping the information they know to themselves. This quality of imperfect information from the start of the game and individual capacities for holding visuospatial information makes the game, though relatively simple overall, challenging and pleasurable to play.

In addition to the pleasure derived from the mystery of imperfect information, the game is pleasurable because of the opportunity to develop and test strategy. Most humans’ memories are imperfect, especially when tasked with recalling anywhere from thirty to sixty cards’ locations and

39 Often, for children’s versions, the game’s cards are made out of pieces of wood or thick cardstock, making them easier to grasp.
identities, revealed over short bursts of time. There is a pleasure to devising strategies for figuring out and remembering “what” is “where.” As cards are turned over, and more and more information becomes known, players’ strategies for both discovering and memorizing new information get tested. Such strategy involves maintaining (and withholding) the knowledge one has, while trying to find out new information. For example, if a player knows for certain where one card is, they might (wisely) choose to not turn that card over again because to reveal a card unnecessarily might result in their opponent making a matched pair. Mystery and strategy combine in Memory to create what Salen and Zimmerman call a “discernable action-outcome sequence.” The player devises a strategy, and then when it is her turn, takes action, turning over two cards. The action is made in an effort to obtain certain goals—a long-term goal is to win the game, a short-term goal is to make a match, and an even shorter-term goal, is to reveal yet unknown information. Having goals and making plans, i.e. strategizing, and attempting to achieve them, generates pleasure (Salen and Zimmerman 344).

Another facet of pleasure I want to draw attention to in the game of Memory is that of what Salen and Zimmerman call the “same-but-different” quality available in some games. The pleasure of “same-but-different” can happen with any game that can be played more than once. In all cases, a player begins a game at the beginning. Everything that can happen thereafter, within the structure of the game, is the same as the last time that the player played the game, but different, in that the “experiential path that a player takes through the space [of the game] will vary each time the game is played. Every play of the game,” Salen and Zimmerman continue, “will be unique, even though the rules of the game, its formal structure, remain fixed” (340). This same-but-different quality allows a person to experience the game of Memory as a structure they know but whose individual play instances they experience anew. This same-but-different quality “is a powerful engine that sustains and encourages play” (Salen and Zimmerman 340).

This same-but-different quality to the game of Memory reverberates even further if one considers play experiences one has had in one’s lifetime thus far. A player experiences the activity of game play as a same-but-different type of play they’ve encountered before. The rhythm of play—the back and forth of turn taking, the stylized interaction within the game, the adoption of a ruleset, the implicit and explicit rules in play—becomes a bouncing back and forth between the familiar and the new, the remembered “before” and the engaging “now.” Falling into this patterned activity, the rhythm of play, even within so simple a game, is deeply pleasurable (Salen and Zimmerman 341). This pleasure within play, as structured through games, is an important component of my efforts to push back against human habits of the mind that encourage one to forget or diminish the importance of species extinction.
Figure 17 *recollect*. 2018. Personal Collection.
recollect: Multispecies Commemoration

recollect consists of eighteen paired images for a total of thirty-six cards in the deck, and a custom-made “clamshell box,” [see Fig. 17]. The deck of cards is accompanied by a 4-fold pamphlet explaining the rules and brief history of the game, a description of the species images, and three prompting questions: “Why do some cards have color and others do not?” “Why are some species only outlined?” and “Do you recognize any of the species on the cards?” [see Fig.18]. The clamshell box is 4.5 in x 8.5 in. and is constructed out of book board, book cloth, Strathmore 403-11 Series pastel paper, and polyvinyl acetate. Each of the thirty-six cards is 4 in x 4 in, constructed of paper, book board, and polyvinyl acetate. Each image features an original drawn intaglio print. Intaglio is a type of printmaking in which lines are incised with a sharp stylus, into a surface, in this case plexi-glass. The incisions hold ink. The ink is transferred, under pressure, onto damp Reeves BFK paper. Reeves BFK paper is a 100% cotton paper with a smooth surface, selected for its durability.

Figure 18 recollect Pamphlet: Front, Interior, and Back. 2018. Personal Collection.

The species images for recollect represent three generalized categories: “deep time,” “near time,” and the present (and by extension the foreseeable future). In their essay on lemurs and extinction in

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40 A clamshell box or "drop-spine box" is comprised of two nesting enclosures (an inner tray and an outer tray) connected by flexible spine.
Madagascar, Laurie R. Godfrey and Emilienne Rasoazanabary emphasize that “extinctions can be viewed in deep time, in near time, or in today’s world; each view generates insights that cannot be gained from any of the others” (165). Godfrey and Rasoazanabary note that the main difference between deep time and near time extinctions is the presence of humans—in a deep time perspective “humans cannot have been responsible” (165). The five species chosen for this period category in recollect represent one species from each of the five main past extinctions [see Fig. 19]. Quaternary extinctions, on the other hand, those in “near time,” “demand a consideration of humans as at least possible agents of extermination” (Godfrey and Rasoazanabary 165). A paleoecological perspective tells us that on every continent except for Antarctica, before the arrival of *Homo sapiens*, there were diverse and abundant mega fauna. “It was during the very last part (the most recent 100,000 years) of the geological period called the Quaternary,” Godfrey and Rasoazanabary state, “that people began to populate many regions that had never before experienced their presence, and these regions, one after the other, suffered dramatic species loss” (165).

From within “near time,” I chose four species [see Fig. 20]. For present time, I chose nine species for their designation as globally and/or locally endangered, two of which have global recognition; the rest are specific to the region of the Midwestern United States [see Fig. 21]. The number of present/future of species is outsized compared to each of the other two categories because I wish to keep player focus on the present situation. The species of “deep time” quickly cue players into the topic of the game. Most players can recognize species such as dinosaurs or trilobites as being extinct. Species from “near time” such as the passenger pigeon and dodo bird may be less well known but are inferable as extinct. The present/future category of species depicted on the cards of recollect requires further explication.

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41 Quaternary is also variously called Pleistocene and Holocene (Godfrey and Rasoazanabary 165).
Left to right, top to bottom:
Graptolite, *Graptolella*—Extinct, End Ordovician, 444 million years ago;
Rugose Coral—Extinct, Late Devonian, 375 million years ago;
Trilobite, *Modocia typica*—Extinct, End Permian, 251 million years ago;
Conodont—Extinct, End Triassic, 200 million years ago;
Triceratops, *Triceratops horridus*—Extinct, End Cretaceous, 66 million years

Figure 19 recollect *Deep Time* Species. 2018. Personal Collection
Left to right, top to bottom:
- Woolly Mammoth, *Mammuthus primigenius*—Extinct, 10,000 years ago;
- Dodo Bird, *Raphus cucullatus*—Extinct, late 1600s;
- Rocky Mountain Locust, *Melanoplus spretus*—Extinct, 1902;

Figure 20 recollect "Near Time" Species. 2018. Personal Collection.
Left to right, top to bottom:
- Common Barn Owl, *Tyto alba*—Endangered in Iowa;
- Indiana Bat, *Myotis sodalis*—Endangered;
- Polar Bear, *Ursus maritimus*—Vulnerable;
- Monarch Butterfly, *Danaus plexippus*—Status Pending (2019);
- Topeka Shiner, *Notropis topeka*—Endangered in Iowa;
- Rusty Patched Bumble Bee, *Bombus affinis*—Endangered;
- Blue-spotted Salamander, *Ambystoma laterale*—Endangered in Iowa;
- Western Prairie Fringed Orchid, *Platanthera praeclara*—Endangered

Figure 21 *recollect Present/Future Species*, 2018. Personal Collection.
Attending to Local Players: Species of the Midwest

Of the nine species chosen for the present/future category, two are flagship species already used in environmentalist and conservationist efforts to build public engagement with species extinction—the polar bear and the Monarch butterfly. I use them as many others do, as shorthand for species extinction as a whole, in the present. They quickly queue players in to the fact that the game is not just about past losses but instead also speaking about the present. But then I depart from such popularly known species to consider seven species in the Midwestern United States. I chose these species for two reasons. First, they are the species that, should my players living in the Midwest have much extended interaction with natural areas that surround them, they may have had chance encounters with. Even without the possibility of chance interactions, the incorporation of regionally specific species taps into place-based affinities. The story of extinction so often takes place far distant from individuals in the Midwest—on the polar ice sheets (Polar bears), in the bamboo forests of China (Panda bears), in the depths of the Pacific Ocean (Gray Whales). As Michelle Bastian’s attempt to embed the leatherback turtle in her life in such a way as to render it as “something more than a crisis happening in the wide blue elsewhere” illustrates, bringing home the plight of species in peril is work, even for someone primed to do so. Love of place, or at the very least, identification with place, has long figured in narratives for how to get people to care. Choosing species from the region of my game testing works to bring species extinction closer to home for my chosen audience. Second, as species that are typically not the poster children of conservation and environmental movements, they become touchstones for other, “unloved others”—“the countless other creatures who are less visible, less beautiful, less a part of our cultural lives” and who we sometimes dislike and actively vilify (Rose and van Dooren “Unloved Others” 50).

Representing Loss: Tracing the Void

The question of how to represent and communicate loss has long plagued memorial and commemoration practices. As memorial scholar James E. Young discusses in the context of human commemoration practices that take physical forms such as monuments, the difficulty in representing loss is being able “to articulate a void without filling it in […] to formalize irreparable loss without seeming to repair it” (2). As an example, Young offers the “negative form” of Maya Lin’s Vietnam Memorial (1982). Young asserts that Lin’s work expresses loss through void (2-3). The Vietnam Memorial, Young argues, articulates loss and absence through the “carved-out pieces of landscape, as well as by the visitor’s descent downward (and inward) into memory” (3). The memorial is “defined by our movement through its space, memory by means of perambulation and walking through” (Young 4). Loss is communicated in the physical form of the monument and commemoration takes in the embodied engagement with the piece. The task for a game designer wishing to take on loss and memory is to do memorial work without
the help of a physical, monumental form and to do so in a more explicitly playful form. As the discussion of recollect will demonstrate, a game can express loss in ways different from traditional commemoration practices. At the same time, it can operate as a poetics of memory, serving as a visual mnemonic that can call us to remembrance and create temporary community around the void of extinction as it is taking shape now. Doing so can articulate the void of extinction without filling it in.

In the edited volume *Arts of Living on a Damaged Planet: Ghosts*, Tsing et al. state that “extinction leaves traces” (G5). The concept of trace is one I want to consider in more depth because it offers one avenue toward expressing the void of species extinction. Tsing et al. don’t define trace, but instead offer an example. Northern trees, such as oaks, grow back when cut down (G5). This ability to regrow is a trace, they suggest, of the animals that once roamed there but are now extinct. The trees “may have evolved that ability in times when elephants trampled them. The ghosts of lost animals haunt these plants, even as the plants live on as our companions in the present” (Tsing et al. G5 – G6). In this instance, trace can be understood as something left behind, some small but discernable feature that we can “read.” It is the imprint and outline of a shape of multispecies relationship in which trees and elephants and many other species participated.

Here too, trace has to do with the bulk of the work that the various contributors are doing within the edited volume itself. The verb trace means variously “to follow (a course); draw a line, make an outline of something; to ponder and investigate; to look for, follow, and pursue.” Many of the authors, in their efforts to understand how “human-induced environmental change threatens multispecies livability,” trace or follow the course of modes of thought and being that have helped shape our present moment. Tracing requires a looking backwards and exploring the past in the present in order to understand species extinction in the age of climate change. But “to trace” is also a decidedly forward moving action. In some creative visual art practices, tracing is an integral step toward the commencement of a project, a first task for making a new work.

Trace, as in to make an outline, is the action I used to create a void that can communicate species loss without presuming to fill it in. This is to say, in recollect, the matching cards are not exact duplicates of one another. Rather, one of the two drawings of the species are a mere outline, a trace. The outline of the extinct or possibly soon-to-be extinct species in recollect reads as an erasure even while the shape of the thing remains. In recollect, the player(s) come to recognize a near-perfect or non-matching pair through the outline; the shape retains an echo of the original [Fig. 22]. Players come to understand that the trace signals that there is a difference in the cards, that is, that in one image the species is there and in another it is not. But also, the trace communicates a larger categorical difference between the near time and present/future extinctions and previous extinction events.
The human brain has trouble remembering abstract and impersonal information. We are better at remembering the relatable—faces like ours, lives with whom we are directly entangled. What could be more abstract than a million species going extinct? Or species extinction that took place because of humans thousands of years ago? Or mass extinctions occurring hundreds of millions of years ago? *recollect* becomes a visual mnemonic whose central task is to “call to remembrance” species loss and our role in it. Importantly, it recalls one to the fact that memory is a capability that can be exercised and strengthened toward what Rose and van Dooren call “curious attentiveness”—an exercising of our powers to pay attention, to be and remain “[open] to the call of others” (“Encountering” 125). Learning to see the trace as a link to a much bigger story about loss and human/nonhuman relationships, about co-mingling and unraveling worlds is where the act of remembering within *recollect*, a multispecies commemoration, takes place and reaches into the future.

**Same-but-Different: *recollect*’s Divergence**

Memory is a game of imperfect information—it is card-based, it has a starting point with all cards facedown, and it withholds information through limited, partially revealed information during turn taking. But there is another way in which my mod *recollect* is a game of imperfect information and this has to do with a purposeful slippage within the objective information. Objective information is the information that structures a game (Salen and Zimmerman 208). The rules of *recollect*, and other *Memory* games in fact,
tell players: all cards are pairs; the goal is to make matches by matching cards into pairs. What the rules do not divulge is what constitutes a pair. In Karuta, the cards are pairs based on their being the beginning half and the second half of one poem. In image-based Memory games, the images are usually exact matches—the apple goes with the apple, the chair goes with the chair, the tree goes with the tree. Unlike typical games of Memory, recollect is composed of perfect matches, near-perfect matches, and non-matching matches. Perfect matches are identical from one card to its partnering card, for example, trilobite goes with trilobite [Fig. 23].

![Figure 23 recollect: Perfect Match—Trilobite. 2018. Personal Collection.](image)

Near-perfect matches are composed of an image and its trace [Fig. 24]. Non-matching matches are images of a species in its habitat with an accompanying color swatch. The cards with the species belonging to present/future are the only ones where habitat is rendered within the pictorial space. One card shows the species in its habitat. The other shows neither the species nor the habitat but merely the trace of the species and a portion of the color swatch [Fig. 25]. The incorporation of color serves two purposes: it serves as a clue for players to match non-matching cards and it signals to players that the species and habitats accompanied by color are species who belong to the present, lively world.
Just like in a more traditionally designed game of Memory, *recollect* proceeds through the taking of turns and the making of matches. But the evolution from imperfect information to known matches, through the repeated turning over of cards and strategy for remembering them, is halted in *recollect* by the
turning over of cards that seem to have no matches. At first, the near-perfect matches and non-matching matches are taken to be one of many images that the player has yet to find a pair for. But as more and more perfect matches are made, and more and more attempts turn over near-perfect matches that the players remember, something happens. These near-perfect matches and non-matching matches produce a rupture in the knowledge economy of the game. The objective information, which structures the game and which all players know at the start of the game, remains unchanged: all are pairs. But players’ understandings of the objective information are informed by perceived information (Salen and Zimmerman 208). At some point, one or all the players begins to think: if all are pairs and we only have these cards left, some other logic for what constitutes a “match” must be in operation. This deduction occurs twice in recollect as players move from the perfect matches (of which there are five pairs), through to the near-perfect matches (of which there are four pairs), and finally, through the most difficult transition, to the non-matching matches (of which there are nine pairs).

