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Wiped Off the Map: Disturbing Toronto's Draft Biodiversity Strategy

Maya Watson

Dr. Matthew Tiessen, Supervisor

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Abstract

As policies to conserve urban "green spaces" in cities like Toronto proliferate, it is vital to re-examine the frameworks employed to communicate these issues to the public. A sub-section of recent biodiversity conservation analysis has examined the rhetorics that global neoliberal systems have employed to undermine traditional ways of regulating the natural environment (notably: Brockington and Duffy 2010; Macdonald 2010; Brockington and Igoe, 2010). Contributing to this literature, this paper critically examines the rhetorical maneuvers at work in Toronto's Draft Biodiversity Strategy, focusing on the ways that "harm" is constructed and how these frameworks are put to work. In particular, this paper uses invasive species as an example of a "harm" framework that diverts public attention from the de-regulation of natural spaces that the conservation movement arose to combat. The case studies for this paper begin to examine this tension in three current cartographical frameworks in Ontario and the policies that shape and make use of these frameworks. Through these case studies, this paper begins to elucidate the written and visual rhetorics that Toronto's DBS must critically analyze before developing their maps. To resist neoliberal ideologies that deregulate natural spaces, this paper makes the case for developing public communication frameworks that are intensive, adaptable, and locally informed. Explicitly engaging with the rhetorics that legitimize these extensive systems locally allows public communicators to resist (if only temporarily) the re-deployment of these local frameworks for global neoliberal aims.

Keywords: Conservation, Biodiversity, Invasive Species, Ecology, Cartography, Public Communication, Neoliberalism, Harm, Environmental Communication Frameworks

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Introduction

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The maxim, 'act locally, think globally,' should be reversed: there can be no encompassing global thought, for insofar as we think we are fragmented by various locales, figures, lexicons, disciplines and desires, but we nevertheless are caught up in a globe of action where no intent or prediction will be enough to secure or predict the outcome of any action (Claire Colebrook, "A Globe of One's Own in Praise of the Flat Earth," <u>Essays on Extinction: Death of the Posthuman Volume 1</u>, Chapter 3, p. 62).

The City of Toronto's (2018) Draft Biodiversity Strategy (DBS) begins with a quotation from Diana Beresford-Kroger in Jeff Mackay's (2017) film *Call of the Forest*: "where you have native species you have biodiversity, where you have biodiversity you have health" (p.1). The introduction, thus, sets up a dichotomy that opposes "[beneficial]" (p. 19) native species, to harmful and "dangerous" (p.19) invasive species, prevalent throughout the rest of the document (p. 4; p. 5; p. 13; p. 19; p. 20; p. 21; p. 22; etc.). The engagement framework for the DBS's proposed biodiversity maps sustains this opposition. It is crucial to analyze this contradistinction because these maps frame public engagement with the natural environment in order to "create a healthier biodiverse ecosystem" (p.20). These maps communicate to the public frameworks that could be used to generate action, inform research agendas, and influence policy decisions (Yung et al. 2013, p. 247). The maps include: (1) a "self-guided geo-referenced tour" (DBS, p.30) and (2) a re-constructed map of Toronto's "original landscape" (DBS, p.30). Because both maps draw on rhetorics of originality and "resiliency" (DBS, p. 30) to portray biodiversity "health" (DBS, p. 30) they clearly align themselves with narratives of native "fragility" that define

invasive species as inevitably harmful and as a category of living things to be excised from Toronto's natural environments.

On the ground, however, the effects of Toronto's invasives are not always so clear cut and are often neutral, ambiguous, and sometimes – arguably – even beneficial. The DBS classifies invasives as harmful because "[habitats] created by single non-native species have not co-evolved with native wildlife and cannot offer the same benefits to wildlife that native species can" (DBS, p.19). There are two assumptions in this definition of ecosystem heath: (1) wildlife is native (read: non-invasive) and (2) habitats must be maintained and always "the same" in order to sustain ecosystem health (novel benefits are thereby discounted). But let's consider a counter-example.

Once an industrial waste site, Tommy Thompson Park now hosts 316 bird species, including some of the largest colonies of water-birds in the Great Lakes ("Tommy Thompson Park") *precisely because* some of the invasive species listed as detrimental in the DBS – Norway maples, garlic mustard, dog-strangling vine (DBS, p. 19) – were able to re-populate this once inhospitable landscape (Foster and Sandberg, 2016, p.195). Another counter-example: in December 2018, the Ontario government proposed an extended hunting season for a *native* bird species known as the double-crested cormorant, in order to restrict booming population levels because of the subsequent reported biodiversity loss in island habitats and harm to other native species ("Proposal"). Native species, therefore, do not always sustain biodiverse ecosystems, nor do invasive species always harm them. Indeed, invasive species sometimes create new possibilities for biodiversity by generating novel ecosystems and new – and maybe more sustainable – environmental relations (Hobbs et. al, 2006).

Why, then, does the DBS decree that the impact of invasive species is ecologically harmful? Is this over simplification of Toronto's environmental reality a deliberate decision to incite public engagement through invasive species directed outrage? Or, perhaps this flawed reasoning reflects a disjunction between (1) the context and definition of biodiversity that propels the project and (2) the ecological reality of Toronto's "green spaces"? On the DBS webpage, the City stresses the influence of global institutional paradigms upon this project. For example, Toronto "aspires to be a world leader in the development of urban initiatives that will be critical to the preservation of our flora and fauna" ("DBS"). The DBS further asserts that "Toronto's interest in biodiversity is also part of a larger global initiative focused on prioritizing biodiversity conservation in cities" (p.1). Clearly, then, this local strategy must be situated within a more expansive and all encompassing global agenda. For example, the DBS relies on the United Nations' Environment Programme (UNEP) terminology for its own definitions of "biodiversity": "a combination of 'bio' (life) and 'diversity,' generally referring to the variety and variability of life on Earth" (p. 3). While this definition and context celebrate a global vision of biodiversity in the face of a mass extinction crisis, this generic definition has little to do with the ecological realities in Toronto. Indeed, these globally applicable rhetorics and the emphasis on the global context risks ignoring the quite particular relationships and entities within the ecosystem in question (Macdonald, 2010; Brockington, Duffy and Igoe, 2010; Brockington, Duffy, 2010; Adams 2004; Neumann 1998). By expanding the rhetorical and definitional breadth of the DBS, the meaning of biodiversity "health" and "harm" loses sight of particular contexts and the specificities of local ecosystems. And once these globalized rhetorics get put to work, over-generalizations about invasive species can begin to shape the conversation and define the boundaries of what is, and what isn't, acceptable in local natural environments.

Although analyzing these rhetorical maneuvers may seem irrelevant or even "perverse" (Simberloff, cited in *Science Daily*, 2014) in the face of rising extinction rates world-wide (Pievani, 2014, p. 85), there is value in these rhetorical analyses because *words legitimize power claims to ideological and material territories*. For example, the globalization of conservation rhetorics often invisibly (and occasionally unwittingly) supports neoliberal economic and political agendas, and thereby helps expand the traditional limits and restrictions on the accumulation of natural capital (Macdonald, 2010, p. 532; Goodenough, 2010, p. 12). Moreover, while global environmental frameworks, logics, and rationales are often adopted to rally environmental action, the global scope of these concepts has been shown to de-incentivize their intended audience: e.g. the problem is too large to solve, nothing can be done (Hibberd and Nguyen 2013, p. 33; Yung et al. 2013, p. 251; Schweizer et al. 2009, p. 271). Caution is necessary, then, because rhetorics affect resistance. Indeed, as many have noted (Tiessen, 2017; Macdonald, 2010; Brockington, Duffy, 2010), these expansive, and often neoliberal, formulations of environmental conservation often "perpetuate the very status quo policies, practices, and programs that have contributed to our moment of [environmental] crisis in the first place" (Hroch, 2014, p. 14).