Memory requires both spatial memory, where the card is on the table relative to the other cards in the game, and visual recognition, that is, which cards are visually a match with others that the player has seen. Because the information in the game is made public over time, we are forced to rely on our memories to store that information. Human memory is fallible, especially with so much information made public for such short bursts of time, that is, after a player makes a failed match. The moment for recognizing and memorizing the card and its position is limited. Visual and spatial memory is made more difficult in recollect. Because players are unaware, at first, of the non-matching matches, and are later confounded by them, they spend several turns believing that failures in their visuospatial memory are to blame for not making matches. But after a time, perceived information forces a conversation among players on how to continue the game given the new information that they surmise. A discussion ensues about the game, the players’ understanding(s) of what’s happening in the game, and their thoughts about whether these cards [usually the cards most recently turned over, at the moment the player becomes convinced that something else might be at play] are indeed matches and what makes them so. Collaboration, negotiation, and consensus is required if the game is to proceed.

This moment breaks individual strategy practices as well as the rhythm and normal conditions of the game but adds intriguing elements of conversation, card comparison, image evaluation, and attempts at deciphering the meaning of the difference(s) within the cards that are matches nonetheless. By changing the ingredients for what constitutes a pair, I added additional uncertainty and challenge to a somewhat over determined game. The moment forces an exploration between players’ knowledge of the types of extinction events that have occurred in the past, a reexamination of the cards that had already been matched as compared to those yet on the table, and a conversation about what made these cards—or “this type of extinction”—different from other cards. In making the choice together on how to proceed,
the players are participating in a game as an emergent system. Players find themselves participating and determining, to some effect, the relationship between the ruleset or structure of the game, their actions (the negotiation about how to treat the non-matching matches), and the outcome of these factors—all of which contributes to meaningful play (Salen and Zimmerman 199). Ambiguity within the objective rules becomes another element of play within recollect and a pathway to the environmental stakes of the game.

An additional reason to insert near-perfect and non-matching matches into the game has to do with the power of the same-but-different concept introduced earlier. When the hidden information of the unusually defined matches becomes apparent, the rhythm of making matches is upset, but this moment also produces a hiccup in the game and by extension in the perceived linearity of the extinction narrative itself. Determining the “what” in “what is different about these non-matching matching cards” is followed by a “why,” not only the “why would the game designer build this into the game” but also “why did these species go extinct” and “why are these not-yet-extinct species included in the deck”? This moment of disruption challenges the internal narrative of the supposed inevitability of extinction for some species. It is a small but meaningful moment when players can practice their observation skills and push against a quick intuitive reading of the problem. This exercising of our attentiveness contributes to a practice of slow thinking which is necessary for apprehending the environmental problems before us.

recollect and the Poetics of Memory within Game Playspaces

Extinction is both a cultural and biological phenomenon and our current status within the sixth mass extinction calls us to reexamine how we might engage with extinction in all its nuances. Various scholars have proposed ways in which to engage the public and tell the stories of extinction so as to alter how humans participate in the unraveling of nonhuman others’ lives. Games offer a relatively underexplored avenue to do this same work. Games are often used in collaborative game labs to study gaming as a means to affect human thought around human health concerns. Take for example, Patrick Jagoda’s Chicago Game Changer Lab which uses games to introduce, shape perspectives, and research communication strategies around sexually transmitted diseases in Chicago teenagers. Using games as commemoration, as spaces that encourage the witness and contemplation of species loss marshalls the power of play to different ends. By exploring and adapting the game Memory, I was able to bring the concept of a poetics of memory to a game format. This enabled me to call attention to historical aspects of extinction and build temporary communities around the topic. This performs a both/and of reaching into the past and the future around species extinction. Furthermore, by adding “unloved others” of the Midwestern US and enabling a slippage in the objective information, I added additional play elements within the game that connect players to environmental stakes.
To read about the iterative design and playtesting process, and the results from game play events, turn to page 170.

Notes

xxvi See for example: Tsing et. al. 2017; Kolbert 2014; van Dooren 2014; Sodikoff 2012.


xxviii For an interesting take on the deep-sea creatures we have yet to meet or name but whose lives are no doubt affected by humans, see Stacy Alaimo’s “The Anthropocene at Sea: Temporality, Paradox, Compression.”


xxx For additional studies that use the game for understanding human capabilities, see for example, Eskritt, Michelle et al. “The influence of symbolic literacy on memory: Testing Plato’s hypothesis.”

CHAPTER 4: SNAKES AND LADDERS AND FRINGE-ASSAY: DESIGNING CONSEQUENTIAL DIFFERENCES

This chapter is about my design of a game that embeds players in the experience of systemic complexities and differential environmental injustices of climate change. First, I look to developments in the field of Geography, particularly theorizations around hazards and vulnerability, in order to find ways to bracket and make legible, within a game’s playspace, what Timothy Morton calls the hyperobject of climate change. Second, with an understanding of the systemic and environmental justice complexities of climate change, I re-examine what scholars have meant by place as it relates to game design decisions. This chapter closes with an introduction to and consideration of Fringe-assay, a mod of Snakes and Ladders. Despite variations to the game over time, Snakes and Ladders, as a form, affords the territory of the board, the sequential movement intersected by swift promotion and demotion, and the opportunity for embedding narrative. All of these features lend themselves to the goal of creating an immersive playspace where players can encounter differential hazards and vulnerabilities specific to climate change. The goal is to make the hyperobject of climate change thinkable to players, by overlaying some of its geography onto the territory of a game board, tracking some of its short- and long-term effects on people, nonhumans, and places, and highlighting a few of the stories of individuals differently and adversely affected.

Systemic Complexity: the “Hyperobject” Climate Change

The earth’s climate has changed over geological time, experiencing both warm and cold spells that lasted thousands or millions of years (Dunbar). The moment of global warming we find ourselves in now is of a different character. In the summer of 1988, climate scientist James Hansen testified before a US Senate committee that the earth was warming, and the cause was, with ninety-nine percent certainty, human-made greenhouse gases (Hansen xv). This began a decades-long effort by scientists from many fields to try to get a hold on what climate change is and what its effects are and might be. Three decades later, climate change remains one of the most pressing challenges of our time. It poses “a considerable threat to life on Earth” (Hodson S53).

The main human activity causing climate change is the burning of fossil fuels especially from the pre-Industrial Revolution to the present. The burning of fossil fuels, for transportation, industry, and human comforts like air conditioning, releases gases such as carbon dioxide, methane, and nitrous oxide into the air. These have an insulating effect on the Earth’s atmosphere, inhibiting the normal exchange of heat waves in and out of the atmosphere (Tremmel and Robinson 27). Natural and human-caused factors
“expressed as radiative forcing” alter “the energy balance of the climate system” driving “warming and cooling influences on global climate” (IPCC 2007). The Synthesis Report of the Intergovernmental Panel on Climate Change, 2014, clearly defines the relationship of humans to global warming trends:

Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century (The Summary for Policy Makers [SPM] 1.2. par. 1).

The findings in the IPCC, 2014 reports argue “that the more human activities disrupt the climate, greater are the risks of severe, pervasive, and irreversible impacts for people and ecosystems, and long-lasting changes in all components of the climate system” (“Synthesis Report” v). For the purposes of this study then, following the IPCC report and climate experts, climate change is defined as changes in global atmospheric patterns, caused by human activity, that affect the potential for survival of humans and nonhumans on planet earth.

The human-caused impacts of climate change manifest in several observable ways.

- Perhaps the best-known manifestation of anthropogenic climate change is a rise in average temperatures. According to the consortium of scientific experts who authored the Intergovernmental Panel on Climate Change’s Synthesis Report, “the period from 1983 to 2012 was likely the warmest 30-year period of the last 1400 years in the Northern Hemisphere, where such assessment is possible” (IPCC AR5 “Synthesis Report” 1.1.1 par. 2). This means, that since 1900, global average temperatures have increased by 0.75°C (1.35°F) (Tremmel and Robinson 46). A change of a 1.35°F may seem insignificant but in an example of agriculture in the United States, such increases mean more frost-free days. This means there are and will be longer growing seasons but also higher incidences of some pest species and a shift in which crops can grow where.xxxii

- Another effect of anthropogenic global warming is the release of carbon dioxide and its impact on oceans. While carbon dioxide affects the atmosphere, the world’s oceans absorb it. “Since the beginning of the industrial era, oceanic uptake of CO2 has resulted in acidification of the ocean; the pH of ocean surface water has decreased by 0.1 (high confidence), corresponding to a 26% increase in acidity, measured as hydrogen ion concentration” (IPCC AR5, SPM 1.1.2 par. 1). The current rate of acidity change in the oceans is 50 percent higher than historical records (Climate Central “Ocean Acidification”). The acidity corrodes shellfish and coral and makes it more difficult for fish to breathe.
The effects of climate change are pronounced in the Polar Regions, ice sheets, and glaciers. “Over the period 1992 to 2011, the Greenland and Antarctic ice sheets have been losing mass, likely at a larger rate over 2002 to 2011. Glaciers have continued to shrink almost worldwide” (IPCC AR5, SPM 1.1.3 par. 3). In places where glacial melt is crucial to providing drinking water and water for agriculture, such as Bolivia, the loss of glaciers leads to significant water shortages. “The annual mean Arctic sea-ice extent decreased over the period 1979 to 2012, with a rate that was very likely in the range 3.5 to 4.1% per decade. Arctic sea-ice extent has decreased in every season and in every successive decade since 1979” (IPCC AR5, SPM 1.1 par. 8).

The melting of both glaciers and sea-ice, in conjunction with warming temperatures, leads to sea-level rise. As Steve Nerem of the Sea Level Change Team for NASA’s global climate change reports, “given what we know now about how the ocean expands as it warms and how ice sheets and glaciers are adding water to the seas, it's pretty certain we are locked into at least 3 feet [0.9 meter] of sea level rise” (Viñas and Rasmussen par. 4). Hundreds of millions of people live near coastlines and will be affected by inundation from rising sea levels.

What’s clear in all of these examples is that the rate at which humans are driving change to the climate system is faster than the earth, nonhumans, and it seems even we humans, can adapt to. As Joerg Tremmel and Katherine Robinson put it poignantly in their opening chapter of Climate Ethics, the world as we know it evolved over millions of years, changing to develop an atmosphere and ecosystem optimal to life forms currently inhabiting the Earth. Expecting the atmosphere to be able to cope with the drastic changes of a mere 160 years to its millions-of-years-old foundation would be like submerging people under water and telling them to grow gills (25).

Climate change affects the whole of the planet and its inhabitants, human and nonhuman. It is temporarily and spatially vast, and yet it is felt as immediate and intimate. It seems temporally out-of-whack when one tries to think it: it is long in the making, experienced in the present, and will continue to affect the future for centuries to come. It is a problem comprised of natural, social, political, and psychological complexities. It is what Timothy Morton has called a hyperobject. Thinking hyperobjects is, according to Morton, “intrinsically tricky” because “one only sees pieces of a hyperobject at any one time” (4). Hyperobjects are “viscous” in that they “‘stick’ to beings that are involved with them” (1). They are “non-local,” meaning that any “local-manifestation” is “not directly a hyperobject” (1). They are massive in scale, both temporally and spatially. Thus, a hyperobject could be, according to Morton, “a black hole. A hyperobject could be the Lago Agrio oil field in Ecuador, or the Florida Everglades. A hyperobject could be the biosphere, or the Solar System. A hyperobject could be the sum total of all the
nuclear materials on Earth; or just the plutonium, or the uranium. A hyperobject could be the very long-
lastling product of direct human manufacture, such as Styrofoam or plastic bags, or the sum of all the
whirring machinery of capitalism” (1). And while humans are used to thinking about complex systems,
there is something particularly unique about thinking through hyperobjects because, Morton argues,
“these entities cause us to reflect on our very place on Earth and in the cosmos...[They] seem to force
something on us, something that affects some core ideas of what it means to exist, what Earth is, what
society is” (15). Thinking through the hyperobject of global climate change reorganizes how we think and
live, who we recognize as being “in it” with us, and where we find causality and responsibility.

**Considering the Spatio-temporal Reach of Climate Change**

Thinking through the temporal and spatial reach of climate change is crucial to understanding
how and why climate change is an environmental justice issue. While climate change affects us all, it
does not do so equally. Particularly disturbing is the fact that those countries that are least responsible
are already experiencing and suffering the worst of global warming effects. Bolivia, a country in the heart
of South America, has contributed very little to climate change—they are responsible for 0.04% of global
carbon emissions—and yet, climate change is impacting them greatly (Bolivian Information Forum).
Bolivia is one of the poorest nations in Latin America and its geographical make-up renders global
warming effects particularly visible (Rocha par. 1 – 4). Bolivia’s Andean mountain glaciers, whose
glacial melt provides water for the Amazonian lowlands, have been shrinking quickly, by 40% since 1985
(Martinez par. 7). These glaciers provide over 20% of the water to the cities of La Paz, the nation’s
capital, and El Alto, the second-largest city, as well as for agriculture and hydroelectric power (Rocha par.
10). As a country, Bolivia does not have the financial means necessary to develop new water resources
and so is working within extreme economic constraints to produce solutions to water shortages within an
uncertain climatic future. It is clear that the makings of climate change and Bolivia’s current socio-
ecological predicaments, such as the need for water rationing, are temporally and spatially discordant—
 occurring because of historical and ongoing industries and economies of developed nations
geographically distant from them.

Concepts from environmental justice inform thinking about climate change and whom it affects,
especially in regard to historical responsibility. In their short history of environmental justice in “From
Environmental to Climate Justice,” David Schlosberg and Lisette B. Collins demonstrate how, prior to the

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43 Hans-Martin Füssel notes in “How Inequitable is the Global Distribution of Responsibility, Capability,
and Vulnerability to Climate Change” that “the term ‘responsibility for climate change’ can be interpreted
in different ways, including as causal responsibility, outcome responsibility, moral responsibility, and
remedial responsibility” (597). Here I use “responsible” to denote causal responsibility.
1980s, conceptions of “environment,” and concerns for it, were largely relegated to far away, pristine, wilderness areas, and the concern of environmental activists. The realm of the urban and the individual humans more broadly was left to social justice activists, public health professionals, civil rights groups, and Indigenous community activists. But research on the siting of toxic waste dumps and other locally unwanted land-use necessarily forced a shift in thinking of the environment as something “out there,” apart from human livelihoods, to the everyday places and spaces in which human lives take place.

Robert Bullard’s book *Dumping in Dixie* was instrumental to a growing movement at the intersections of race, class, gender and the environment that would become the environmental justice movement. The environmental justice movement grew, in part Bullard suggests, as an extension of a social justice movement, in which black community activists illustrated a link between the health of their communities and their environments, and racial discrimination (Bullard 73). Bullard’s analysis of five southern US locations with industrial facilities sited in residential communities confirmed this link. His research concluded:

> toxic-waste dumps, municipal landfills, garbage incinerators, and similar noxious facilities are not randomly scattered across the American landscape. The siting process has resulted in minority neighborhoods (regardless of class) carrying a greater burden of localized costs than either affluent or poor white neighborhoods. Differential access to power and decision-making found among black and white communities also institutionalizes siting disparities (35).

An environmental justice perspective begins with the premise, from Bullard, that “all [people] have a basic right to live, work, play, go to school, and worship in a clean and healthy environment” (xiii).

After Hurricane Katrina in 2005, the realities of climate change forced an expansion in environmental justice thinking to include climate justice. While environmental justice activists had long been working with and for “local fence-line communities” who were in a corridor between Baton Rouge and New Orleans called “cancer alley,” the emphasis, notes Schlosberg and Collins, was on how local industries were impacting local residents (364). After Katrina, the local industries were seen from a new perspective, one where local industrial activity had global and compounding effects. “The emissions coming out of those same community-threatening smokestacks,” Schlosberg and Collins state, “did not just fall on local peoples, but went into the atmosphere, added to greenhouse emissions, caused the warming of the Gulf that added to the strength of Katrina, and so came back to impact the community in a new way” (Schlosberg and Collins 364). Too, the local emissions contributed to greenhouse gas emissions that threatened people and places far distant from New Orleans. Social injustices in New Orleans, prior to Katrina, could be explained in existing environmental justice frameworks, but climate change expands these by requiring a consideration of local climate vulnerability and disaster relief amid global climate change responsibility and accountability.
Early calls for climate justice were first concerned with a transition away from a carbon economy, while remaining committed to helping vulnerable communities (Long et al. 223). The oil industry and the capitalist economies dependent on them were, in this early notion of climate justice, responsible for and continuing to act against the “already vulnerable—poor communities in urban, rural, and coastal areas, as well as indigenous communities and communities already impacted by fossil fuel extraction” (Schlosberg and Collins 369). According to Long et al., climate justice recognizes that “climate change is not simply anthropogenic, in that it is caused by an undifferentiated humanity, but that climate change is the product of specific modes of capitalistic production and distribution” (224). From these initial connections between fossil fuels and vulnerable communities within climate justice comes two critical advancements, one from the 2009 Declaration of the Klimaforum and the other from the World People’s Conference on Climate Change and the Rights of Mother Earth, in Cochabamba, Bolivia, 2010.

In the Declaration of the Klimaforum, 2009, the climate justice movement clearly articulates four basic arguments: 1) the use of fossil fuels must cease and remaining reserves must stay in the ground; 2) developed nations, those primarily responsible for the greenhouse gas emissions that are warming the planet, owe an ecological debt, which necessitates repayment, to those nations who contributed less; 3) the transition away from fossil fuels requires considerations of food and land sovereignty for the most vulnerable; and 4) free-market based policy cannot fix climate change (Schlosberg and Collins 370). These clear arguments were augmented, by climate justice claims focused on “a variety of individual and collective rights including participation, the rights of indigenous peoples, labor, women, and nature” (Schlosberg and Collins 370). Taken together, “these themes…focus on changing the nature of a production system that is creating risks, compensating for those risks, and providing for procedural justice and autonomy” (Schlosberg and Collins 370). The World People’s Conference on Climate Change and the Rights of Mother Earth, 2010, formalized the relationship between climate justice and nature by assigning legal rights to ecosystems and species (Long et al. 225 – 226). This addition to climate justice perspectives argues that the disruption of earth’s systems through climate change producing activities, that is, through human actions, is an ongoing inequity that is forced upon humans and nonhumans.

Looking through the lens of human health impacts helps clarify how climate change hazards have the potential to reinforce inequities and infringe on basic human rights of life, health, and sustenance. Climate change consequences disproportionately affect individuals from low-income countries and poor people within high-income countries. In “Climate Change, Human Rights, and Social Justice,” Barry S Levy and Jonathan Patz, remind us that groups of people who are poor, belong to a minority group, are women, children, older, have a disability or chronic health issue, live in geographic areas that are highly impacted by climate-related diseases, or are employed in jobs that are exposed to high heat or weather conditions.
variability are most adversely impacted by climate change (311 – 312). The long list of climate change hazards—including increased temperature, excess rainfall or drought, extreme weather (such as increased instances and strength of hurricanes), and sea level rise—represent potential impacts that each act differently to jeopardize human rights. As an example, Levy and Patz share potential consequences related to the inundation of agricultural lands, a process that threatens agricultural production. For groups of people who rely on food production from this land, many of whom are already among the poorest subgroups in their country, the loss of land can lead to food scarcity, increased malnutrition, and, if the land becomes completely uninhabitable, environmental displacement (Levy and Patz 312). Climate change hazards have other potential health related consequences, for example, “heat-related disorders, vector-borne diseases, waterborne and foodborne diseases, respiratory and allergic disorders, malnutrition, collective violence, and mental health problems” (Levy and Patz 311). Importantly, Levy and Patz remind us that those countries that contribute least to the greenhouse gas emissions experience the most adverse health consequences. This is because they often already occupy marginalized environments and "lack access to protective and preventative services" as well as "socioeconomic resilience" (315).

This is where the global, intergenerational, and theoretical concerns of climate justice intersect with research on climate hazards and vulnerability. As the example of Bolivia’s water shortages and Levy and Patz’s analysis of health impacts of climate hazards illustrates, there is an asymmetry between responsibility and vulnerability—countries (and individuals) who did not significantly contribute to climate change are already suffering from its impacts. This asymmetry writes Hans-Martin Füller “is considered unjust based on many intuitive as well as formalized concepts of justice, including the ‘no harm’ principle and the ‘polluter pays’ principle” (598). This injustice sets up an obligation (the nature of which is being debated) to the countries responsible and/or capable of assisting (Füller 598). But it also raises questions about differences between developing and developed nations, particularly with regards to distributive justice. As the world “[tries] to move from a situation where emissions of the main greenhouse gas—carbon dioxide—are almost completely unconstrained to one that imposes strict limits,” observes Stephen M. Gardiner, we have to ask, “who should be allowed to emit, to what extent, and with what justification” (310). A closer look at hazards and vulnerability as defined within the field of Geography makes clearer the stakes for those countries (and individuals) most vulnerable to climate change hazards.
Tools for Thinking Climate Justice

In theory, natural hazards such as earthquakes, floods, drought, storms, tropical cyclones and hurricanes, wildfire, tsunami, volcanic eruptions and landslides can threaten everyone. In practice, proportionally, they tend to hurt the poor most of all. This is because the poor outnumber the rich and live in greater density in more poorly built housing on land most at risk (UN/ISDR, xi).

The hazards, risks, and vulnerabilities associated with climate change disproportionately affect some human groups more than others. In order to think about environmental justice in the age of climate change, I find research on hazards and vulnerability in the field of Geography particularly useful. According to the United Nations International Strategy for Disaster Reduction, a hazard is defined as

A property or situation that under particular circumstances could lead to harm. More specifically, a hazard is a potentially damaging physical event, phenomenon or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can be single, sequential, or combined in their origin and effects. Each hazard is characterized by its location, intensity and probability (UN/ISDR).

Climate change effects such as heat waves, increased and stronger hurricanes, and sea level rise are hazards; they are potentialities that if and when they occur can cause disruption. The degree to which they disrupt has to do with their characteristics, such as location and intensity, but also with the populations and locations they affect. The latter is best described through concepts of vulnerability. Importantly, places and people can be vulnerable to climate change hazards. Vulnerability as it relates to places considers natural systems and the built environment in relation to hazards. Social vulnerability, by contrast, focuses on humans, particularly socioeconomic and demographic factors that shape a community’s or individual’s resilience. Ben Wisner et al. present two definitions of social vulnerability in At Risk: People’s Vulnerability and Disasters (2003), a commonplace definition: “being prone to or susceptible to damage or injury” and one more sensitive to the social systems which produce susceptible beings: “…the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process)” (11). Social vulnerability, then, is a spectrum on which humans experience hazard impacts at varying levels of magnitude, with some people experiencing higher levels of vulnerability than others (Wisner et al. 12).

Hazards and vulnerability researchers use mapping technologies, such as Geographic Information Systems (GIS), to map locations and populations affected by climate change. Such technology allows hazards researchers to digitally overlay maps of natural hazards, the built environment, and characteristics of socially vulnerable populations. The result can be used to produce a risk model that can say something about a place with specific hazards and the particular people possibly, and differentially affected within
that place (Rak and Jurikova 123). The most common social vulnerability indices used to map such vulnerability include indicators such as: age, gender, immigration status, language, health, government status, mobility, wealth, and access to technology.

Despite the seemingly neat categories listed above, there is debate around how to build determinants for measuring social vulnerability. In At Risk: Natural Hazards, People’s Vulnerabilities, and Disasters, Wisner et al. outline four streams of thought that contribute to the multiple meanings of “vulnerable;” each highlights ways researchers define vulnerable and vulnerability to fit the social vulnerability paradigms they are hoping to elucidate. For the purposes of my work, two ways of thinking about vulnerability, as outlined by Wisner et al., are most useful: the notion of “capacities” and the concept of “vulnerable situations.”

The first, capacity, moves emphasis from solely the social, political, and geological forces that constrain human ability within disasters to “people’s capacities to resist, avoid, adapt to ‘processes that generate vulnerability’ and to use their abilities for creating security, either before a disaster occurs or during its aftermath” (Wisner et al. 14). This important development pushes against the tendency to register vulnerable groups as passive, weak victims who can do nothing to protect themselves or mobilize action on their own behalf (Wisner et al. 14). To be clear, this is not a “pull yourself up by your bootstraps” argument, but rather, an insistence to include social processes of protection not previously accounted for within hazards and vulnerability research.

The second concept, the move from “vulnerable groups” to “vulnerable situations” helps to further articulate the ‘why’ of climate change vulnerability. Wisner et al. note that over the last two decades, NGOs and researchers have developed checklists for needs assessment to assist in the distribution of post-disaster aid (15). “These post-disaster tools are very useful as aides mémoires for busy administrators and case workers in the chaotic situation of a refugee camp or large-scale disaster such as earthquakes. But,” they continue, “the use of post-disaster checklists does not in itself help one to understand why and how those characteristics have come to be associated with a higher probability of injury, death, livelihood disruption and greater difficulty in recovery” (emphasis original 15). This development within hazards and vulnerability research allows for greater granularity with regards to specific situations. It requires researchers to look at the ways that people and groups move in and out of vulnerable situations and how social mechanisms create vulnerable situations in which people find themselves (Wisner et al. 16). These concepts, hazards and vulnerability, from the field of Geography provide a basis for my bracketing of the temporally and spatially vast hyperobject that is climate change, in order to make it legible within Fringe-assay.
**Brief Meander: Making Legible, Bracketing**

What does it mean to make something legible, especially something as complex as climate change? Legibility is, from a typographic and design standpoint, the ability to distinguish one character from another within a text, or even more broadly, “the quality of being clear enough to read” (“Legibility”). When considering legibility in typography, one analyzes the characteristics of the font, its weight, its slant, its width, and/or its ornamentation. Legibility within a document, text, or word-based body of work is also a part of readability. Within design, one way “to make legible” is to change the characteristics of the type. For example, to make signage ADA compliant, designers use sans-serif fonts because the “loops” and “tails” on serif fonts make the characters illegible to individuals with vision impairment (“Best Sign Systems”). Or, in the case of a digital game, designers consider the font, background, and speed at which text moves on the screen to ensure that players do not miss out on crucial plot points (Social Justice Gamer). Things can become legible, however, in different ways and the concept of legibility is taken from typography to explain a process we humans use to make the world “readable.”

Legibility, in this sense, is about conceptual readability, involving our capacity as humans to think through and recognize something. For example, according to anthropologist James C. Scott, in his book *Seeing Like a State*, making something legible is a process requiring the simplification of complex systems, allowing for better control of the members (human and nonhuman) within the system. He writes, certain forms of knowledge and control require a narrowing of vision. The great advantage of such tunnel vision is that it brings into sharp focus certain limited aspects of an otherwise far more complex and unwieldy reality. This very simplification, in turn, makes the phenomenon at the center of the field of vision more legible and hence more susceptible to careful measurement and calculation. Combined with similar observations, an overall, aggregate, synoptic view of a selective reality is achieved, making possible a high degree of schematic knowledge, control, and manipulation (11).

This “narrowing of vision” is not without its costs, however. In *Seeing Like a State*, Scott explores how the practice of making something legible often results in unexpected and negative consequences. In his analysis of the birth of commercial forestry in Europe, Scott shows how a narrowing of vision allowed for forestry managers to produce a monocrop of Norway Spruce, planted in tight, geometric formations over acres of land. This practice allowed them to compare a control of inputs (fertilizers, labor, land) with known product-yields (represented in board feet harvested). However, this narrowing of vision bracketed out many other “variables” including the species that preyed on pest species. The end result is one we now recognize as one of the uglier consequences of monocrops—pests grew to epidemic proportions, wiping out entire “crops” of forest (Scott 20).
If legibility is in part a factor of simplification and bracketing, then who is permitted to make decisions about bracketing and how we do so around the hyperobject that is climate change are important. For instance, climate change becomes legible, but only partly so, through science. It can also become legible, but also, only partly so, through game design and other humanities endeavors. This practice of making legible gets at the heart of the meaning of the word itself. One part of the root meaning of legible is the Latin “leg” which means to “to collect, gather,” with derivatives meaning ‘to speak’ or the notion of ‘to gather words, to pick out words’.” Making legible echoes Jacques Rancière’s notion of the “politics of aesthetics” where aesthetics has everything to do with what is permissible to be said, heard, thought, and possible. The systemic complexity of climate change requires a lot of different sorts of and attempts at collecting, gathering, sifting, and picking, in order to make it legible from many different and differentially affected perspectives. A game like Fringe-assay that takes up and attempts to make climate change legible through aesthetics intervenes and participates in ongoing contestations around who we understand as being affected, how humans and species come to matter or not in this moment, and what claims such beings make upon us.

**In-situ Environmental Justice in the Age of Climate Change**

At the heart of the beginning of the environmental justice movement are communities, *in-situ*, who carry an unfair share of the environmental hazards accompanying industrial practices. Often these minority and low-income communities have been socially and politically disempowered through mechanisms of racial discrimination, exclusion from policy and decision-making, and limited social and physical mobility. These conditions of inequity continue but are of a slightly different character in the age of climate change. The same environmental and industrial practices and policies that endanger local communities have also contributed to greenhouse gas emissions (as have transportation, individual product consumption, and agricultural practices to name a few of the many other contributing factors). Global warming creates and compounds inequities globally.

**An Example—Nuclear/Social/Climate Fallout: The Marshall Islands**

The Republic of the Marshall Islands is a nation composed of 29 narrow coral atolls in the South Pacific Ocean. Between 1946 and 1958, the US government performed 67 nuclear tests in the Marshall Islands (Zak). The site was chosen as the “Pacific Proving Grounds” because of its geographic isolation, the perceived primitivism of its inhabitants, and the ease with which U.S. military could forcibly remove and relocate the residents of some of the islands (Zak). Like the communities studied in the American South by Robert Bullard, the residents of the Marshall Islands were socially and politically disempowered.
and excluded from the decision-making process, while the environment upon which they depended was deemed expendable.

The effects of the nuclear weapons testing were both immediate and long-term. On March 1, 1954, the Castle Bravo test detonated, immediately vaporizing several smaller islands, and sending a plume of pulverized coral and radioactive dust to neighboring islands (“Rongelap Atoll” par. 1). Within days, the “fresh” radioactive fallout required hundreds of residents from Rongelap, Ailinginae, and Utrōk Atolls to be evacuated and treated for exposure (“Rongelap Atoll pars 1 – 3). Despite remediation attempts of parts of Rongelap and because of lingering contamination issues, there was a secondary evacuation of residents in 1985. Many displaced residents and their descendants remain hesitant to return to their home islands. Those that have not returned have taken up permanent residence on neighboring islands and depend on quarterly compensation checks issued to them by the US Government for displacement during nuclear weapons-testing (Zak). This history of contamination and inadequate compensation for health and property damages, creates a legacy of dependency accompanied by crippling poverty, reliance on imported food, uneven infrastructure development, and higher instances of diabetes, cancer rates, and thyroid abnormalities. To this pool of worry Marshallese have learned they must add the legacy of climate change and its effects.