In order to respond to these neoliberal rhetorics and to re-imagine ecological engagement frameworks this paper engages with questions like: What really *harms* ecosystems? Are the rare pockets of invasive ecological abundance to blame – such as Garlic Mustard and Japanese Knot-weed, those few organisms that somehow manage to abound and expand their populations amid news blasts about mass extinctions and global warming?[1] Or does ecological harm get perpetuated instead through global neoliberal systems and the attendant rhetorical maneuvers

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[1] In a quick Google search the prevalence of mass extinction articles becomes clear. The New York Times Website alone there were 2594 hits when I searched "mass extinction" (NYT, 2019).

that work to dissolve restrictions on natural resources – a legislatively enforced molting of natural environments into exchangeable global capital? Moreover, how do these rhetorics function through public communication frameworks of ecological "health" and "harm" in invasive species discourse? And, in what ways do these rhetorics, and the mediums that convey these rhetorics, resist or sustain ecologically toxic and routinely reductive globalized neoliberal systems? Finally, in order to look more closely at these issue, this paper consider how technologies and aesthetics of cartographical communications can serve to mediate ecological resistance frameworks.

Methodology

The reductive invasive species rhetoric in Toronto's DBS is just one example that can provide insight into the swelling material and ideological cleft between (1) conservation movements that align themselves with global neoliberal goals and (2) localized movements that reject "top-down" approaches to biodiversity (Macdonald 2010, p. 515). As this debate over the place of global economics in conservation movements heats up, and while the development of policies to preserve "urban ecosystems" proliferate in major cities like Toronto, there is a need to re-examine the rhetorical processes of legitimization that reconstitute global power formations through environmental conservation frameworks. It is vital to develop critical tools and conceptual frameworks that (1) unpack the (economic) power dynamics at work in dominant local and global environmental rhetorics and (2) produce frameworks for developing intensive, adaptable, and locally informed environmental logics and communications that resist neoliberal ideologies while engaging critically with the global machinery of natural capital accumulation.

Relatedly, Toronto's public biodiversity maps require communication frameworks that expose environmental rhetorics that maintain the global economic status quo at the expense of local realities. I consider the ways conservation frameworks can reorient biodiversity conservation goals and management techniques, generating new "ecological realities" (Macdonald, 2010, 515). The first literature review for this paper, therefore, critically analyses and compares conservation action that stems from global neoliberal value frameworks and localized "place-based" value frameworks, to argue for intensive, adaptable, and local frameworks that engage with the extensive, unpredictable effects of the global de-regulation of natural capital. And, the second literature review examines how this framework can, theoretically, be put to work in and through maps. The methodological section further explores the failings of environmental conservation frameworks through applied cartographical aesthetics and rhetorics. By emphasizing the elastic interactions and feedback-loops that strengthen neoliberal systems through our ecological actions, narratives, and negative communications about invasive species, this paper's analysis of three local maps, their policies, and the communication frameworks they employ can offer insights into the current state of conservation communications in Toronto.

The case studies consist of three comparative analyses of the rhetorics at work in specific environmental policies in Ontario and the maps that frame these policies for the public. The first case study contextualizes the disparate ecological histories of High Park and Tommy Thompson, to situate a visual content analysis of ProtectNature TO's natural heritage maps (Toronto). The second study finds the economic ideological underpinnings of Ontario's Early Detection and Distribution Mapping System Ontario (EDDMS) in current (2019) provincial biodiversity policy. The third, provides a particularly contradictory example of invasive species policy in Ontario,

the proposed cormorant cull, and reveals how globalized conservation frameworks backfire in mappings such as Ebird.org. These case analyses will give policy makers, professional communicators, and the public an opportunity to asses the implications and impacts of different cartographical communication frameworks on the ecosystems discussed.

My research method, then, critically analyses the dominant discourses in ecological diversity rhetoric by examining and comparing the content of (1) global biodiversity frameworks (2) mapping theory and literature, (3) cartographic communications, and (4) local ecological diversity policies. By suggesting different framings of biodiversity conservation that are not explicitly scientific, this paper offers a call-to-action against the reductively financial forces that often remain invisible in environmental movements under the tyrannical cover of scientific "black boxes" (Latour, 1987). My research also contributes to growing debates among environmental theorists, geographers, urban planners, post-humanist philosophers, and technological communication theorists about the ways that capitalist systems lay claim to ideological territories that produce conditions destructive to natural environments (see Haraway, 2015; Colebrook, 2016; Macdonald, 2010; Guattari, 1989; Hroch, 2014; Tiessen, 2019; Tsing, 2016; Brockington and Duffy, 2008; Moore, 2016; among others).

Literature Review: 1) Framing Horizons for Conservation Rhetoric

So how can neoliberal frameworks harm ecosystems? Framing "refers to the process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue" (Chong and Druckman, 2007). Because communication frameworks help to structure public values, direct public interest, and affect policy-making by emphasizing certain aspects of

an issue and obscuring others "frames can facilitate top-down forms of communications and governance" (Yung et al. 2013, p. 250). Global environmental frames that use rhetorical terms, categories, and concepts such as the "Anthropocene," "Sustainability," "Mass Extinctions," and, most importantly for this paper, "Restoration Conservation" have been accused of perpetuating and expanding what broadly can be referred to as neoliberal forms governance – forms of governance and social/environmental organization that dissolve the limits on the accumulation of natural capital and that regard economic value as the measure of all things (Tiessen, 2018; Hroch, 2014; Colebrook, 2016; Macdonald, 2010). These frameworks serve to undermine alternative logics and narratives while serving as "a kind of cultural common sense that blind[s] users to their limitations" (Yung et al. 2013, p. 250). To counter these covert and often tyrannical neoliberal tendencies, this paper rejects a "one-size-fits-all" approach to ecological frameworks and solutions. Instead, I advocate for ways of "framing" that rely on *non-prescriptive, dynamic, and localized processes that explicitly dig into and resist the (rhetorical) points where power is produced and reproduced*, and thereby, provide "the opportunity to change perceptions of the urban environment" (Seastedt et al., 2013, p. 311).

To support my arguments for the development of these dynamic ecological communication frameworks, this section will briefly review literature that traces the divide that exists in the framing techniques of competing conservation movements, supplementing ecological conservation theory with examples of rhetorical framing of invasive species as harmful agents. I will compare the susceptibility of the following three frameworks to neoliberal systems that de-regulate natural resources and harm the environment: (1) global re-framings of biodiversity conservation that translate ecological value into natural capital, (2) local conservation rhetorics that align themselves with complex, "place-based" frameworks of

ecological value, and (3) Deleuzian frameworks that resist extensive economic systems by focusing on local intensities, and accept more nuanced environmental definitions.

My argument draws on David Harvey's (2005) definition of neoliberalism: "a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade" (p. 2). More particularly, this analysis focuses on the development of frameworks that rhetorically conflate the value of economic success with environmental health. This paper can be regarded as contributing to literature on the "neoliberalism of nature" (McCarthy and Prudham 2004) that has further developed into analyses of "neoliberal conservation" most coherently articulated by the work of the authors featured in Volume 42, Issue 3, of *Antipode: A Radical Journal of Geography* (Brockington and Duffy 2010; Macdonald 2010; Brockington and Igoe, 2010). Following these thinkers, the term neoliberalism functions in this paper as a "mode of discourse" (Harvey, p. 3) that legitimizes neoliberal agendas to remove barriers to the accumulation of natural capital.