The Marshallese will be, and already are, some of the first “climate refugees”—individuals and groups of people experiencing “climate-induced migration” (Yamada et al. 93). In “Sea-level Rise and the Marshallese Diaspora,” Seiji Yamada et al. share that, “while Marshallese have had little influence in corporate boardrooms or the negotiation of transnational investor rights agreements, they will be among the first to lose their homes to sea-level rise” (95). Their nation is “among the most vulnerable locations threatened by sea-level rise and may cease to be habitable within this generation” (Yamada et al. 93). “Storm waves and particularly high tides will lead to annual flooding, salinating fresh water supplies and destroying local agriculture. Inhabitants of low-lying coral atolls may have to abandon their islands within decades, rather than in centuries” (Yamada et al. 95). Climate change has already affected Marshallese citizens in quick succession: droughts occurred in 1997, 2001, 2007, and 2013, a cholera epidemic due to an extended La Niña occurred in December 2000, flooding due to high waves occurred in 2008, 2013, and 2014, and more than 1600 dengue outbreaks have occurred since 2011 (Yamada et al. 93).

For many Marshallese, rather than wait for the seeming inevitability of uninhabitable islands and diminished living conditions, they are choosing to leave. When they leave, they find themselves in places like Western Arkansas, where they work as factory workers in poultry processing plants. There they become part of “the globalized capitalist model of food production, distribution, and marketing” that is partly to blame for global warming (Yamada et al. 97). Because the Marshallese climate-refugees have “[joined] the marginal proletariat of the global food industry, their work of slaughtering and packing
chickens, Cornish hens, and turkeys will serve to ensure that the graves of their ancestors will be further underwater” (Yamada et al. 97). The Marshall Islands example points to the compounding inequities that climate change and climate-induced migration forces upon the most marginalized people. Historic environmental injustice caused Marshallese inhabitants to experience radioactive fallout. This disruption caused social fallout by interrupting connections to home environments, communities, and foodways. Climate-forced migration threatens more still, the loss of their nation and environmental and cultural practices wed to place, as well as the risk of hostility from residents and a government in a country that may be hostile to them as refugees.

The Marshallese islanders, and people like them throughout the world, are the first “climate refugees,” a category that at present has no legal standing (Yamada et al. 93). As professor of law Maxine Burkett points out in her article “The Nation Ex-situ,” the “impacts from climate change may exacerbate pre-existing vulnerabilities” in developing nation-states (349). Importantly, she adds, “for certain states, climate change and associated sea-level rise threaten the very survival of their entire territory” (349). These nation’s citizens exist in “a veritable legal no-man’s land” (350). International law, Burkett suggests, is more accustomed to dealing with “relatively neater circumstances of stateless individuals or expiring states” (346). The soon-to-be-landless nation is new and precipitates an emerging crisis of individuals caught in the process. “It is estimated,” Burkett says,

that some two hundred million people worldwide may presently be on the move because of increased storms, flooding, sea-level rise, and desertification. From Bangladesh to Papua New Guinea, loss of homeland is already occurring and may accelerate as slow-onset and sudden disasters due to climate change compromise human habitats” (348-349).

Burkett’s focus on the ex-situ nation brings to light the need to rethink concepts of resiliency, dignity, and fairness as we consider people whose displacement is caused by the disintegration of place through climate disruption.

**Rethinking “Place” within a Hyperobject**

While climate change envelops the entirety of the surface of the earth and its inhabitants it is in place that we experience it or get a glimpse of it. Timothy Morton, in his book on the *Hyperobjects* comes back again and again to the experience of raindrops falling on his head in Northern California. That this wet droplet touching his skin is weather and climate, locally experienced and globally shaped, and that his experience of it as such is always partial and incomplete, is important to how we can begin to understand where we find ourselves in specific places within climate change.

This notion of “place”—where climate change is experienced in specific geographical regions—is not a return to nor argument for restrictive notions of place-based identity. Such a conception draws a boundary around “place,” fixing a geographical region as a discrete object, where it is imagined as a
static, homogenized reality within which certain people exist and certain people do not. The specificity of place that this study takes up is both more and less fixed than this. It is fixed in that it is possible to say, from a scientific perspective, that the physical makeup of a region, with its characteristics like weather, location, and proximity to potential hazards, produces a place with discernable differences. From a climate change hazards perspective, a site near the US coast is a different place than a site in the US Midwest. Sea-level rise is not a potential hazard for the place that is Nebraska. But just because it is possible to determine a boundary of place by defining potential hazards within a delimited region, it does not mean that that defines the “place.” For one, weather is not bound by the geopolitical boundaries we humans draw on a map and call, for example, Nebraska.

For geographer Doreen Massey, place is also not a restrictive, neatly bounded entity. In the same way that humans proceed in the world with different identities, Massey suggests the same could be said of places (Massey *Space, Place, and Gender* 153). These identities are made up of stories in aggregate, in progress. She states,

if space is rather a simultaneity of stories-so-far, then places are collections of those stories, articulations within the wider power-geometries of space. Their character will be a product of these intersections within that wider setting, and of what is made of them. And, too, of the non-meetings-up, the disconnections and the relations not established, the exclusions. All this contributes to the specificity of place (*For Space* 130).

Places can be understood as being differently experienced due to the myriad of ways in which people move through and within place and the multitudinous connections from that place and the rest of world (Massey *Space, Place, and Gender* 153). “What is special about place,” Massey adds, speaking about a particular place in the UK,

is not some romance of a pre-given collective identity or of the eternity of the hills. Rather, what is special about place is precisely that throwntogetherness, the unavoidable challenge of negotiating a here-and-now (itself drawing on a history and a geography of thens and theres); and a negotiation which must take place within and between both human and nonhuman” (*For Space* 140).

This throwntogetherness implicates us, Massey argues, in constantly evolving, intersecting trajectories, in a politics of an “(ever-contested) question of our being-together” (*For Space* 142).

Thinking through a place for the purposes of producing a game on climate change effects requires then that one adopt a “really global sense of place” (Massey, *Space, Place, and Gender* 154). Such a view would consider the place’s multiple identities, its histories, its physical characteristics, and the ways in which it is entangled with and connected to many other places through economic, social, and political relationships. Specificity of place is Massey asserts, “not some long internalized history but the fact that it is constructed out of a particular constellation of social relations, meeting and weaving together at a
particular locus” (Space, Place, and Gender 154). In the context of game design addressing climate change hazards and vulnerabilities, specific climate change hazards and effects are also part of the constellation that produces place. The link between human needs, livelihoods, culture and ecological functioning occurs at the level of place, and we are shaped in the process. “Place, in other words,” Massey asserts, “changes us, not through some visceral belonging (some barely changing rootedness, as so many would have it) but through the practicing of place, the negotiation of intersecting trajectories” (For Space 154).

While hazards and vulnerability researchers have been quick to measure and map quantifiable impacts of climate change, they have been, geographer W. Neil Adger et al. asserts in “Cultural Dimensions of Climate Change Impacts and Adaptations,” slow to take into consideration “non-material processes and resources that allow people to lead meaningful and dignified lives” (112). A sense of place and place connectedness are both “non-material” resources endangered by climate change impacts.

Culture is often closely tied to places (physical spaces that are given meaning by people) …Thus, as culture and community are frequently rooted in place—from metropolitan areas through to marginal rural settlements—climate change impacts in these places may also change cultures and communities, often in ways that people find undesirable and perceive as loss (Adger et al. 112).

This loss in and of place is easily observable in locations acutely affected by climate change impacts, such as the Marshall Islands. But the threat to place does not have to be as severe as that of the Marshall Islands to still affect human culture and well-being. “The loss of access to places as a result of coastal inundation, for example, or even as a consequence of climate change adaptation or mitigation policies, will have clear impacts on culture” (Adger et al. 112). “When people are displaced from places that they value, there is strong evidence that their cultures are diminished, and in many cases endangered. There are often no effective substitutions for, or adequate compensation for, lost sites of significance” (Adger et al. 113).

Following Adger et al. in theorizing the importance of place within the expanded framework of environmental justice in the age of climate change, Schlosberg and Collins assert that a sense of place figures prominently in current concepts of environmental and climate justice:

Activists have made the role and preservation of culture, including its ties to the functioning of ecological systems, central to responses to climate-changed environments…the loss of culturally iconic and significant habitats or landforms…limit[s] adaptive pathways, as they undermine the most familiar and shared experiences, as well as the social capital that comes with them, that could otherwise be the basis of adaptive capacity (13).

Too, they continue, “strengthening ties to the land is seen as a way to contribute to adaptation and climate change solutions. A link is often made between restoring cultural connections to the land, adaptation to
climate change, and the improved health of disadvantaged Indigenous people” (Schlosberg and Collins 14).

This turn, to include the “non-material” in equations for hazards and vulnerability research, makes way for the qualitative elements of social life to take their place beside the quantifiable; it forces researchers to consider the profound loss of being placeless for individuals and communities. As an example, while 4,000 Marshallese individuals have congregated in western Arkansas, taking advantage of a region with fewer climate change stressors and better employment opportunities in the meat packing industry, their climate-induced migration is predicated on the loss of place and brings new challenges. Added to any possible grief related to the loss of their home place, they experience prohibitions in healthcare access, language barriers, and the fraying of social ties (Yamada et al. 96).

This thinking around the importance of place led me to several questions and realizations at the intersection of place, climate change, and vulnerabilities that impacted the current iteration of the game Fringe-assay. I wondered, might it be possible and/or desirable to create a game whose playspace engages multiple places, leading individual players to experience the specificity of a region and its hazards while also highlighting differences of particular places and the hazards therein? If yes, the question then becomes, how to do this in such a way as to make the regions/places discernable and hazards illustrateable in the board’s territory, and how to maintain specificity of region while also gesturing towards the global-ness of local places—the “here” where certain hazards occur and the ‘now’ of economic, political, cultural, ecological negotiations that have made and continue to make a place? And while a strong sense of place, that is, one capable of sustaining cultural and personal identity may not be possible to engender in the brief time-space of the game, might it be possible nonetheless to get players to think through their own place-connectedness as reflected in some parts of the board’s territories? If so, might the identification with sense of place and the potentiality of a loss of place, or its growing or pending uninhabitability, represent a moment for emotional resonance, and make legible consequential social vulnerabilities that create climate refugees within the global problem of climate change?

Adapting Snakes and Ladders

The game known in the United States as Chutes and Ladders is indebted to the earlier Hindu game Leela or gyan chaupar (game of wisdom), known as Snakes and Ladders. The earliest examples of this game date to the 18th Century, but it is likely much older than this—unfortunately, earlier examples did not survive because of they were made of perishable materials (Topsfield “The Indian Game” 203). The versions still in existence are elaborately painted on paper, cotton cloth, and wood and represent a Pilgrim’s progress toward heavenly realms or enlightenment (Topsfield “The Indian Game” 203). Often the board’s territory is bound by a repeating floral or geometric motif, while the interiors, though
segmented and ordered by the squares of the track, vary in style depending on the maker and the content [see Fig. 26]. Too, the total number of spaces an individual player must traverse in order to win vary from as few as 72 squares to as many as 360 squares (Topsfield “The Indian Game” 204).

Figure 26 Game of Snakes and Ladders (Gyanbazi). Late 19th Century. London, Victoria & Albert Museum. ARTSTOR University of Iowa.

Many early versions of the game incorporate text, numbers, and imagery onto the board. The text describes the earthly vices, which a player tries to ascend from, and the heavenly realms toward which a player is moving. In all versions, players begin at the bottom left and proceed upward across the board to the right. Throughout the player’s sequential advancement across the board (through the roll of a die) the player has opportunity to experience rapid promotion or demotion by landing on either a ladder or a
snake. Ladders advance the player upward and illustrate spiritual achievements that bring the player closer to enlightenment. Snakes, or in some versions mythical, lizard-like creatures, advance the player downward, a sign of the player’s inability to forgo vices.

While almost all versions were relatively the same in terms of board territory and game actions, Indian games scholar Andrew Topsfield notes that there is one notable exception, the Vaisnava version. The Vaisnava version, of which there is only one known example, has a cul-de-sac that once one enters, there is no way of exiting. This side-game relegates the player to her own track without opportunity to rejoin the main track. The compartment, Topsfield suggests, is for “spiritually self-seeking individuals” (“The Indian Game” 210). Landing, by chance, on square 31: “those who make sacrifices with interested motives” or square 48: “those of royal birth,” results in an immediate no-win situation for the player (Topsfield “The Indian Game” 210). This situation is, Topsfield suggests, “a cul-de-sac of heavenly states” that is nevertheless contrary to the normal goal of winning because it traps the player in limbo—not only is the player caught in this side-game not able to complete her ascendancy to liberation, she is stuck watching her co-player(s)/competitor(s) advance towards enlightenment (“The Indian Game” 210). While Topsfield fails to explicate further the reasons for the cul-de-sac, it’s possible to speculate that the game designer sought to send a message about making sacrifices with interested motives or being of royal birth and removed from the commoners’ quest that would warrant being relegated to a perpetual non-winning state via the secondary track.

Snakes and Ladders, and its derivatives, proceed through the same core mechanics. According to games scholars Katie Salen and Eric Zimmerman’s Rules of Play: Game Design Fundamentals, a game’s core mechanic “is the essential play activity players perform again and again in a game” (316). In Snakes and Ladders, the core mechanic is the progression of one’s pawn across the board through the roll of a die. The roll of the die and the movement of the pawn is repeated, again and again, until someone reaches the end. It is a game of pure chance, requiring no strategy. But this does not mean that the game is experienced passively. Even without the opportunity to make choices, the game experience is a meaningful one. The core mechanics of the game—rolling a die, moving one’s token, racing to the end—are enlivened by the central feature of the game: the snakes and ladders. The game is rendered less “flat,” observe Salen and Zimmerman, through the rapid demotion and promotion of the snakes and ladders because they disrupt game rhythm by providing “unexpected reversals of fortune” and adding uncertainty around which player might get to the last square first (179 – 180).

But for the Vaisnava example, the win-loss paradigm, that is, the logic for how (and if) winners and losers are determined, follows a single logic, the first to the last square wins. However, here too, the game’s rules insert a moment for disruption and therefore potential excitement or suspense for the game players. In some versions you must land exactly on the final square. For example, if you are one space
from the winning square you must roll exactly a one in order to win. If the player in this example rolls a six, they are boomeranged past the final square and backwards five spaces along the track. This rule, according to Salen and Zimmerman, performs as a “negative feedback on the distance between players” (223). This moment allows other players to catch up while the possible winner attempts to roll the exact number they need. “By reducing the difference between the position of the players,” Salen and Zimmerman argue, “the game is prolonged, the outcome remains uncertain, and in general, the game is more satisfying to play. Those last few die rolls become dramatic, nail-biting game events” (224).

Though scant physical evidence remains, it is likely that the earliest versions of *Snakes and Ladders* were progressions from earlier iterations that employed purely chance actions (movement across the board) while implying spiritual journeys through imagery or text. These chance actions shifted with the addition of ladders and snakes and represent changes in the philosophical desires of the game maker or the culture more generally. The snakes and ladders gave opportunity to illustrate specific spiritual tenets and meanings through both iconography and movement (accelerating either ascent or decent). In this respect, the evolution of the game provides us hints of shifts in culture. As an example, Topsfield’s observation of how the game changed with the influence of Jain cosmological classification shows that “the nomenclature of the squares through which the player progresses [became] more systematic and detailed” (“The Indian Game” 207). Games become, as critical game scholar Mary Flanagan asserts in *Critical Play*, “one of several artifacts of material culture used to trace social practices and beliefs” (67). This is particularly evident when a game travels from one place and culture to another.

**Shifting Worldviews: Successive Exclusions**

The Hindu versions of *Snakes and Ladders* take up temporal and spatial landscapes located in both earthly and heavenly realms. They explore questions of gods, humans, agency, chance, and fate. The game’s context and topic have embedded within them the inexplicable, taking on questions such as: How should one live? What does life mean? What happens when one dies? And who or what controls human destiny? When English colonizers brought the game from India to Europe in the latter part of the 19th Century the game was adapted to its new culture in order to make it legible to Victorian era players. Instead of concern for one’s eternal soul, the board explores, for example, proper etiquette for young ladies and consequences for mischievous boys—topics more in line with the gendered and economic preoccupations of that time and place.

In Victorian era versions of *Snakes and Ladders*, the spatial context of the game is both more specific and finite. Rather than encompassing the heavens and earth, the Victorian era game takes place

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44 There are a few historical examples where a precise roll is not necessary and the win goes to whoever gets there first, but these are not typical (Topsfield “The Indian Game” 202).
in, for example, the classroom, on the playground, in a bedroom at home. The timeline of the game, rather than including all of life’s possible events and the journey into the afterlife or enlightenment, is kept to short-duration events, cause and effect actions that take place within a day or at most a year in the life of a child. This shift, from the expanse of earthly vices and heavenly realms traversed by human souls over the course of lifetimes, as represented in Hindu versions, to the truncated and limited narrative scope of childhood moral lessons, as seen in English versions of the game, parallels a shift in the way stories were told in the 19th century. In *The Great Derangement: Climate Change and the Unthinkable*, Amitov Ghosh traces the historical, political, and cultural shifts that create differences between the epic and the novel. While Ghosh’s project is dedicated to understanding what makes climate change resistant to expression through the modern novel, his assessment of the shift from older forms of storytelling to the modern novel helps explain how and why the game of *Snakes and Ladders* shifted when the English adopted it.

“Before the birth of the modern novel,” says Ghosh, “wherever stories were told, fiction delighted in the unheard-of and the unlikely” (16). Epics, Ghosh argues, are capable of “bring[ing] multiple universes into conjunction” and have sweeping timelines “often rang[ing] over eons and epochs” (59). But in the 19th Century, how stories are told changes. In older forms of storytelling, narrative “proceeds by linking together moments and scenes that are in some way distinctive or different: these are,” Ghosh continues, “nothing other than instances of exception” (17). With the modern novel however, these “instances of exception” which serve as the “motor of narrative” are concealed through descriptions of everyday life, what Franco Moretti calls “fillers” (Ghosh 17). The use of these “fillers” both drives the story and constrains it; it is a process that requires “the relocation of the unheard-of toward the background…while the everyday moves into the foreground” (Moretti qtd in Ghosh 17).

The work of using fillers to obscure “instances of exception” is complimented by practices of exclusion. These practices of exclusion are aptly demonstrated in Ghosh’s analysis of a work of fiction titled *A River Called Titash*, 1956, by Adwaita Mallabarman. Mallabarman writes of a small river in rural Bengal, starting with a wide-angle view. Mallabarman tells the reader about the whole of the Bengal watershed “draped with rivers and their tributaries, twisted and intertwined like tangled locks, streaked with the white of foamy waves” (Ghosh 60). But almost immediately, says Ghosh, this vast landscape is jettisoned through successive exclusions as the author telescopes in, drawing the reader closer and closer to a much smaller tributary, the river Titash. This authorial move allows and requires all the connecting rivers, valleys, towns, and cities to fall away. “The rest of the landscape,” Ghosh says, “is pushed farther and farther into the background until at last we have a setting that can carry a narrative. The setting becomes, in a sense, a self-contained ecosystem” (60-61). The reader is allowed and encouraged, through the exclusions used by the author, to focus on but one part of a larger and vast system. And while the Titash River is connected to and governed by forces ranging far outside the boundaries created by the
author, “it is precisely by excluding those inconceivable large forces, and by telescoping the changes into the duration of a limited-time horizon, that the novel becomes narratable” (Ghosh 61). This “limited-time horizon” means that the modern novel, “…usually requires a ‘period’; it is actualized within a certain time horizon…novels rarely extend beyond a few generations” (Ghosh 59).

While the modern novel becomes both spatially and temporally bound in ways that the epic was not, its actors also change. Where gods and mythical creatures, humans and nonhuman forces once roamed together in vast landscapes and timelines within the epic, the modern novel became “radically centered on the individual psyche,” most especially on “a sense of individual moral adventure” (Ghosh 77). In this move of exclusion, “what is banished from the territory of the novel is precisely the collective” (Ghosh 78). For Ghosh, the modern novel lost its capability to address the shared, collective concern of climate change precisely at the moment that it became an inward-looking exercise of self-discovery.

This shift to and preference for “fillers,” boundary creating through exclusion, and focus on the individual human’s moral adventure in the modern novel are, Ghosh shows, part and parcel of larger shifts in Western worldviews and patterns of thinking. In the nineteenth century, several “regimes of thought” coalesce at the nexus of the enlightenment, colonialism, rationalism, industrial revolution, and capitalism. Advances and theorizations around topics as varied as earth history, evolution, and cartography shaped the cultural outputs of both novels, and I argue, games. For example, Ghosh’s analysis for how cities born of colonial empires came to be situated in the very sites that are now vulnerable to sea-level rise and other climate change effects offers a window into the regime of thought permeating the 19th Century. It was, Ghosh summarizes,

a habit of mind that proceeded by creating discontinuities; that is to say, they were trained to break problems into smaller and smaller puzzles until a solution presented itself. This is a way of thinking that deliberately excludes things and forces (“externalities”) that lie beyond the horizon of the matter at hand (56).

These habits of mind and other contemporaneous developments help produce a literary imagination that puts humans in the center of a journey, bounded in time and space through the exclusion of Nature and the inconceivable, within a restricted, limited-timeline. It is in this very same cultural environment that the game Snakes and Ladders is taken from its Hindu roots and made legible for Victorian Era Europeans.

Of course, even within Europe, there were differences between versions due to when the game was made, where it was made, who made it, and what subject matter the game took up. For example, some imagery influences, such as the use of snakes continued to occur until roughly the 1940s when British rule in India collapsed—the snakes were variously replaced by chutes, slides, hillsides, and ladders (Topsfield “Snakes and Ladders” 143 – 144). Another important change was the way in which the narrative of cause and effect, super-imposed onto the snakes and ladders, varied from version to version.
In a 1930s version, consequences are quite explicit. A young lady kicks a chair at square 61: “Temper” and slides down the chute to the square 22: “Regret” where she is depicted massaging her pained foot. Square 27: “Courage” shows a young boy diving into water after a girl who appears to be drowning. The boy is “Reward[ed]” by advancement up the ladder to square 56. Interestingly, analysis of a version of the game from the 1940s shows that the game favors economic virtues over spiritual ones—there are 109 steps upward that have to do with economic virtues and only 70 steps upwards that have to do with moral virtues. In fact, the fastest way to the top is be lucky enough not to land on “Generosity” and instead land on the largest ladder up “Thrift” (Beresford par. 6). Like all cultural objects, the game is a participant in the social context where and when it is designed and engaged with. The 1930s game’s emphasis on economics virtues undoubtedly reflects changing worldviews shaped by the severe economic upheaval of the Great Depression and forced rationing during World War I prior to that.

The Sleds and Toboggans (1895) version from France has nothing to do with good or bad deeds, cause or effect (Dodd). Instead it shows young children wrapped in winter gear, sledding up and down a wintry landscape dotted with evergreens. In a version of the game, perhaps best known to Westerners as Chutes and Ladders, copyright 1943, the game is divorced from the spiritual or religious journey as well. A few game features are worth noting in this version: a change of scene—gameplay takes place solely on a children’s playground; the use of a spinner—as the die was believed to too easily reference gambling; and the use of slides rather than snakes—it was thought that kids were put off by snakes (Slesin). With or without the underlying lessons of good vs. bad deeds, virtues vs. vices, the form of the game seems endlessly adaptable as evidenced by various versions created recently, such as one that teaches students how to be elected to the Scottish Parliament or Eco-Action’s life-sized board teaching students positive environmental habits.

**Fringe-Assay: Incorporating Spatio-Temporalities of Climate Change**

The game Fringe-assay adopts and adapts many of the mechanisms of Snakes and Ladders. Play within Fringe-assay is the same as historical and modern versions of the game in that it takes place on a board, it involves movement along a track beset by moments of rapid promotion and demotion, and it remains chance driven. However, without altering the essential core mechanics, several aspects of the game have changed, namely the board’s territory and the substitution of a spinner for the die. The game features a playspace made up of four equal board pieces, eight pawns, eight spinners, and a set of instructions [Fig. 27]. Each of the quadrants and spinners is made of book board and hand-drawn, hand-painted illustrations using acrylic pen and paint on paper. The pawns are painted wood pieces. The boards are sealed with clear acrylic to promote durability.
Board Territories and Temporal Effects

In order to incorporate multiple, specific, geographical experiences of climate change, the game’s board space was altered from one board to four distinct boards that together create the playspace. Players’ pawns advance on one of the four boards (quadrants/territories) that define the playspace, each with its own track. Each quadrant or territory of the playspace gestures to a particular ecotone and/or region-type: coastal region, inland (middle equatorial) region, and Arctic (polar) region, and desert region [see Fig. 28].
As individual players advance within their territory, they experience the regional character and specific climate change effects particular to that area. For example, in the Arctic (polar) quadrant of the board game, the images describe heat waves, melting permafrost, rising ocean temperatures, shifting animal ranges, and glacial melting [see Fig. 29]. While there are only six downward leading arrows (some quadrants have more), the total number of potential spaces lost to downward leading arrows are greater than the seven upward leading arrows.
In addition to being able to express, generically, four region-types, *Fringe-assay* alters the illustrations of *Snakes and Ladders* in order to describe climate change effects not as single event effects but as effects that take place over time. While news coverage of a particular hazard may lead one to think about disasters as acute, short-term events, the reality is that hazards change over time and often have compounding, long-lasting effects. An example of hazards and time can be seen following hurricanes that affected Puerto Rico in 2017. Hurricane Maria hit Puerto Rico on September 20, 2017. Maria, a category 5 hurricane, made landfall over the center of the island, lashing the landscape and infrastructure for over thirty hours with torrential rain and 200 mile per hour winds (Meyer). The effect was loss of electricity and 3.5 million people without safe drinking water. The field of Geography’s categorizations of primary,
secondary, and tertiary effects helps describe what has happened in place, over time following the hurricane Maria in Puerto Rico.

Primary effects are those that are a direct result of the event, for example, the flooding of your basement as your watershed experiences flooding. Secondary effects are those that are set in motion because a primary effect caused them, for example, because of the flooding in your region, there is a loss of electricity in your region. Tertiary effects are the longer-term effects started because of a primary event, for example, the flooding in your region caused a permanent shift in the river’s channel, resulting in the permanent displacement of human habitations (Nelson). In reference to Puerto Rico, the example would be: Hurricane Maria hits, critical infrastructure is damaged (primary effects), resulting in difficulty or even the impossibility of getting clean drinking water and basic services to people (secondary effect), and because of this, there is an uptick of instances of water-borne diseases such as Leptospirosis (tertiary effect).45

Typically, primary, secondary, and tertiary effects are conceptualized from the point of the event. That is, these categories do not consider the baseline situation of a place prior to said event. It’s not that geographers think these events occur in a vacuum, but rather that they seek to bracket events for assessment, aid disbursement, future planning, and more. In Fringe-assay, primary, secondary, and tertiary effects are assigned to downward leading arrows. Each territory’s snakes are illustrated with images of climate change effects at different temporal scales, allowing the game to hint towards questions of hazards over time. While the length of downward leading arrows are not assigned based on temporal length or sequence of primary, secondary, and tertiary effects, the presence of varying degrees of natural disaster, from ones that occur quickly in time (as in a hurricane) to ones that take longer to develop (such as increases in negative health impacts following a hurricane) alerts players to a temporal landscape extending beyond the singular event, to processes underway, in time and space, in particular places, involving specific humans [see Fig. 30].

45 After just over a month after Hurricane Maria, there were 76 suspected and confirmed cases of Leptospirosis, a bacterial infection caused by water contaminated by rodent urine. This number of cases of Leptospirosis would be more typical of the total number of cases the island might expect over an entire year, not because of one event (Nedelman).
Temporal Bracketing: The Short and the Long of it.

While describing time through primary, secondary, and tertiary effects is helpful for producing a game with a delimited spatial and temporal landscape, it ties time into too neat a bundle. Take the example of Hurricane Maria above. The discussion of primary, secondary, and tertiary effects does not look backwards in time at compounding hazards. That Hurricane Maria made landfall on Puerto Rico a mere 15 days after Hurricane Irma skirted the island is largely lost in the temporal bracketing of post-
Maria categories of primary, secondary, and tertiary effects. And this points to a larger issue, that while it may be easy to think through compounding hazards as temporally proximate as Hurricanes Irene and Maria in Puerto Rico, it becomes even more difficult to gather the collective impact of longer temporal stretches. The short-term bracketing around primary, secondary, and tertiary effects elides other sorts of complex violence at the nexus of many contributing factors like hurricanes (an acute-in-time instantiation of climate change), economic and development policies, globalized capitalism, and patriarchy to mention just a handful of forces in play.

By zooming out temporally, we can begin to understand climate change as a form of slow violence. Slow violence, as Rob Nixon develops in his book *Slow Violence and the Environmentalism of the Poor*, are types of violence that “occur gradually and out of sight, a violence of delayed destruction that is dispersed across time and space” (2). Such a violence is often decoupled from its original causes, long in the making, and fails to appear as violence at all, in that it doesn’t match the sort of disasters/violence that are acute in time, space, and the bodies they affect (Nixon 3). Understanding climate change as a form of slow violence is further articulated through Christian Parenti’s term “catastrophic convergence.” In *Tropics of Chaos: Climate Change and the New Geography of Violence*, Parenti considers how "current and impending dislocations of climate change intersect with the already-existing crisis of poverty and violence" a collision of "political, economic, and environmental disasters" he calls the catastrophic convergence (7). These problems are more than concurrent he argues; they amplify and compound one another, expressing themselves in a variety of complex ways.