It has often been suggested that the development of frameworks amenable to neoliberal infiltration of the biodiversity conservation movement began with the establishment of the World Conservation Strategy (WCS) in 1980. Macdonald asserts that this strategy "was the initial step in an attempt to structure the establishment of coherent national conservation strategies around the world and became the basis for the rapid expansion of… major conservation organizations into international project-based conservation programming" (2010, p. 517). In this movement from scattered local groups to a global re-organization of biodiversity aims, however, biodiversity became abstracted from the particular ecological context and regulatory anti-

accumulation interests from which the movement had originally sprung (Macdonald, 2010, p. 541), the result being that neoliberal interests were able to infiltrate and co-opt this new global biodiversity strategy (Fairhead et al., 2014, p. 42; Macdonald, 2010, p. 541; Asiyanbi, 2015, p. 116). As many theorists have observed (Brand and Gorg 2008; McAfee 1999; Swanson 1999, Macdonald, p. 526), the rhetoric originally developed in the WCS and later by the 1992 Convention on Biological Diversity (CBD) "codifies a dominant perspective of nature as capital through its emphasis on sustainable use initiatives that, when translated into practice, means the use of *in situ* biodiversity to realize profit through the conversion of use value to exchange value" (Macdonald, 2010, p. 526). In other words, as biodiversity discourse shifts from particular ecosystems to a globally abstract "biodiversity," a space opens up for global institutions to rhetorically re-align and re-map the value of particular biodiversities. These rhetorical maneuvers produce frameworks that ontologically and legally equate the value of the natural environment wtih capital, legitimizing policies and legislation designed to de-regulate the accumulation of natural capital and to facilitate the transformation of natural environments into financial ones.

Global neoliberal conservation frameworks use rhetorical abstraction to divert public attention from the local "protest and conflict" (Macdonald 2010, p. 517) frameworks that characterized the early (1960s-70s) conservation movement. Instead, the frames used by globalized neoliberal conservation organizations emphasized "consensus and consent by claiming that economic and environmental goals were compatible" (Macdonald 2010, p. 517). Freudenburg calls this environmental framing tactic "diversionary re-framing": "attempting to divert attention away from an uncomfortable question by trying to reframe the debate as being 'about' something else" (2005, p. 104). The communication frameworks used by global institutions and the rhetorics they employ divert public attention (and response) from the harm

that neoliberal systems wreak upon actual ecosystems in specific locales.[2] In the case of

biodiversity conservation, working as "stakeholders," corporate influence shifted the framework

of the biodiversity debate to obscure the harmful effects of the free market on ecosystems

(Macdonald 2010, 516). Moreover, by assuming responsibility for environmental sustainability,

global institutions are able to short-circuit and usurp more grassroots and local environmental

activism.

There are two main tactics that neoliberal re-framing employs: (1) optimistic win-win

narratives (with the economy – and by extension the public – always as one of the winners) and

(2) the transmutation of "harm" onto agents other than the economy. Win-win rhetorics often

translate into an odd "obligatory optimism [that] marginalizes complaints and critiques, and an

over-emphasis on individual responsibility obfuscates the need to hold responsible those who

have the greatest power to make decisions to transform a given situation" (Hroch, 2013, p. 21).

Harm transference, on the other hand, positions "corporate actors as having the will, resources

and knowledge to engage in environmental repair or caretaker services to solve the

environmental problems that global capitalism has itself created" (Macdonald 2010, p. 529). By

positioning "corporate" actors as environmental saviors, other entities take the blame for

environmental "harm," like invasive species.

These diversionary frameworks are at work in the intense resistance to the potentially

"healthy" effects of invasive species. In 2011, 18 prominent ecologists, including M. Davies,

argued that "most human and natural communities now consist both of long-term residents and

of new arrivals, and ecosystems are emerging that have never existed before" (p. 154); they

argue that it is, therefore, "impractical to try to restore ecosystems to some 'rightful' historical

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[2] See Tiessen (2019) for a rambunctious exploration of these neoliberal tactics applied to the Don Valley's "resilient" creatures!

state" (p. 154). Some ecologists even go so far as to argue that ecological stasis is more unnatural than the radical increase in "invasive" species and the ecological change that they bring (Goodenough, 2010 p. 14). Despite many examples "of introduced species acting as hosts, food sources, pollinators or seed dispersers for native species, as well as providing herbivory, predatory or parasite release" (abstract), many still reject these positive framings of invasives as "perverse" because they endanger the more expansive work of global conservation movements (Simberloff, cited in *Science Daily*, 2014). In response, however, other environmental theorists have asserted that the human concentration on invasive species as a primary threat is a diversionary frame that shifts harm to invasive species and away from the impact of more directly human-caused "disturbances and global warming (not to mention human population growth and global trade), [that] may overwhelm the effects of invasive species" (Larson, 2007, p. 1).

As the neoliberal frameworks proffered by global institutions proliferate, the potential for effective and organized resistance to neoliberal de-regulation of ecological areas weakens. Research has shown that "effective communication of scientific research requires situating findings in specific places where changes are occurring" (Yung et al., 2013). In other words, local "place-based" communication frameworks are more effective at rallying public engagement than global approaches (Hibberd and Nguyen 2013, p. 33; Yung et al. 2013; Thompson and Schweizer, 2008). Moreover, the organizations that would be most likely to employ these local frameworks have lost funding to large organizations that supported abstract neoliberal global conservation goals (Macdonald, 2010, p. 534; Chapin, 2004, p. 18). The conflation of capital accumulation and environmental protection is, thus, "partially responsible for [the] subordination [of earlier conservation organization models] as it developed an infrastructure grounded in short-

term, project-based support rather than reliable core funding" (Macdonald 2010). Without well-funded local groups to organize resistance against toxic neoliberal tendencies, the rhetoric (quietly) sustained in global mandates, has, over the past 40 years continued to "[legitimize] an agenda that prioritized economic growth over environmental goals" (Macdonald, 2010, p. 526).

Let's consider an example: the CBD website claims that "Invasive alien species (IAS) are a global issue that requires international cooperation and actions" because "preventing international movement of IAS and rapid detection at borders are less costly than control and eradication." Action (and funding) against invasives is explicitly re-routed, here, from local to international borders. In short, action against invasive species becomes another tool to globalize environmental action. Although globalized neoliberal frameworks do produce environmental engagement, diversionary re-framing techniques that delimit ecosystems as natural capital are often more "harmful" to natural environments than the chosen diversionary "harming" agent, (invasive species, for the purposes of this paper).

And let's not ignore the ironic double standard being created by global (and globally-minded) progressive who decry "invasive" species in the "natural" world, while at the same time being proponents of mass immigration of humans in the political and social world. Of course, both logics serve to enable ongoing capital accumulation and control by the corporations served by today's international – or "globalist" – organizations.

To resist the toxic effects of these globalized neoliberal conservation frameworks, many suggest developing local conservation rhetorics that align themselves with complex, "place-based" frameworks of ecological value. Macdonald claims that in the 1992 discussions preceding the creation of the CBD, "the potential of [local and indigenous] groups to formulate and lobby for the implementation of an equitable access and benefit-sharing regime posed a direct threat to

existing patterns of capital accumulation, particularly unhindered access to and use of resources"
(p. 532). In other words, corporate interference in CBD was a direct result of the potential power
of conservation organizations to limit access to natural resources. Corporations re-routed this
attempt at a global conservation movement based in local action precisely *because* it presented
the possibility of effective environmental action and conservation. The protest frameworks that
early conservation groups employed can be regarded as less susceptible to supporting the
depletion of natural resources for capital accumulation. These were local and indigenous groups
who struggled "to establish a regulatory framework for access and benefit sharing that
accommodates *diverse* understandings of material and intellectual property, recognizes *multiple*
forms of sovereignty, and fosters widely *democratic involvement* in formulation of equitable
'access and benefit sharing' agreements" (Macdonald, 2010, 534, emphasis added). Because
these groups rejected "singular definitions of biodiversity," instead engaging with the local
complexities of ecological realities which often included invasive species (Vermes quoting
Nicholas Reo, 2018), their frameworks often effectively limited capital accumulation where
more general definitions failed (Macdonald, 2010, p. 532; Chapin p. 23). In other words, these
frameworks of "protest and conflict," in their rhetorical multiplicity, explicitly located harm in
de-regulatory capitalist accumulation and thereby challenged neoliberal ambitions (Macdonald,
2010, p. 515).