Thinking through climate change as a slow violence whose effects are both acute in time and intimately experienced, slow forming and dispersed is crucial to a more nuanced understanding of the scale of multi-generational, long term effects of climate change hazards. Using the categories primary, secondary, and tertiary effects allows me to bracket and produce boundaries around the hazards covered within the game. It allows me to create a slice of time, a brief instance within the hyperobject of climate change, that hints at some historical makings of particular places and vulnerabilities. It may be useful to think of this slice of time as the cross-sectional images produced by MRIs. The image is a picture, showing but a small fraction of the entire body but still capable of assisting a medical professional with their diagnosis. In a similar way, the game brackets time, a small fraction of all the time experienced and yet to be experienced within the age of climate change. This slice of time serves the game in limiting the context within which player actions occur. It does not, and cannot tell the entire story, all the factors of the catastrophic convergence, but it enables thinking around it all the same.
Spinner vs. Die: Inhabitable Protagonists and Affect

With the board’s territories capable of illustrating some representative hazards a region faces and the way hazards manifest and compound over time, my final task was to consider how differences are felt at the individual or group level. This has to do with social vulnerability. In a standard game of Snakes and Ladders, the progress from start to finish is made sequentially through the roll of a die but for the upward and downward movements. The die, usually a six-sided cube, is the same for every participating player, every turn. But real-life vulnerability differs within a nation, region by region, and in fact, within regions, vulnerability varies from town to town, household to household, and even person to person (Wisner et al. 7 – 8). The equality of the die does not contribute to an understanding of differential vulnerability. In order to explore differing social vulnerabilities, I chose to forgo the die and instead to create eight individual spinners. Each spinner has one through six on it but each spinner’s ratio between the numbers is different. To the spinner is attached a character profile, in bulleted form, outlining six to eight vulnerability index factors. A character profile that is more vulnerable is paired with a spinner whose one, two, and three areas were greatly outsized compared to the four, five, and six areas [see Fig. 31]. With such a spinner, the player is more likely to land on a one, two, or three, and less likely to land on a four, five, or six. This greatly affects the player’s chances at success by making it difficult to move quickly across the board in comparison to other players’ opportunities with spinners with more favorable ratios. The differences and “fairness” of the uneven ratios are also immediately apparent to players. The spinners with their varying ratios aren’t meant to illustrate a hierarchy of “haves” and “have nots” but rather to flesh out a gradation of climate-compounded vulnerable situations in which people find themselves.

Figure 31 Fringe-assay Spinner. 2017. Personal Collection.
The opportunity to adjust the ratios of chance by foregoing a die for a spinner with a character profile offers additional value—that of the inhabitable protagonist. One of the goals for adapting *Snakes and Ladders* into an immersive experience of differential climate change hazards is for individual players to participate in the game while inhabiting perspectives that might be different from their own. The inhabitable protagonist is also referred to as “the player character” or “avatar” (Isbister 11). In *Mario Kart: Super Circuit*, if a player chooses the Princess as their avatar, their car is bedazzled pink and they can shoot slippery banana peels into their opponent’s path. In the board game *World of Warcraft*, a player can move through the game as one of the following player characters: paladin, shaman, priest, warlock, rogue, or others, all which have character backstories and specific abilities (“World of Warcraft”). The inhabitable protagonist is one of the first elements of design with the power to affect players (Isbister 2-3).

Within a game, the player character has certain abilities, and this shapes the way a player inhabits or moves through the game; it determines what a player can do. And this has powerful consequences for player experience as compared to experiences generated by protagonists in other media. Isbister argues, “players project themselves more deeply onto game avatars than protagonists in other media because avatars offer action possibilities at multiple psychological levels” (12). Through grounded-cognition theory, specifically research on how our brains use past experiences to sense and evaluate our present experiences (including those that take place in a game), Isbister demonstrates that this extension of the self “forge[s] an identification grounded in observation as well as action and experience” (13). Whether “real” or “mediated” (as in a game), if we recognize, from past experiences, some part of the avatar’s experience, our brain is tricked, through willful participation, to experience the attendant emotions from the experience as real.

People psychologically opt-in when inhabiting a protagonist, and in so doing, they align some of their personal goals, for example, winning, having fun, proceeding to the next level, or mastering a skill, with that of the game character’s actions. Players begin Isbister says, “to care about the characters and situations as if they were real” (7). Caring, attachment, and being affected by the game’s characters are a form of “para-social interaction,” a pro-social emotional experience allowing for intimacy from a distance (Isbister 7). If *Fringe-assay’s* spinner allows for players to align their goals for winning or doing well in the game with the character profile of their spinner, they might, to the degree that they care about the game or the context in which they are playing, make an emotionally charged bond between themselves and the fictionalized character. The spinner therefore helps players make empathetic reaches of the imagination toward the experiences of others in a climate changed world.

*Snakes and Ladders*, as a form, afforded me the opportunity to add narrative elements and assign meaning to the mechanisms of promotion and demotion. My mod *Fringe-assay*, with its four-quadrant
territories and spinners, allowed me to tie together place specific hazards and their temporal dimension with human vulnerabilities. Each territory is made to encompass primary, secondary, and tertiary effects in order to communicate the ways hazards compound over time. Each spinner introduces the concept of varying vulnerabilities and uneven chances to respond and act in a climate change affected world. Players find themselves traversing a region through the perspective of another, someone with differing vulnerabilities and capacities than their own. This work is in conversation with other digital games that seek to raise environmental awareness or educate players about a territory or people negatively impacted by environmental changes. What can be learned from this particular game-making experiment is that by thinking through the ways cultural forms such as the novel or games are made to fit the culture in which they live illuminates something specific about the makers and players at that time in comparison to the makers and players in the present. By layering an understanding of not only the game components and their respective topics, but also the conditions under which some games are produced and others not, we can begin to see how our culture creates blind spots that inhibit our very ability to think climate change. The multiple board territories, the spinners, and the incorporation of hazards enables me to bracket and make legible aspects of the hyperobject of climate change. In the end, these slight but important changes to the traditional game form of Snakes and Ladders contributes to my goal to create a playspace where players can be immersed in the differential consequences of climate change hazards and vulnerabilities.
To read about the iterative design and playtesting process, and the results from game play events, turn to page 176.

Notes

xxxii NASA. “The Consequences of Climate Change.” For more on frost-free growing season effects see: Climate Central. “Climate Change Increasing Length of Frost Free Season.”

xxxiii Simmons et al. p. 105.

xxxiv vintage-jane.blogspot.com/2013/08/snakes-and-ladders.html. For one of the best online images of this game, see: imgur.com/gallery/ZWxtEwR. For pedagogy, see the suggested discussion guide: www.classicsnakesandladders.com/discussion-guide.html.

CHAPTER 5: TAKING STOCK—
ITERATIVE DESIGN AND LESSONS 
LEARNED

This final chapter investigates several key insights I gained through the design process, playtesting, and game play events. For each game, I share 1) design decisions from the early phases of game production, 2) several important changes that were made after initial playtesting, and 3) a few key observations made during the game play events. This chapter explains some of my decisions and thinking, explores how those decisions manifested and changed throughout the process, and details some of the game’s effects. In reflecting on these three games, I explore how players bent rules and how one-time effects operate, and I speculate about the potential power of the inhabitable protagonist. This chapter captures one of the crucial facets of the iterative process from within what Burdick et al. so rightly call a thinking-through-practice—reflection. This reflection does not reiterate in any detail the descriptions of the games that can be found in the previous chapters. Instead it shares insights about the breadth of knowledge gained within the game design process and locates next moves for my game design practice.

Tether: Modifying Scrabble

_Tether_, the game kit that alters _Scrabble_, does so by introducing constraint through species letter cards and layering normal _Scrabble_ game play with chance operations illustrative of species’ diminishments. The goal of _Tether_ is to immerse players in a play experience in which they can explore meaning making and affect around species extinction. In _Tether_, players engage in play within the word world of _Scrabble_ as a multi-species configuration. The player is no longer just themselves, their intellectual abilities and command of language; instead they become player plus their nonhuman species cohorts. Players find that their fate and affordances are entangled with and circumcised by what befalls their species. Their ability to flourish in the game, or not, is bound up in their species flourishing, or not. The designation as multi-species configurations and an incorporation of meaningful choice creates repeating emotion-eliciting opportunities that affect players. Here I wish to look at the advent of the game kit, changes to species letter cards, and important results from playtesting and game play events.

To read more about _Tether_, return to Chapter 2—_Scrabble_ and _Tether_: Multispecies Configurations in a Word World (pp. 59 – 96).

_Tether_: Design

There are two primary moments of interest during the design phase worth sharing. The first is the decision to produce a game kit that would modify _Scrabble_ play. This decision necessitated that I acquire
a fair use assessment before continuing the game design. The second is design iterations and feedback about early species letter cards. Of special note is the relationship of the species, their letter, and text within the pictorial space. These two decisions during the design phase determined the outcome of the iteration that was played at game play events. Additionally, as this was the first game I produced, the decision to modify a well-known game and to learn the benefits of doing so shaped the trajectory of the other two games produced for this dissertation.

![Early Attempt: Game Board and 16 Chance Outcomes Draft](image)

Figure 32 Early Attempt: Game Board and 16 Chance Outcomes Draft. 2016. Personal Collection.

**Early Attempts—Before the Game Kit**

My initial attempts at producing a game that brought questions of language and species together started with the idea of using Scrabble concepts, such as word construction and letter tiles, and layering in chance through a 16-sided die. This iteration was not a modification of Scrabble. Rather, it was a word game that used some of the conventions of word formation common to Scrabble and crosswords more generally. The 16-sided die allowed for a nuanced set of possible outcomes that would impact word construction [Fig. 32]. Just as in the final iteration, the impacts were divided into positive, neutral, and negative effects. As I continued working with the project however, it became increasingly apparent that 16 chance outcomes, while helpful for fleshing out a wide array of changing species’ statuses, were less
helpful in creating an engaging gameplay experience. The 16 chance outcomes were too difficult to keep track of during play. Also, the game too closely resembled *Scrabble* but also clearly wasn’t *Scrabble*. These two factors contributed to a general frustration and confusion for players during play. I asked myself: how can I harness the power and delight of *Scrabble* while introducing new concepts? If my interest is to bring language endangerment and species endangerment into orbit with one another, what better way than to engage a beloved word game like *Scrabble*? What might it mean to adopt and adapt *Scrabble*, especially given that many people have played or may own the game? How might an adaptation comment on the pre-existing game, the type of play it generates, and the contexts in which it is played? With these questions, and inspired by Fluxus game kits, I decided to create a game kit that could adapt *Scrabble*.

In 1974, economist Ralph Anspach created *Anti-Monopoly*, a game that “would show the dark side of monopolies” (qtd in Flanagan 87). Parker Brothers claimed trademark violation and in 1977, because the game so closely resembled *Monopoly*, they won their case against Anspach. The case was settled outside of court for an undisclosed amount of money (Flanagan 87). Artists have, according to Flanagan, been “reskinning” popular games as a form of resistance, a mode of social commentary, and a way of making art for hundreds of years. “Reskinning” is a way of altering a game or play object in such a way that it does not completely destroy the referent but rather layers new meaning onto it through new or unexpected imagery, play styles, rules, and more (Flanagan 14). But Anspach’s tale is a cautionary one. To that end, I engaged Hamilton IP Law to assist in a trademark, copyright, and fair use assessment of my planned modification of *Scrabble*. With regards to a game kit that adapted *Scrabble* and indeed required *Scrabble* to be played, the attorney at Hamilton IP Law determined that the game kit did not represent a trademark infringement nor harm Hasbro. My game kit was found to be within fair use for a variety of reasons but most especially because I was “not making copies, distributing copies, or in any way making use that only a copyright owner could” (personal communication with Andrew Johnson, Associate Attorney, Hamilton IP Law). Instead, I was making a derivative use of a bona fide copy of the game, which I owned. With this assessment in hand, I proceeded to make the game kit *Tether*.

**Visual Weight—Species Letter Cards**

One of the key components of the game kit *Tether* is the species letter card. Early drafts of species letter cards afforded considerable visual weight to the species itself with the letter taking up

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46 This preliminary assessment is available upon request, courtesy of the author.
47 The assessment by Hamilton IP Law also determined that the game concentration or pairs is held in public domain, as is snakes and ladders.
considerably less space. A second version, giving more card space to the letter of the alphabet resulted in some interesting feedback [see Fig. 33].

Figure 33 Early Species Letter Card—Versions I & II. 2016. Personal Collection.

In the example above of the species letter card of the Golden Poison Dart Frog, the frog is large but visually balanced by the amount of white space in the picture. The eye is drawn first and foremost to the frog and its details and then only secondarily drawn to the name and the letter “P.” To read this image would be to understand that the card communicates something about the species’ importance above and beyond that of the words that appear to describe it. Additionally, inferring how the “P” is connected, via the Latin binomial, takes a bit too much effort, as the letter is some distance away from that which it is referring to: “Phyllobates terribilis.” In the second version, Kaiser Spotted Newt, the letter and the newt share the pictorial space. The letter “N” is somewhat obscured by the newt but is visible nonetheless because of its size. Additionally, the connection between “N” and the Latin binomial is clearer because the eye can easily move from the large “N” to the line “Neurergus kaiseri.”

While the Golden Poison Dart Frog allowed for more pictorial space to be awarded to the species, its association with a letter and word formation more broadly was not immediately apparent. Too, when I showed one player the Kaiser Spotted Newt sample, they said, “it reminds me of children’s
alphabet learning cards” (personal observation 2017). This observation seemed to me a particularly rich one because it was in line with my goals to make a game about both language and species endangerments—the fact that one image could clue a person in to concepts of human language acquisition and species was exciting to me and shaped the final species letter card layout [see Figures 34, 35, and 36].

48 During game design, playtesting, and game play events, I took note of what people said about the game and game play experience. No identifying details from participants were kept in order to comply with the rules for protecting human subjects according to the University of Iowa’s Institutional Review Board.
Figure 34 Species Letter Cards: A through I. 2016. Personal Collection.
Figure 35  *Species Letter Cards “J” through “R”*. 2016. Personal Collection.
Throughout the design process, I thought about the word world of Scrabble as a playful manifestation of the human habitat of language. It seemed to me that the frustration of language expertise brought about by the constraint of letters introduced through the species letter cards and the order of...
operations might generate for players some of the same feelings that arise for minority speakers as their opportunities to speak their language diminish. In the end, according to participant feedback, the game became exclusively about species extinction. Unfortunately, players remained unaware of the content related to the human habitat of language. While bringing language and species extinction into orbit with one another was productive for me as a designer, the conceptual tie to language endangerment within the game withered in this iteration of the game. For future iterations, I wish to explore using both the Latin binomial and the common name of the species in the language representative of where that species resides. For example, the bird *Zosterops oleagineus*, or Yap olive white-eye (in English), resides on the island of Yap (Federated States of Micronesia) where Yapese is the language of an estimated 6,500 – 7,000 Indigenous residents. xxxvi I am left with the following questions: What might it mean and look like to incorporate the minority language common names for species? Are there other ways I might draw this connection more explicitly? Or is this a question for a different sort of game all together?

*Tether: Playtesting*

In the early versions of *Tether*, species letter cards were kept in a pile in the middle of the table. The iteration I describe is after the 16-sided die and order of operations were jettisoned for a six-sided die and an order of operations card very similar to the current iteration. Before each player’s turn, they were instructed to draw a species letter card from the pile in the middle of the table. Grabbing a species letter card and rolling a die became a rhythmic part of the game. So much so that one participant, as they reached for their card, said flippantly, “Well, let’s see who goes extinct next!” (Personal observation 2016). The attitude seemed to be that species diminishment was a given. Drawing a card seemed to be a depressing fact that always had negative impacts on word construction, every turn. The players had zero attachment to the species/This of course was antithetical to the goal I was attempting to achieve.

In order to address this problem, I reexamined the quality of interaction between the species letter cards and the players. To do that, I changed when species letter cards were introduced and lengthened the amount of time a player had with each species. The result is now how *Tether* is experienced. The species letter cards are introduced immediately at the start of the game. The species one draws at the start of the game stay with the player, in their queue, for the entirety of the game (unless the species goes globally extinct). This early introduction to and sustained interaction with species letter cards proved indispensable to my goal of getting players to attach their personal goals to what happens to the species in their hands. What I learned was that players needed more time and more repeated opportunities for them to feel that their fates were intertwined with their species. The results were immediate. In game play events, under the new
species letter card and player relationship, players became attached to their species. As an example, one person rolled the die with trepidation, exclaiming, “I just don’t want anything to happen to my little turtle here” (personal observation 2017). The “turtle” is Geochelone elegans, Indian star Tortoise. While I did not see the player’s letter tray, it is safe to assume that they likely had a “G” and had personal goals and strategies that were dependent on what happened to their species letter card.

Figure 37 University of Iowa Students Playtest Tether. 2017. Personal Collection.

Tether: Game Play

In Tether, I purposefully altered the Triple Word Score modifier of Scrabble in order to present players with an interesting choice between taking points or bringing species back. The decision for the player is made more difficult because personal desires for winning are brought up against other implicit expectations, including in-game pressure to “be a good sport” and help the game continue by bringing a species back and outside-of-game expectations to care and do something about species extinction. In the background, an additional, main reason that I created the Triple Word Amendment, as discussed in Chapter 2, was to keep the game from deteriorating too quickly. For the most part, this worked. But I observed something interesting during game play events when the speed at which the game deteriorated was still too fast due to my introduced constraints. Exploring how players responded has alerted me to a potentially rich vein for future exploration.
When players enter a game, they enter into a social contract within the community of play. It is within this community that rules are enforced or sometimes not. In *Tether*, there were intriguing moments where adversarial roles gave way to in-game collaborations and problem solving. This situation, where players choose to bend the rules and game norms, can be understood through Salen and Zimmerman’s analysis of ideal vs. real rules. The differences between ideal and real rules are best explained through an example: In basketball, the *ideal rule* is “no double dribbling.” *Real rules* are ones that players come to agree on (sometimes through a verbal negotiation or sometimes through implicit acknowledgements of obvious power differentials such as age, size, skill, and knowledge of the game) (Salen and Zimmerman 475). So, the way players *should* play basketball—“no double dribbling”—becomes the way players *do* play: “no double dribbling, unless you can’t help it” (Salen and Zimmerman 475.

Increased difficulty through the introduction of constraints via species letter cards forced new forms of collaborative play among opponents. As words became more difficult to form, a skilled player would sometimes elect to purposefully produce a word that would re-open the board. That is, rather than play defensively, they chose to make a word that would contribute to the continuance of the game, momentarily side-lining their personal goals for points or hopes to withhold future points from their opponent (Personal Interview 2017). Or for example, a player struggling with a particularly bad set of tiles or a hefty number of species diminishments may be allowed to accept help from a spectator or even a
competitor (depending on the differential in skill). The normative enforcement of ideal rules was questioned as players interpreted and acted upon their opponent’s frustration, disappointment, or threatening to leave the game (Salen and Zimmerman 574-576). The desire to “stay in play” caused a renegotiation of the ideal rules. Such slippage between ideal and real rules represents a moment of transformative social play where the rule system of the game is negotiated in order to alter the relations between players (Salen and Zimmerman 475). This leaves me wondering, might it be possible to craft play scenarios that more purposefully tap into transformative social play in the future? What sorts of games and play lend themselves more easily to transformative social play? And what humanistic values or concerns might be best served by such a game?

In the end, *Tether* did several things well. It got people to dwell in the topic of species extinction for an extended amount of time. It got players to attach their personal goals to events within the game, particularly to the fates that befell their species. It set up opportunities for interesting choices and negotiations. And, I have evidence that the play experience may have stayed with people after the play ended. In an email from a game play event participant, I learned that the player was still thinking about their decision within the game three days following the event [see Fig.39]. While this is only one example it is an encouraging one pointing to the potentiality of games as platforms for affecting environmental thought.

![Figure 39 Game. 2017. Personal E-mail.](image-url)
**recollect: Modifying Memory**

*recollect* is a mod of the game *Memory*. In *recollect*, as in *Memory*, players take turns attempting to make pairs of images. This task requires visuospatial memory and strategy. That is, players attempt not only to remember the imagery of the cards but also where the cards are and they develop strategies to maintain that information in their memories. Devising strategy and attempting to make matches is part of the action and outcome feedback loop that generates pleasure from within the game. Unbeknownst to players, unlike in classical memory games, in *recollect* some objective information has been withheld—there are three types of pairs: perfect matches, near-perfect matches, and nonmatching matches. The decision to withhold objective information produced two intriguing effects: 1) As players become aware of near-matching and nonmatching matches, their objective information becomes informed by perceived information and they were forced to participate in a conversation and decision with their opponent in order to proceed with the game (as discussed in Chapter 3). 2) Once the players know that there are multiple types of pairs, they cannot not know that. All subsequent play of the game *recollect* by that person(s) is categorically different from the first time playing the game. This is what I am calling a one-time (affect) effect.

To read more about *recollect*, turn to Chapter 3: *Memory and recollect—Playful Mnemonics and Commemoration* (pp. 97 – 124).

**recollect: Design**

The design phase of *recollect* was the easiest of all three games created for this study. The mechanics of the game are relatively simple, and the main emphasis is on the imagery chosen for the deck of cards. Once the decision was made for the distribution of perfect matches, near matches, and nonmatching matches, my task was to locate species to represent each category. The sole, major design shift was with regards to how I depicted species from the “deep time” category. The main consideration was whether to depict the species as fossilized remains, as humans know them to exist now, or to render them as they are imagined having appeared.
The first set of drawings I drew for *recollect* within the “deep time” category were drawn as fossilized remains [see Fig. 40]. But after sitting with these drawings, I worried that they were too stylized and too abstract for people to imaginatively picture them as living, interacting beings. So, I decided to draw the “deep time” species as they are imagined having appeared [Fig. 41].
recollect: Playtesting—One-time (Affect) Effect

In her analysis of games as emotion-eliciting structures, Katherine Isbister argues that games move us because they set up opportunity for “a series of interesting choices” or “actions with consequences” that give players a sense of responsibility (2 – 3). This, she suggests, causes games to be categorically different from other forms of media. While a film or book may make us feel horror, sadness, or joy, for example, a game can do the same while also eliciting our active participation, our meaningful, consequential, game-shaping choices throughout (Isbister 2). In recollect, choice is involved in setting up short term and long-term strategies, as well as in the negotiated decision around near perfect and non-matching matches. The opportunity and necessity to communicate and negotiate the meanings of the near perfect and non-matching matches with one’s opponent within recollect is important to player experience and affect. However, when recollect is played a second time, the interesting choice that is related to
negotiating near perfect and non-matching matches changes. Here I explore what I call one-time (affect) effects and discuss their potential for creating unique moments for player decision.

Before explaining the role of one-time effect within recollect, I wish to turn to game designer Brenda Romero’s *Train*. *Train* is a tabletop board game in which players attempt to get the most tokens, which represent people, via a train from one end of a track to the other. Each turn, a player rolls a die and chooses from one of four possible actions: to take that number and get more people for their train, move their train that many spots up the board, take a chance card, or play a chance card. Chance cards offer action words that alter the player’s train position on the board. For example, the chance card “hill” results in the swift promotion of a player’s train to several spaces ahead because, in a commonsensical way, hills contribute to a train’s speed. Only at the end of the game, when one player’s train has reached the end of the track is the destination revealed through a terminus card. The destination is Auschwitz. The power of this game, says Romero, is that people are involved in decision-making throughout and think that the tokens representing people are worth points and that they’ve won, and then find themselves complicit in something else altogether (Romero). The affect-generating reveal of the terminus card is a one-time effect. Once players know about the end destination, they actively try to subvert the game mechanics, working to reduce the number of tokens, aka people, on their train and/or to delay the inevitable trajectory of the train as much as possible. Once a person has played *Train*, all subsequent play instances are shaped by their knowledge of the final terminus. This is one example of what happens with repetitive play of “one-time effect” games.

In the case of recollect, when two players who had already played the game sat down to play the game once again, the game became a more traditionally defined, if somewhat more demanding, version of *Memory*. However, when a player who had played the game already was paired with a player who had not, the player with the more complete information about the game’s slippery objective information often withheld revealing that information to their competitor. Additionally, and perhaps most intriguingly, players with more complete information of the game, repeatedly chose not to make a match of near perfect and non-matching pairs until their opponent’s perceived information status changed. That is, until the opponent suggested that there might be some logic other than exact image match for matching pairs, the player with more complete information would opt to play as if they didn’t know. They still had a significant advantage once a negotiated way forward was determined because they had had more chance overall to observe potential pairs than their opponent but almost always, players with more complete information withheld their easy opportunity to win in order to let their opponent come to the reveal themselves.

I observed instances of one-time (affect) effects on multiple occasions during both playtesting and game play events, but it was only after all events were done that, I recognized this effect as something
interesting outside the designed choices I had intended. While I can only speculate the reasons players chose to withhold the information about near perfect and non-matching matches from their opponents while also choosing not to take advantage of the differential in player information, I imagine that one of the following is in play: players felt bound by implicit expectations to play fair or players derived pleasure from knowing about the near perfect and non-matching pairs and enjoyed witnessing their opponent come to the realization for what constitutes a pair. It is the latter that most interests me with regards to future game play and game design. I would like to investigate if withholding and allowing their opponent to gain their own insights is akin to the experience of giving a gift and knowing the contents of said gift. Importantly, I would like to know if the incorporation of one-time effects contributes to my environmental prerogatives within game design.

Figure 42 Participants at recollect Game Play Event. 2017. Personal Collection.

recollect: Game Play

While it was possible and interesting to observe ongoing negotiations between players around what constitutes a pair and how or why various pairings were determined to be legitimate during game play events, one of the most unexpected outcomes occurred when negotiations broke down. This happened twice during game play events. The first time, the breakdown in negotiations during play occurred between three adult participants [see Fig. 42]. When I inquired after the game play event about
the move to deconstruct the game experience by flipping the cards face up, I learned that there was a significant difference in players’ knowledge of species. One of the participants self-identified as a science educator and made a nuanced argument about pairs being constituted by species prey drive or way of life that their opponents could not refute. Once the decision was made to organize pairs based on species habits rather than the imagery cues, I gave in the pictorial space, the game was effectively off track. As play progressed, the two opponents became more convinced and more adamant that pairs were constituted otherwise. In the end, the way to solve the issue was to quit the game. The second time discussion around near perfect and non-matching pairs halted was between a parent and child [Fig. 43]. The child was interested in making pairs based on who might be “friends” and the parent obliged.

While the competitive aspects of the game are over once the cards are turned face-up, the conversation around what constitutes a pair, and why, continues until players come to a shared understanding. In that respect, despite the players using the game in a way that is unexpected, it still manages to get people talking about species and species extinction for an extended amount of time. There may be yet underexplored opportunities to build in even more ambiguity for what constitutes a pair in order to generate more conversation around species and species extinction. And it remains to be seen if such ambiguity would aid or hinder my goals for designing play scenarios that affect players’ thinking around species extinction.

Figure 43 Players Deliberate. 2017. Personal Collection.
Fringe-assay

Fringe-assay is a mod of Snakes and Ladders. In the mod, individuals inhabit protagonist perspectives representative of individuals with differing vulnerabilities to climate change effects. Players proceed across a series of territories (boards) that have differential hazards based on the region-type they represent. As they move across the board, players experience rapid promotions (upward pointing arrows) and demotions (downward pointing arrows). The demotions are described, through imagery, as being primary, secondary, and tertiary effects of a climate change hazard. In Fringe-assay, the die that is standard to Snakes and Ladders is replaced by a spinner with a bulleted list of protagonist’s characteristics, which I found ultimately to be less effective for generating affect than narrative description.

To read more about Fringe-assay, return to Chapter 4—Snakes and Ladders and Fringe-assay: Designing Consequential Differences (pp. 125 – 156).

Fringe-assay: Design

When I began working towards a game design that could immerse players in concepts of hazards and vulnerability in relation to climate change, I originally explored simple race games such as The Game of the Goose. The Game of the Goose has been adopted and adapted since its known inception during the 16th Century (Damsté par. 1). The game was originally used for gambling but shifted in the 18th Century to become a children’s game. With one track, starting from the exterior and spiraling inward toward the finish, the board’s territory and simple linear progression leaves plenty of room for imagery and text, making it an obvious choice for adaptation by an artist-game designer. Australian printmaker Sandi
Rigby’s *The Game of Owls*, 2015, is a perfect example of a modern version of the Game of the Goose. In a series and exhibition titled *Mapping the Powerful Owl*, of which *The Game of Owls* was a part, Rigby explores ongoing debates around owl conservation, particularly the battle to prevent the clearing of crucial owl habitat in Sydney and New South Wales [Fig. 45].

![Figure 45 The Game of Owls by Sandi Rigby. 2015. Limited edition hand-stained etching, 33 cm x 50 cm. Used with permission.](image)

While the pictorial space available and the layering of chance through the die fit my interests, finding a way to incorporate multiple tracks or hazards indicative of different areas of the globe proved impossible. The physical remains of my initial attempts did not survive to documentation but the process of trying to fit multiple, different environment types on one board forced me to think about the territory of the game board as being composed of multiple game territories, each with their own track and imagery. For a game about climate change, the simple “race to the finish” format of *The Game of the Goose* communicates a too neat progression. I turned to *Snakes and Ladders* for a game form punctuated with both good and bad luck. Unexpected benefits and hardships, as represented by upward and downward pointing arrows, produced a game that more explicitly echoes life in the age of climate change [see Fig. 46].
During playtesting I gained two key insights, one having to do with discernibility on the game’s board and the other having to do with imagery choice. The first, the discernibility of the game board, is a problem both quickly identified and addressed. While observing playtesting, I witnessed repeated instances where individual players would roll the die during their turn and begin to move their token the wrong direction on the board. While each square on the board was numbered from one to one hundred, whenever large imagery was incorporated, the number(s) labeling the squares were removed [see Fig. 47]. After playtesting, wherever possible, I added numbers back to the board. Unfortunately, this did not
completely solve the problem. In future iterations, I will incorporate small directional arrows at key points to assist players.

![Image of a game layout with numbers and arrows]

Figure 47 Early iteration Game Layout: Imagery Obscures Numbers. 2017. Personal Collection.

**Critical Error(s): Designing for the Default**

The second unresolved consideration in *Fringe-assay* has to do with imagery choice. In *Critical Play*, game designer Mary Flanagan points to the importance of critically analyzing the content of the game before, during, and after design and user tests. Without question, writes Flanagan, failing to do so can result in a game that does or says something unexpected or which detracts from the humanistic goals the designer has set for themselves. “On some level,” Flanagan states, “systems such as games must, due to the conditions of their creation, represent cultural norms and biases in their realization. These results can go, and have gone, completely unacknowledged” (254). Unexamined racism, sexism, and classism can and do make their way into game designs. Historical examples, like the ones offered in *Critical Play*,
illustrate how game designers can modify a game in order to champion and bolster racist and colonial claims. Such moves go (mostly) unchallenged because *it’s just a game…children’s play really* (Flanagan 84). But games are not innocent. They are persuasive precisely because their pictorial space combines with content and game mechanisms (such as the game’s win loss paradigm) to communicate, inform, and educate from the perspective of the game maker (Flanagan 255).