These early resistance frameworks, however, eventually failed. Why were these
frameworks unable to resist globalized neoliberal deployment? In her (2013) essay "Resilience
versus Resistance: Affectively Modulating Contemporary Diagrams of Social Resilience, Social
Sustainability, and Social Innovation," Petra Hroch digs into this failure of environmental
movements by asking: "how can we make distinctions about which actions/reactions are acts of

so-called resilience and which are acts of resistance?" (p. 21). In other words, how can we

distinguish between environmental movements that operate within the framework status quo

economics, and those that break with and effectively offer resistance to the dominant discourse?

While Hroch's socio-rhetorical argument emphasizes the problematic re-distribution of

environmental responsibility onto the individual, or "dividualized' agents" (quoting Deleuze, p.

22), her theory can be expanded upon to argue against the legitimizing rhetorical frameworks at

work in contemporary conservation movements. In particular, I wish to take up her assertion that

effective resistance occurs in the "ability to locate the points through which power is produced

and reproduced" (Hroch, 2013, p. 33). Following this thought, resistance must take place through

frameworks that explicitly engage with these rhetorical "pressure-points" of power. These points

will be referred to in the rest of this essay as "intensities": the particular form of rhetorical

deployment that extensive, all-encompassing neoliberal systems take in local realities. Because

"protest and conflict" frameworks resist through *extensive* opposition to capitalist accumulation

rather than through an *intensive* disassembling of these rhetorical points of power, early

conservation frameworks are susceptible to maintaining the economic status quo. Rather than

formulating an oppositional and general resistance to capitalist accumulation of natural capital

(i.e. "fight the power!"), effective conservation frameworks must engage with the particular

rhetorical points of neoliberal power-legitimization.

    A close examination of "harmful" natural disturbances, like invasive species, sheds light

on how these intense frameworks can disrupt extensive systems. Because neoliberal frameworks

ontologically and legally delimit the natural environment as *in situ*, these frames create the

perception of "a system of proper places within the environment (an environmental norm) [and]

prompts use of purported laws of nature to both defend and destroy environmental features or to

sanction a moral code" (Foster and Anders, 2004, p.181). Natural agents of disturbance, such as invasive species, thus become coded as inevitably harmful, obscuring the harm that globalized neoliberal systems facilitate and perpetuate. Focusing new ecological resistance frameworks on the particular tangled inconsistencies that diversionary globalized neoliberal re-framing technique attempts to suppress, then, can reveal the ecological agents that are already resisting beneath the simplistic frameworks of neoliberal rhetorics. Emphasizing the ways that natural disturbances break from their definition as "harming agents," as Tsing asserts in her (2016) manifesto, can "[realign] possibilities for transformative encounter" (p. 121). Moreover, natural disturbances require radical re-assessments of not only the natural environment, but "the social idea of proper order" (Foster and Anders, 2004, p.181). Disturbances, thus, demand emergent forms of social resistance that sprout from faint fissures in the seemingly impenetrable neoliberal paradigms of ecological governance (Tsing 2016). Frameworks that engage with the local nuances of these natural disturbances could challenge the broad rhetorics typical of globe-spanning neoliberal systems.

New ecological communication frameworks, then, must be (1) locally grounded in particular moments of disturbance and (2) expose the intensive locations where extensive neoliberal rhetorics apply diversionary re-framing techniques. Moreover, to resist falling into the discursive push-and-pull of early conservation organization's oppositional frameworks, this change must take the form of "imperceptible rupture, not signifying break" (Deleuze and Guattari 1987, p.2). In other words, the fissure should not attempt to change a "truth" through general resistance; rather, resistance must "work" in a particular context. Because this pragmatic approach rejects universal frameworks, the frames produced are only useful if they function; after they serve their purpose, these frames must be discarded so as not to stagnate into a form of

governance (Williams 2017, p. 1). In Deleuze and Guattari's words, "any precarious and pragmatic framework is better than tracing concepts, with their breaks and progress changing nothing" (1987, p. 4). To be clear: these new ecological frameworks cannot simply replace neoliberal conservation frameworks or the early local conservation frameworks like other innovative frameworks such as "resilience" that still function within neoliberal systems (as seen in: Hroch 2013; Tiessen 2019). These new ecological frameworks require an intensive and explicit public engagement with the rhetorics of "harm" that legitimize extensive global neoliberal systems as the seemingly sole "healthy" status quo.

Literature Review: 2) Mapping Invasive Species and Visualizing Capital

Cartography helps frame invasive species narratives of "health" and "harm" within biodiversity conservation movements. From heritage maps that record ecological history to mark the boundaries of protected areas, to invasive species maps that track and predict the expansion of ecological "threats," ecological maps are often used to translate scientific findings for the public. It is perhaps surprising, then, that little academic attention has been paid to the significant potential of this medium to frame and communicate environmental protection to the public. As Moritz, a wildfire expert affiliated with the University of California, asserted about predictive maps that were used during the wildfires last year (2018) that caused widespread panic and disturbance, "predictive technologies will not change the underlying factors of urban development and a warming planet that are making fires more intense" (quoted by Del Real). Although the maps that Moritz critiques are not meant for public communication, his comment points to the failure of these natural disturbance maps to "[draw] new cartographies rather than

reproducing cartographies of power as they currently exist" (Hroch, 2013, p. 33). These maps were unable to frame either *local* intensities of ecological harm or the more extensive global systems (and their consequences) that are the product of neoliberal capital accumulation. As they function now, then, disturbance maps employ visual forms of the diversionary re-framing frameworks discussed above to distract from the transference of neoliberal harm to invasives as disturbing agents. In other words, the aesthetic choices and integration of new technologies to disturbance maps, (often inadvertently) supports public framings of nature as exchangeable global capital. This section will examine how dominant mapping aesthetics, horizons, and technologies employ globalized neoliberal frames. Through this lens, I will revisit the proposed maps in Toronto's DBS to argue for the development of invasive species cartographies that engage effective public resistance.

Maps frame. Rather than arguing for a re-framing of mapping to communicate the eco-crisis, media studies theorist S. Taffel uses mapping as a metaphor to describe the divergent lines of flight (Deleuze and Guattari) that arise from different definitions and locations of the Anthropocene (Taffel, 2016, p. 221). His metaphor, however, points to the potential of maps as communication frameworks. As Sy Taffel explains in his (2016) paper "Mapping the Anthropocene," "mapping deliberately foregrounds particular features while omitting others, thereby comprising a performative activity, which actively engages with a dynamic and mutable world" (Taffel, p. 220). Deleuze and Guattari elaborate in their (1980) work *1000 Plateaus*: the map is "open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by an individual, group, or social formation" (Massumi, Intro, p. 1). Although cartographic framing replaces words for aesthetics, maps, too, present a particular orientation.

As with rhetorical frameworks, there are cartographies that are more responsive to novel engagements than others, particularly those that reproduce neoliberal forms of governance. Tracings, for example, represent the world as a closed and replicable totality (without room for change or action). According to Brian Massumi in his (1987) translation of, and introduction to, *1000 Plateaus*, the aim of tracing "is to describe a de facto state, to maintain balance in intersubjective relations" (p.1). Tracing "confines every desire and statement to a genetic axis or overcoding structure, and makes infinite, monotonous tracings of the stages on that axis or the constituents of that structure" (Massumi, p. 1). Tracings reproduce reality as static: they do not innovate, become, or incite emerging ideas. These static cartographies, then, would be more susceptible to the employment of the neoliberal conservation goals described above. On the other hand, because mapping frameworks engage with "a dynamic and mutable world" and require deliberation, they have the potential to rupture established discourses and to provide a frame for emergent ideas.

Of course, cartographic aesthetics also mediate communication frameworks. And let's not forget that the development of these aesthetics is primarily financed by major global corporations and the State (Pickles, 2006, p. 11). Although the emergence of new computational theory and technologies has changed cartographic aesthetics, introducing spatial data collection innovations (satellites, aircrafts, drones, etc.) and new technologies of representation (three-dimensional "fly-overs," interactive images, animations, representations of temporal change, etc.) (Pickles, 2006, 155), these maps still employ aesthetics that emerged in the 1600s as "an aid to developing the new systems of exclusive rights to land" (Pickles, 2006, p. 98). Typical signs and lines in contemporary cartographies reflect this history: modern maps emphasize "natural and built physical objects, rather than developing universal conventions dealing with symbol,

affect or movement" (Pickles, 2006, 57). Maps also typically employ a "God's eye" point of

view (see Haraway 1988 or Pickles 2006 for a more extensive analysis). This POV became

common when the aim of cartography shifted to depicting the globe: mapping was "a part of the

sixteenth- and seventeenth-century project of European exploration and science, a nineteenth-

century project of territorial acquisition and ethnographic taxonomy, and a twentieth-century

project of imperial reach" (Pickles, 2006, p.). These aesthetic choices were made in a way that

facilitated the transition from mapping locales, to nations, to the globe. Abstract signs and

boundaries, however, loosen their grasp on specific local realities. While this loss of local nuance

was necessary to visualize global capitalist expansion, I argue that the use of these globalize-able

aesthetics in ecological resistance maps undermines the effectiveness of these communications.

Local resistance maps, then, should not look like global (e.g. Google) maps. In her (2016)

essay "A Globe of One's Own: In Praise of the Flat Earth," C. Colebrook challenges the

aesthetics and logics of global mapping aesthetics. She asserts that the image of the globe

communicates a theological faith in an unchanging balance, a "proper potentiality that might be

restored" (p. 71). A globular earth must eventually (and naturally) re-balance itself. More

importantly, Colebrook mentions this globular re-balancing in terms of the "surfeit of

information, especially information regarding the limits of the globe (such as data about global

warming, resource depletion)" (p. 72). Although many studies compile data arguing that the

natural environment has limits, the image of the unified globe undermines these claims. For

Colebrook, framing the earth as a globe makes local environmental action seem both unlikely

and unnecessary because the spherical shape obscures local limits and realities. N. Mirzoeff's

(2014) paper points to this ability of global (economic) aesthetics to obscure environmental

harm: "the Anthropocene cannot visualize itself, no more can the market or empire, and yet the

'authority' of both can be felt across the world… Anthropocene visuality allows us to move on, to see nothing and keep circulating commodities, despite the destruction of the biosphere" (p. 217). The extensive scope of these crisis maps masks the potential for effective ecological action. Colebrook, similarly argues that a "horizon is neither given nor guaranteed, but is nevertheless urgently required if we are not to lose sight altogether of our potentiality to be political, to open a political space" (Colebrook, p. 64). In other words, we need to take a local stance, to "act locally" to "think globally" (p.64), in order to effectively react to ecological crises. Biodiversity maps that use aesthetics and technologies that allow them to become globalized cannot effectively represent the ecological realities they are attempting to portray because the maps need to ignore geographic and ecological inconsistencies in particular locales to produce a cohesive whole. To effectively frame ecological resistance, then, maps must switch out global aesthetics for nuanced signs particular to local scenarios.

Since the maps that Toronto's DBS proposes have not yet been developed, the possibilities for their aesthetic analysis are tenuous. The proposed rhetorical frameworks of Toronto's DBS, quickly discussed in the introduction, however, seem to be susceptible to being co-opted by neoliberal frameworks. Furthermore, the title of the project that will guide the development of the two maps (self guided podcast and visualization of Toronto before colonization), the Reconstructing and Mapping Toronto's Original Landscape and Biodiversity *Health* project (DBS, 2018, p. 30), already recalls the diversionary frameworks that re-align rhetorics of harm from neoliberal de-regulation to other harming agents.

There is also no best practice example included in the plans for this Original Landscape project from which to base an aesthetic analysis. The limited description of the proposed mapping format claims that "the project will create a database and visualization tool that presents

Toronto's past landscape and ecology georeferenced to the street grid of the City of Toronto" (p. 30). Although this quick description may seem to limit the scope and scale of the project to Toronto, presenting the possibility of a local map that focuses on particular ecological intensities, it is too vague to accurately predict outcomes. The description fails to describe what signs will be included, or, what these signs will look like. Nor, does the rhetoric propelling the development of these maps support the framework outlined for effective environmental action above: there is no explicit resistance to the rhetorics (and aesthetics) employed by neoliberal frameworks. It is unclear whether the included signs will function, as implied by the global framework in the introduction and the focus on "restoring" an "original" and "past landscape" (p. 30), to solidify Toronto's place in the global conservation movement, including only ecosystems and ecological entities that fit within that framework (e.g. native species)? Or whether the map also presents – reluctantly, perhaps? – signs of the less desirable invasive species that also help populate and add biodiversity to the city? Will the scale of these maps, although appearing to be limited to Toronto, engage with the expansive realities of ecological harm framed in global biodiversity conservation movements? Both the aesthetics and the specific frameworks that these maps will employ are elusive; however, the rhetorical frameworks apparent throughout the rest of the draft suggests that these maps will fail to engage the public in effective – that is, locally informed, relevant, and responsive – environmental action.

The following cartographical case studies explore some of the potential failings in the proposed biodiversity map frameworks for Toronto's DBS through an analysis of three maps that currently make up Toronto's biodiversity framework: (1) Natural Heritage Maps of High Park and Tommy Thompson Park (Leslie Street Spit), (2) Ontario's Early Detection and Distribution Mapping System, and (3) the birding engagement map on Ebirds.org. In each case, I will analyze

how rhetorical maneuvers in policy frameworks and current mappings shape, and are shaped by, these particular spaces of biodiversity. These studies further elucidate the rhetorical maneuvers that these maps and policies employ by focusing on the ways that invasive species – as potentially transformative disturbances – are hidden or highlighted throughout all these cases.

Natural Heritage Maps: High Park and Tommy Thompson Park, Toronto

High Park houses one of the last remaining black oak savannah reserves native to southern Ontario and employs scheduled burns to control invasive species (Foster and Sandberg, 2005, p. 187). The ecosystems that make up Tommy Thompson park, on the other hand, are composed primarily of invasive species. (Foster and Sandberg, p. 194). Conservation movements sprung up to protect High park around 1980, when a report determined only 58 hectares of High Park were defined as "natural" (Foster and Sandberg, p.187). "Non-native species" (Foster and Sandberg, p. 187) were reported as a main cause of environmental degradation. Tommy Thompson park, by contrast, was never "natural." In 1959, the park took root in the excavation "debris" dumped at the edge of Lake Ontario by the Toronto Harbor Commission: the five-kilometer-long spit is made of "clean fill," which consists of "a mass of concrete, brick, asphalt, and rubble" (Ibid., p. 191). By the 1970s the once industrial spit, was thriving: full of forests, mudflats, wetlands, and meadows made up of mainly invasive species – the only plants hardy enough to colonize a wasteland. Now, Tommy Thompson hosts up to six percent of herring gull, ring-billed gull, and double-crested cormorants global breeding populations (TRCA 2000), not to mention the hundreds of migratory birds that fly through the park every spring ("Birds of

Tommy Thompson Park"). In short, while both parks support some of the largest densities of ecological entities in the city, this is where the similarities end.

Despite their radically different ecosystems and ecological histories, official City of Toronto maps frame both these spaces as "natural heritage systems" (Figure 1). Because the City does not explicitly frame their maps to rally environmental action,[3] I will analyze ProtectNature TO's "natural heritage" maps instead. I will use ProtectNature's use of the City's maps to argue that (1) the functional and aesthetic constraints on the City's Open Application Interface (API), "interactive" map, forestall the creation of emergent cartographies that could potentially rupture dominant ecological discourses and, (2) that the use of almost identical aesthetics to map these disparate spaces reveals top-down biodiversity conservation frameworks at work in "natural heritage" rhetoric, exchanging local ecological realities for extensive global rhetorics. This case study concludes that, as they currently function, Toronto's "natural heritage" maps are not effective ecological frameworks for the DBS.