Flanagan transforms the traditional iterative game design process in order to include “values goals.” In place of the traditional design cycle of: set design goal, develop rules, develop playable prototype, playtest, revise goal, repeat, the critical game design model requires further reflection at the “set a design goal” stage. At this stage, the designer must consider the underlying “human concerns, identifiable as principles, values, or concepts” that are to be embedded in the game (Flanagan 257). Because critical games are sites that can offer intervention, disruption, and critique of social issues, the careful consideration of values goals must become embedded in the design, playtest, and feedback loop. The critical game design model’s iterative progression therefore includes “set a design goal and set values goal(s)” (257-258).

In explaining the critical design method, particularly in relation to values goals, Flanagan’s outline is quite vague, offering only that the iterative process for the critical games designer should continually orbit around the underlying humanistic values that the game designer wants to address within the work (257). This vagueness is purposeful because the critical games design model is to be general enough to accommodate many different types of games, from videogames to card games, from live action role-playing to locative games. While her final chapter is not meant to be an all-encompassing how-to manual by any means, its concerning that there is exceptionally scant information in her critical game design model for the proper or extended assessment of visual representations within the game. Most games have at least some type of visual component(s). While Flanagan likely assumes that it is understood that imagery is to be but one part of the many components that are analyzed and scrutinized during the critical game design process, I wish to focus more intently on this crucial aspect of game design.49

Flanagan admits that, “in making anything, there is a gap between what was intended and what actually is created” (258). This can produce both positive and negative consequences, as when a game is successful in communicating the game designer’s goals or when a game has unexamined biases in it. Continually comparing feedback to the values goals through playtests with diverse publics helps the

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49 It should be noted too that games with representations and imagery are but one in the myriad of structured play scenarios that the critical game model should help steer. It is probable that in an effort to allow the critical games model to be broad in its application, Flanagan has not omitted imagery from consideration but rather assumes its inclusion in “content.”
designer make sure that “conceptual, thematic, and technological factors continue to ‘say the same thing’ once the project is finished” (Flanagan 258). It is assumed then, that the iterative design process, especially a critical design practice attuned to humanistic themes such as social justice, should help game designers identify and correct unexamined inherent biases. But I argue that the model Flanagan puts forth should and can do more with regards to representation in games.

In sharing the following example, I acknowledge and explore an embedded bias in my own design and speculate future iterations. My own unexamined position as a Western, white, woman came into focus in Fringe-assay when Professor Sarah Kanouse asked me: what does it might mean for the only representation of a human in Fringe-assay to be a white woman when most of the world’s population is not white?  

When I didn’t have an answer for her, I went back to reflect on my design process: What happened here? How is that in my thinking and tinkering around in the game design, I inadvertently “designed for a default”? [see Fig. 48].

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In a talk Catherine D’Ignazio gave at the MIT Media Lab for the *No Permission, No Apology* lab, she urges designers to take a closer look at the default “normal” categories at work in their designs. Default categories are pervasive and ubiquitous; they are what make something “other,” they are often
used to delineate between ‘normal’ (good) and everything else. For example, “white” is a default category, as are “man,” “straight,” and “rich.” Most everyone, D’ignazio reminds us, is “the ‘Other’ in one, two, or many dimensions” (Designing for Other). D’Ignazio cautions, “when designers do not specify an audience, they might think they are designing for everyone but in fact they are Designing for these Defaults” (Designing for Other).

Thinking back to the initial design stages of Fringe-assay, when I made decisions about who to include, why, and importantly, what they would look like, I recall thinking about how the experience of hazards is a gendered one—women, for a variety of reasons, find themselves vulnerable to the effects of hazards in different ways than men. As Geographer Ben Wisner and social scientist Henry Luce point out, women may not be particularly vulnerable [because they are] women…but more commonly poor women (e.g. class + gender), old, poor, women (age + class + gender), or old, poor, minority women (age + class + ethnicity + gender) are most vulnerable. It is highly probable that, everything else being equal, the addition of disability (blindness, for instance) would create a concatenation of vulnerability factors that more or less assures that this person will be most severely affected by most hazard events and, if she survives, will find it hardest to recover” (131).

To address this gender binary that creates unequally vulnerable states, I drew a woman, a woman whose body type, skin color, and age range I know. For all intents and purposes, the person I drew also looks able-bodied. This moment is an important one because it illustrates how easily a game’s imagery cannot only fail to disrupt hierarchies that limit visibility of Other’s existence within the age of climate change but rather can contribute to the continued marginalization of Other’s experiences and stories.

A critical games design model that takes into account what imagery is doing within the game may start by asking questions like: What perspectives do the drawings represent? Whose experiences are permissible to think with within the game and how will those perspectives be illustrated? What assumptions do I make about who will be playing the games? What assumptions do I make about players’ ability to read images? In wanting particular representations to resonate with some of my hypothetical players, whose experiences and representations do I include, whose might I be excluding? How can the images I display on my board be made to be more pluralistic, more inclusive, and ultimately more representative of the ‘real’ world?51 Certainly, this moment and particular drawing doesn’t “break” the game but it does represent a moment recording my own learning curve within game design.

51 Many of these questions are informed by process and outputs questions developed by Catherine D’Ignazio and Lauren Klein within the field of feminist data visualization. Feminist data visualization pushes the digital humanities and information visualization communities to question how power, embodiment, affect, labor, binaries and much more are figured within data visualization. I use them here because many of these same questions are useful and integral to the critical games design process, for more see Catherine D’Ignazio and Lauren F. Klein’s. Feminist Data Visualization.
**Fringe-assay: Game Play**

![Figure 49 University of Iowa Students Play Fringe-assay. 2017. Personal Collection.](image)

**The Power of Story—Inhabitable Protagonist in Context(s)**

The inhabitable protagonist is crucial to the goal of immersing players in and producing empathy around the experiences of diverse humans in climate change. In some types of games, there is the possibility for player agency in building and customizing the protagonist and developing their backstory. \(^{xxxviii}\) This possibility for decision-making around the player character contributes to the attachment that players feel with their player character (Isbister 11). In first iterations of *Fringe-assay*, the player character of the spinners might more accurately be called a character profile, for each spinner’s character was composed solely by a bulleted list of attributes. The attributes tell a player something of the character, their age, country of origin, immigration status, but such a list, I learned after play tests, requires a player to do a lot of work to translate such data points into characters worth inhabiting. These data points do not readily allow players to inhabit another’s perspective during the game. A bulleted list, it turns out, does not tell the story of a character.

Thinking about story for a moment will help illuminate why a bulleted list falls short of contributing to my goal of having players inhabit diverse perspectives within a climate changed world. According to Barbara Eckstein in “Making Space: Stories in the Practice of Planning,” 2003, stories are
how we narrate “the unfolding of events over some passage of time and in some particular location” (14). Stories are important to our understanding of what happened when and to whom and help us navigate how these experiences connect to and inform the decisions in front of us, whether in city planning, as is Eckstein’s topic in her chapter “Story and Sustainability,” or in trying to act with an eye to questions of climate justice within a game. In telling a story, a good storyteller makes space for multiple, sometimes contradictory stories to exist and be engaged. The storyteller is, Eckstein asserts, following traditional Inuit storytellers, “…the one mak[ing] space for stories to be heard” (21). I believe that the inhabitable character components of Fringe-assay, as represented by the spinner, offer an opportunity to tell a story about distinct individuals in a climate changed world, a story that creates impactful space and emotion eliciting opportunity.

During game play events, the shortcomings of the bulleted list were observable in player conversation. In one play event, two participants carried on a discussion about what material affordances they might have. One player, whose character who was from a warm climate and suddenly thrust into the game territory of the Arctic questioned, “What if I was able to bring my snow boots with me? Like, I had some and brought them? Then being in the cold wouldn’t be a problem” (game play observation 2017). This player and her opponent were trying to give their protagonist more details, to “flesh out” the story of their character. This is a moment when they can be seen really attempting to do the work to think through what it would be like and what resources and abilities they might have at hand. The game did not nurture these questions and desires but could be made to do so. This may set up an opportunity for players to have the chance to take actions but the game (and metaphorically climate change hazards) would keep restricting their success. This sense of unfairness reverberates as they witness their peers and opponents narrowly miss problems they themselves are stuck in or as when their opponents have a spinner with better ratios from the beginning. Being able to flesh out character profiles and take action within a game where everything happens “to you” may help facilitate player buy in and an expansion of concern toward others negatively impacted by climate change. Such an opportunity would undoubtedly strengthen the link between player goals and game actions and therefore the opportunity for emotion eliciting moments.

**Speculating Future Iteration(s)**

Let’s suppose for a moment that the spinners and their character profiles are character narratives instead of the character profiles, that the spinners contain compelling stories about specific persons rather than bulleted data points about persons. In this scenario, each of the eight spinners would tell the story of a specific person who is negatively impacted by climate change. All together, they would tell a story about a world in which some individuals are more or less affected by, and some might even benefit from,
climate change. Within the space of the aggregated story created by the individual spinners, the player may understand that there is a gradation of vulnerabilities within which, they, the game character and they, the player, are embedded. This gradation would give room for both individual comparisons in game and for the player to see themselves fitting into a much larger story, outside the game, in which all humans and nonhumans are entangled. The space, created through the story, embedded in the spinners, would give individuals room to take in, feel, evaluate, and try on another’s perspective, another’s experience of moving through a world shaped by climate change. Done well, the multiple perspectives of the spinners would not present a clean and orderly set of facts for players to organize, nor enforce a singular linear narrative but rather invite players into a world that is only partially, messily expressible in the form of a game. This hypothetical future iteration then could allow players to dwell and play within the entangled realities in which differentially empowered persons live within the age of climate change.

Now let’s spend a few more moments considering the story that the spinners might tell but currently, in their bulleted form, do not. In Slow Violence, Nixon brings attention to forms that are uniquely capable of bringing to light temporally and spatially remote slow violence. Whether creative non-fiction, prose, or painting, there are types of cultural production that are the “kinds of aesthetic activism [that] can reinsert the violence into the view” (Nixon 249). A brief but powerful example of bringing slow violence into view are Keith Washington’s paintings “Within Our Gates” that Nixon analyzes. The works are mural-sized oil landscape paintings where lynchings have occurred. Regarding one painting, Nixon notes, “The tree-lined rural and suburban scenes have no people in them, but beneath each bucolic painting, [Washington] has inscribed the name of the lynched man and the location. No date is given: the effect is of a violence that feels open ended, ongoing in its deep yet incomplete specificity” (249-250). Thinking then through Nixon’s charge to make space for the slow violence of climate change, I’ve identified two additional ways that the form of the spinners’ narratives might be enlisted to help tell the story of individuals within climate change; these have to do with temporal bracketing and duration within the eight character narratives.

When I designed the spinners, I thought about character profiles as stand-ins for individuals who are negatively impacted by climate change in the present. This temporal bracketing obfuscates longer histories and consequences of violence in places. Additionally, these character profiles were supposed to represent whole socially vulnerable groups, to be a “type,” bound less by nation or geographic region and more by shared levels of vulnerability but this too offers too small a window into the specificities of slow

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52 While one might be tempted to think solely about the many, many individuals negatively impacted by climate change hazards in a game about climate change, its important to make space, even if that space takes up only one of the eight spinners, for those individuals that benefit from climate change, the better to help us understand why maintaining the status quo is crucial to such parties.
violence unfolding over time in particular places. After initial playtesting, I think it is possible, and important, to think about the spinners as being capable of incorporating a larger time-slice than “the present.” What might it mean, for example, for the narratives embedded within the spinners to take place in different temporalities? What happens to the game if the characters’ stories have different time stamps with some queuing players to earlier evidences of climate change? This might be a tactic for making space for a story of climate change as one that reaches into the past, present, and future. It also may be a way to give attention to the slow violence of climate change within the narrative of the game.

Another way that the form of the spinner character stories might be made to tell a richer story about climate change has to do with duration within the story. In “Story and Sustainability,” Eckstein looks to duration within stories to understand their import. “Skill with duration in storytelling affords one the opportunity,” Eckstein says, “to rivet attention on those events and occasions that best serve one’s intention” (26). This power to rivet attention, to make space for dwelling in moments of both acute and long-term climate change hazard experiences, represents a powerful potentiality for future iterations of the spinners’ narrative space. For example, since the spinners tell a story of climate change in aggregate, what might it mean and how might it affect player experience for stories within the spinners to have different durations?

In Eckstein’s analysis of Ann Petry’s *The Street* (1946), she demonstrates that duration works in part by differential speed within one work. That is, speed and duration is noticeable in comparison to the rest of the work. The importance of one night in the life of the novel’s protagonist is heightened for the reader, Eckstein argues, precisely because of the disproportionate amount of space it takes up in the novel. A full third of the book is dedicated to one night, vastly slowing down the speed at which the reader comes to know about the event and increasing its importance in the whole of the story (Eckstein 25). Following this logic, that duration, pace, and total space used within the work all contribute to affect the reader, might it be possible to apply this to the spinners and game player experience? Might some of the spinners’ character stories tell a story of one day, say, the day that a climate refugee reaches the border, while others tell a story of longer duration, the years of strange weather that created crop failures and chronic hunger for one person? For the purposes of thinking through where and how the spinners might contribute to the story of climate change, duration, following Eckstein, would be the ratio of stories whose timeline is sweeping versus those that are zoomed in. Such design shifts may allow both the long languishing of slow violence and the acute intimacy of climate change hazards to be given space within this story I am trying to tell through Fringe-assay.
Figure 50  Participants play Fringe-assay: Mid-equitorial Quadrant. 2017. Personal Collection.
In this dissertation, I explored the power and potential of games for affecting environmental thought. I investigated play as a powerful generator of meaning and emotion. By manipulating components of games—the representational space, mechanics, win/loss paradigms, and more—I can create a space for players to dwell within and be affected by the realities of living on a damaged planet. Entering into play requires a psychological “opting-in,” an unconscious agreement to proceed together that subverts cognitive tendencies that might trigger an adverse reaction. The games encourage players to “stay with the trouble” (Haraway) by bringing attention to, sustaining reflection around, and giving opportunity to make metaphorically large decisions within some of our most intractable politico-ecological problems. This and other facets of the games from this study, including their materiality and familiarity, contribute to my goal of getting players to enter play and practice moving past quick, intuitive thinking to a more deliberate and slow thinking around environmental crises. While the gameplay experience can be enriching for players, the “thinking-through-practice” of critical making has also contributed greatly to my advancement as an Environmental Humanities scholar. Scholars in the Environmental Humanities would do well to consider game design and game play as a powerful strategy for interweaving the complex interdisciplinary concerns at the nexus of environmental crises and challenges of human behavior. In the end, “playing within the trouble” is a model for bridging the gap between scientific understandings of environmental problems and inaction amongst a general public. It demonstrates the potentialities of using ecoaesthetic games as a platform for affecting environmental thought around growing human and nonhuman vulnerabilities in the age of climate change.
**An error was made on “‘A’ Apis Mellifera, Western Honey Bee.” It should read “‘A’ Apis Mellifera, Honey Bee.”

Notes


xxxvii See also Kenneth Goldstein’s “Strategies in Counting Out.” pp. 172-177.

xxxviii Isbister, How Games Move Us, esp. pp. 32-40.
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