Open-access API technologies seem like revolutionary tools for public engagement: these services have no direct monetary cost[4] and make mapping services more accessible to the public. Some theorists have even dubbed the development of these maps the end of an era of "tyranny" and the democratization of map-making (Dodge, p. 135). Notwithstanding a few notable exceptions (e.g. Giaccardi and Fogli, 2008; Young and Rankin, 2001; Aberley, 1993; Cravey et al., 2000), however, "these [maps] all ultimately still have the look and feel of a Google Map and are constrained by the tools that the corporation provides" (Dodge et al., 2011, p. 136). These

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[3] In the City's "interactive" map, the "natural heritage" system heading appears only halfway down the list of heading options and does not appear in the original caption for the map ("Maps"). The City's map is clearly not actively attempting to engage the public with "natural heritage" sites; and therefore, not particularly useful for public communications analysis. ProtectNature TO's Natural Heritage maps (Figure 2 and Figure 3), in contrast, explicitly attempt to communicate the importance of these "natural heritage" areas to the public, by using screenshots of the City's maps.

[4] The indirect cost to users is: "geographically- targeted advertising" and supporting large corporate monopolies as these tools are "being heavily subsidised at the moment by large corporations, like Google and Microsoft as they seek to entice users to their sites and to dominate the marketplace for online mapping" (Dodge, p. 135).

maps are, therefore, subject to the aesthetic restrictions of early capitalist mappings, noted above. Indeed, as Dodge ironically asserts, these interactive maps "[serve] the interests of corporations and states, as they can operate as surveillant technologies – typing a postcode into a search boxes generates a unique map for the individual but also reveals to the mapping site what that individual is interested in at that moment in time" (Dodge, p. 136). Not only do API technologies maintain early capitalist aesthetics while promising novel creative freedom, but these technologies can help enforce a different sort of "tyranny."

The City's descriptions of their "interactive" map on Toronto's municipal website boasts these same API benefits and exhibits these same failings ("Map"). The map's caption boasts about the technologies employed by the "interactive" map: "This tool is easy to use and includes zooming, navigating, panning, etc. As well, the robust search allows users to search by address, intersection, and place name" ("Map"). Clicking on the link, a map of the city of Toronto opens that displays a legend with interactive options displaying geographical boundaries through various coloured gradients (see Figure 1). "Natural Heritage" is the fourth option listed, with the following sub-options (listed in order of appearance): "Environmentally Significant Areas" (ESA), "Natural Heritage Systems," and "Provincial Areas of Natural Significance" (sub-option: "Provincially Significant Wetlands"). Users then, can easily customize their own ecological maps of Toronto for no obvious cost. The "interactive" map, however, employs boundaries, base features, and POV reminiscent of the early capitalist maps discussed above (Figure 1). The map "shows the city's base geography, aerial view, administrative boundaries and a variety of city attractions just to name a few" ("Map"). Resulting maps, then, must employ pre-defined aesthetic, functions, and rhetorical frameworks, similar to Google Maps.

ProtectNature TO's "natural heritage" maps exemplify the aesthetic and technological limitations of the City's "interactive" map as a tool to rally ecological conservation action. These maps are screenshots of the City of Toronto's maps with the "Natural Heritage" filters on: static colored images with a close up image of the Environmentally Significant Area (ESA) in question overlaid with a larger image of the whole district (Figure 2 and Figure 3). The City's definitions of Natural Heritage Systems (NSA) and ESA surround these maps, followed by a list of the ESA(s) found in the ward in question, and a list of the relevant Natural Heritage Protection policies that apply (Figure 2 and Figure 3). While this list of relevant protection policies can facilitate user engagement with local environmental regulations, the aesthetic and technological tools employed by these maps undermine this local framework. ProtectTO's maps cannot provide a level of detail that resonates with the ecological realities they represent because the "zoom" feature from the City's maps cannot move the user close enough to see the details of the parks that they would recognize: the foot-paths that lead to the prime birding spots, and the field to harvest garlic-mustard to make pesto. In other words, because of technological limitations, the images featured in ProtectTO's maps ignore local ecological details of High Park and Tommy Thompson. While it could be argued that these static images could not contain the level of detail required to identify ecological details like garlic mustard, the City of Toronto's maps, from which ProtectTO's maps were taken, could employ technologies with that level of detail. The City, however, chooses to engage with broader framings of these parks that do not require the technologies and aesthetics to represent precise ecological details.

Indeed, blindness to certain ecological realities is a main critique of the "natural heritage" framework that shapes both these maps. While it is important to continue preserving natural environments, the "movement to create parks and wilderness has, in many senses, created a kind

of blindness to the conservation opportunities that exist outside of those protected areas that are close simulacrums of historical ecosystems, absent of permanent human habitation and use" (Yung et al., 2016, p. 248). In other words, this framework ignores ecosystems that do not fit its definition of a natural environment. "Natural heritage" frameworks, for example, that gloss over the beneficial role of invasive species in ecosystems, could lead to policy and management changes that cause harm to the ecosystem in question by ignoring the nuanced ecological reality of the environment. The definition of "natural heritage systems" on the City of Toronto website, exemplifies this potentially harmful rhetoric: "natural heritage systems" are described as "habitats that diverse plants and animals need to live and thrive […] this includes lands with the potential to be restored to natural habitat and become more interconnected" ("Definitions"). Only the potential for restoration allows "un-natural" habitats to be included in "natural heritage systems." In other words, the only habitats that "need to live and thrive" are those that can be framed as "diverse" and "natural." There is no space in natural heritage systems for ecological disturbances that do not fit dominant definitions of nature, such as invasive species and novel ecosystems.

This "natural heritage" blindness functions in ProtectNature TO and the City of Toronto's maps through the almost identical aesthetic representations of Tommy Thompson Park and High Park. Since they both come from the City of Toronto's maps, ProtectTO's maps are consistent with City of Toronto aesthetics: the background of "basemap-simple" follows early capitalist map aesthetics delimiting property boundaries with dark-gray lines on a light beige-gray background; "environmentally significant areas" are identified as a light-blue grid overlay; and "natural heritage systems" are clearly marked by the light brown shadowing in designated areas (Figure 2 and Figure 3). These overlays and grids only show the outline of the designated areas.

In more than general geographic reach, these features fail to add a level of detail that could differentiate High Park from Tommy Thompson park. Further, the species which make up the "natural heritage systems" of these particular sites are not listed, nor are the particular threats to these environments. The only substantial difference between the two maps are the actual distributions of ESAs and NHSs. Because they obscure the ecological difference between Tommy Thompson Park and High Park, these maps miss an opportunity to effectively engage Torontonians with the complexities ecological disturbance in their locales.

"Natural heritage" frameworks, however, can effectively rally environmental action, even though the action tends to harm non-traditional ecosystems. "Natural heritage" sites are spaces that contain "the flora and fauna of a region as well as the geological forms on land or sea *as people understand themselves to have received it*" (emphasis added, Standish et al., 2016, p. 302). Policy and maps that officiate heritage areas emerged (at least in part) because of human attachments to the recognizable natural environments they grew up experiencing, and to assert their, and their children's, right to the continued (stable) existence of these natural environments. As examples from both High Park and Tommy Thompson park show, this emotional connection to the natural environment does not necessarily preclude invasive species: current conservation methods in High Park emerged from local citizen's love of Norway Maples (Foster and Sandberg, p.189) – an invasive species – and Tommy Thompson Park only exists as a ESA because of local organizations rallying to protect this park made of invasive species (Foster and Sandberg, p. 192). The current "natural heritage" frameworks in both maps, however, do not address this potential for nuance, choosing instead to engage with expansive rhetorics. How can communicators harness this emotional attachment to local ecosystems, while avoiding "natural heritage" frameworks that provoke harmful biases against ecological novelties and disturbances?

Framing High Park and Tommy Thompson Park through an expansive "natural heritage" lens, ignoring disparate ecological histories, could lead to policy changes in the future that also ignore these differences and, thereby, overlook the specific methods of management needed to maintain the ecological health of the park in question. These generalizations could also undermine possibilities for nuanced, and therefore, more helpful and effective, public engagement with High Park and Tommy Thompson Park. While these maps do not explicitly forward a neoliberal agenda, their lack of intensive engagement with the different ecosystems, facilitates binary definitions of biodiversity sustained in the "natural heritage" mode of global conservation rhetoric. These maps could all too easily be further abstracted for global conservation goals rather than engagement with local ecosystems. This paper concludes that the rhetorical, technological, and aesthetic features of these maps would require extensive revisions to become models for the maps called for in Toronto's Biodiversity Strategy.

Early Detection and Distribution Mapping System: Invasive Species Policy Ontario

Ontario's Invasive Species Center (ISC) in Saul-Saint Marie receives the most funding for biodiversity on a provincial level. In May 2019, the organization's funding was only cut by $50,000, leaving them with $850,000 in spending, as opposed to the Anishinabek/Ontario Fisheries Resource Centre whose funding was cut from $860,000 to $250,000; the Ontario Invasive Plant Council whose $100,000 in funding was cut to zero; and other organizations such as the Wind Energy Bird and Bat Monitoring Database project and the Great Lakes Marsh Monitoring Program both received $25,000 cuts in funding (Cruickshank, 2019). As Justine Lewkowicz, the Ministry of Natural Resources and Forestry's director of communication, wrote

in a provincial email: "[W]e believe [ISC] are in the best position to protect our ecosystems province-wide" (quoted by Cruickshank, 2019). The ISC, then, represents Ontario's current vision for biodiversity and, therefore, the communication narratives that they use to frame this action need to be examined. This section will analyze the communications on the ISC website, the Early Detection and Distribution Mapping System (EDDMS) website, the participatory mapping technologies, and aesthetics. I will argue that the economic benefits highlighted on the ISC and EDDMS websites take away from the environmental action goals and that, as my analysis of EDDMS itself shows, this focus on economics (provincial, federal, and at times global), disconnects invasives from their particular role in ecosystems. I argue that the citizen science framework and participatory mapping technologies in EDDMS would have to be modified to incite effective environmental action in the Toronto Biodiversity Strategy.

Invasive species rhetoric on the ISC website conflates a successful economy with ecological health. Two short lines make up the "Why Are Invasive Species a Big Deal?" blurb on the home page: "Invasive Species take over our environment; Invasive Species hurt our economy." As discussed above, this linking of environmental "health" with economic goals can be harmful to the local ecologies in question. Furthermore, under the "Learn About Invasive Species" header, the first option is "Economic Impacts." After clicking on this link, the user is re-directed to a page that features a report that "[estimates] expenditures on invasive species by municipalities and conservation authorities in Ontario" ("Updated Expenditure Estimates on Invasive Species in Ontario: 2018 Survey Results," p. iv). The average reported expenditure of 34 municipalities was $62,328 and $51,438 out of 8 conservation authorities (p. 26). In the conclusion of the report, it becomes clear that it was created to garner funding from the provincial government: "even if ten times the total expenditure estimated in this report is

required to effectively control invasive species in the province, there would still be a net benefit to the province" (p. 18). ISC frames invasive species as ecological threats to the economy to garner funding. As argued above, however, framing conservation through economic health and harmful invasive species leave unaddressed the systematic harm caused by neoliberal forces of deregulation.

The ISC employs citizen science as their particular rhetorical mode to link economic goals to environmental health. The newsletter for summer 2019, in a section on "Climate Change and Invasive Species," proclaims that "climate change is a *global issue*, and you can do your part to protect biodiversity in your area by preventing the spread of invasive species!" (emphasis added). These global rhetorics of "climate change" transfer ecological harm from neoliberal systems of deregulation to invasive species and charge the individual citizen with responsibility for this war. There are three prevalent critiques of this approach. First, as Kimura and Kinchy, for example, assert, citizen science "[re-enacts] the neoliberal insistence on market mechanisms, regulatory devolution, and public funding cuts to its influence on citizens' subjectivity, creating the docile, self-responsible "entrepreneur of himself" (quoting Foucault, Kimura and Kinchy, 2016, p. 345). Hroch has also claimed (2013) that the emphasis on local and individual resilience can distract from the neoliberal systems activists must focus on to be effective. Instead of attempting to change public policy, the citizen scientist finds satisfaction in personal efforts. Secondly, "while citizen science can be admired for increasing environmental awareness among participants, critics might argue that citizen science channels public concern about the impacts of industrial developments toward scientific and technical questions rather than the socio-political roots of environmental problems" (p. 348). Diversionary frameworks make resistance recede. ISC's frameworks ask: how can we help scientists collect data on these "harmful agents," rather

than, what caused these agents to exist in the first place? And finally, the funding cuts to other

ecological diversity agencies, discussed in the introduction, perhaps point to ISC's amenability to

"neoliberal funding cuts" that "[undermine] the conditions needed to support academic and

government science" (Kimura and Kinchy, p. 348). Because the ISC puts the onus on the

individual to restore ecosystem health by obscuring particular ecological threats with global

rhetorics of scientific "climate change," the organization distracts from the socio-political forces

at work in invasive species frameworks. Citizen science frameworks have the potential to spread

awareness and rally local action; however, the ISC mode of citizen science cannot rally effective

conservation action.

ISC's choice of EDDMS as a method to take part in citizen science, makes the potential

successes and failures of this citizen science framework even more explicit. Users can find the

EDDMS under the ISC's "Report a Sighting" tab ("Home"). The EDDMS is an interactive web-

based mapping system that tracks sightings of invasive species. This system consolidates the

many agencies across Ontario that collect invasive species data to present more cohesive and

effective data resources to support provincial and federal attempts to "detect and respond to"

("Home") these species. As of August 2019, the website currently features an impressive 50,998

records from Ontario, out of more than 4.9 million records total across North America

("About"). The system's features are directed towards user engagement: there is "real time

tracking of invasive species occurrences" ("Home"), "local and national distribution maps"

("Home"), "electronic early detection reporting tools" ("Home"), and a "library of identification

and management information," and the website allows users to create personal accounts with

individual data visualization tools and interactive maps ("About"). While the rate of user

engagement could seem to mark the rhetorical, aesthetic, and technological framing of the

EDDMS as a public engagement success story, the type of conservation action encouraged would likely do more harm than good to the ecosystems in question.

Because the web and mobile interface maintains ISC's flawed citizen science rhetoric, all invasive species in Ontario are reduced to a threat. The cartographic reveal this simplified coding: the instances of "positive" invasive species sightings are marked by red dots (📍); negative sightings are marked with blue dots (📍); treated sightings are marked with yellow dots (📍); and eradicated sightings are marked with green dots (📍). Colour coding by levels of ecological health and harm help users make quick judgements, rejecting a more nuanced engagement with local ecological realities. These tools and rhetorics simplify and facilitate data collection to motivate EDDMS users to denounce invasive species; however, the lack of particular details obscures the ecological reality of local disturbances that could incite effective environmental action. This failure to engage with local realities is also evident in the constraints of the mapping tool. The "search" will not let you find particular ecosystem: users cannot access local parks, the closest they can search is "City of Toronto" under "Lower Tier Municipal" ("Search"). This failure to locate particular ecosystems sustains the impression that these invasives have no place in local ecosystems, while entrenching the framework's global rather than local focus.

As this quick comparative analysis of ISC's diversionary economic framework and the technologies and aesthetics of EDDMS reveals, the economic citizen science framework taken up by both sites diverts attention from neoliberal systems to the abstract "villains" ("Blog") – invasive species. The simple interface and aesthetics of EDDMS successfully facilitates this framework, allowing the public to easily and superficially engage with biodiversity issues. However, EDDMS's pre-set oppositional rhetorics and aesthetics point to a shift from resistance

against neoliberal systems to personal (and self-funded) action against invasive species characteristic of citizen science. The ISC's diversionary economic framework also further exchanges the particular ecosystems in question to take part in the global biodiversity agenda. EDDMS' technological constraints on searchable areas reflects this extensive rather than intensive focus. EDDMS, then, would have to be modified to incite effective environmental action in the Toronto Biodiversity Strategy.

Ebirds.org: The Invasive Native Double-Crested Cormorant, Ontario

On November 19, 2018 the provincial government proposed an amendment to the 1997 Fish and Wildlife Conservation Act, to list the double-breasted cormorant as a "game bird" ("Proposal"). This legislative and regulatory amendment would create an "open hunting season for double-crested cormorant from March 15 to December 31 each year"; "establish a bag limit of 50 cormorants/day with no possession limit"; and, "add provisions so hunters could allow cormorant to spoil" among other proposals ("Proposal"). Intriguingly, the proposal frames cormorants as an invasive species, harmful to other native species. Because the proposal presents a contentious example of a diversionary invasive species framework in provincial policy, yet contains no complimentary map, I will analyze the proposal with Ebird.org, an interactive birding map popular with Canadians bird-lovers. While City News Toronto has suggested this map could be used to help native species (Roth, 2019), I argue that this map could just as easily be deployed by hunters looking to cull the native double-crested cormorant. By showing how Ebird.org can be put to work by clashing ideologies, this section contends that the expansive framework of Ebird.org allows for diversions in two new ways (1) a global framing that

obfuscates particular ecological and political contexts and (2) failure to engage with affective responses.

Cormorants pose an interesting dilemma for conservationists: a "significant" species on the brink of extirpation rebounds to the point of invasion. Cormorant colonies abounded from around 1920-1940 (Weseloh and Collier, 1995, p. 1). In the late 1940s cormorants became so abundant that Ontario instituted control measures to protect the fisheries complaining about cormorant poaching (Weseloh and Collier, 1995, p. 1). However, these measures and "environmental contamination" (Dorr and Fielder, 2017) led to a dramatic decrease in cormorant populations. By 1973, there were only 125 nesting pairs of cormorants in Canada, 10 of those pairs residing around Lake Ontario (Taylor et al., 2011, p. 3). From near extirpation, subsequent conservation management techniques (Taylor and Dorr, 2003) and the "reduction of contaminants such as DDT" have created a resurgence of the double-breasted cormorant to up to 300 times their population in the late 1970s from approximately 200 nesting pairs to 15,000 by 2000 (Taylor and Dorr, 2003). While this abundance was originally met with joy as a conservation success story, "2005 Toronto mayor David Miller declared April 12 Cormorant Day in honour of what he called these 'amazing and magnificent birds'" (Walkholm, 2018), recently cormorants have been defined as a threat to biodiversity ("Proposal"). From being listed as a "significant species" along with other birds "such as the Common Tern, Black-crowned Night Heron, and Double-crested Cormorant," the cormorant is now framed as an "enemy" of these same birds and an invasive species of sorts (Taylor et al., 2011, p. 5).

This strange history of contradictory frameworks begs the question: are cormorants native or invasive? The proposal frames cormorants as invasive: citing the negative effect of cormorants on other native water birds as a reason for the cull. However, assertions that

cormorants harm "black-crowned night herons (Nycticorax nycticorax) and great blue herons (Ardea herodias) on a regional scale are not supported by the past 20 years of scientific documentation" (McRae, 2015, p. 8). In fact, because cormorants change ecological dynamics of the habitat they inhabit, these birds have had a positive impact on ring-billed gulls, herring gulls, common terns, and Caspian terns (McRae, 2015, p. 3). Moreover, according to a 2012 report by Andrews, Fraser, and Weseloh, cormorants typically feed on invasive species, such as the alewife and the round goby, thereby controlling the "alien" invasion of these fish as a native species. This confusion is also prevalent in attempts to classify these cormorants as native or invasive. While most scientific publications refer to double-crested cormorants as a species native to North America and the Toronto region, a 1995 publication on cormorants by Environment Canada notes that "archaeological excavations in aboriginal settlements have not shown any evidence of the bird" ("Winning the War"). This report claims that the double-breasted cormorant started colonizing the Great Lakes in 1913. In any case, this lack of consensus on the "native" or "invasive" status of cormorants shows how these distinctions are put to use to further an (economic) agenda, rather than apolitically reflect or identify environmental "harm."

In Ontario, the economic agenda that seems to benefit from this act is the fishing industry. The fishing industry and some private property owners claim that "cormorants have been detrimental to fish populations, island forest habitats, other species and aesthetics" ("Proposal"). Although this negative perception of cormorant impact is common, "as of 2008, there were four published studies indicating that cormorants negatively impact sport fishing, and eighteen published studies indicating that cormorant predation impacts are negligible" (McRae, 2015, p. 3). The negative effects of cormorants on the fishing industry, then, is not supported by

scientific evidence.[5] Once again, the natural disturbance sanctified as "harm" shifts from the neoliberal systems that are likely more involved in the depletion of fish populations, to cormorants.

Should this proposal be passed, maps such as Ebird.org could easily be deployed to enact this strange (and ineffective) mode of ecological conservation. Although the ebird.org map was created as an educational resource ("Ebird.org Home"), this map uses similar citizen science frameworks and similar aesthetic interfaces to EDDMS in order to pinpoint the location of cormorants. The map's perspective is the God's eye view and the viewer has the possibility to see terrain view, street view, or a mixture of the two views (Figure 5). Similar to EDDMS, Ebird.org registers personal information and photographs submitted by volunteers and contains official information about the birds in question, including the sounds for specific birds, as well as other pertinent facts (found using an easy search engine) ("Search"). In addition, Ebird.org reveals both a date range, year range, and marks birding hotspots: recent sightings are marked with a red fire locator and sightings older than 30 days are marked with light blue locator signs. There is also a gradient scale of darkening purple squares that mark bird density. In short, the interface of this map bears a strong resemblance to EDDMS discussed above the purpose of which was to locate invasives for eradication.

The global scale of the map makes local ecological complexities even more obscure than with the EDDMS. About global-scale citizen science conservation projects Kimura and Kinchy assert, "framing […] issues in a globally relevant manner […] poses the dilemma of reducing the problem to a common denominator at the expense of more locally rooted understandings of the problem and solutions" (2016, p. 351). On a smaller scale, the citizen science locators of double-

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[5] Moreover, even if the cormorants were feeding on sport fish, why would the fishing industry have more right to the fish than the cormorants?

crested cormorants in Tommy Thompson Park on Ebird.org for global research purposes, could potentially help enforce the proposed cormorant cull. These global citizen science maps, thus, "[present] a profound dilemma for local communities; they may participate with the hope that it will improve their livelihoods, while being co-opted to lend legitimacy to development policies that are not of their making" (2016, p. 352).

The lack of technologies and aesthetics that portray affect could also be part of the reason Ebird.org could be deployed for similar eradication purposes. As Giaccardi and Fogli argue in their insightful (2008) paper "Affective geographies: Toward a richer cartographic semantics for the geospatial web": "[the] cartographic semantics of current web mapping services show the where and when of information, but they do not visually relate that information to one's perceptions, interpretations, and expectations—they are not designed to show the personal meaning that one ascribes to specific locations" (p.1).[6] Although Ebird.org allows viewers to upload images, "it does not visually convey individual meanings or 'social moods' at first glance" (Giaccardi and Fogli, 2008, p. 2). Perhaps adding an explicitly affective element to Ebird.org would prevent Ontarians from using the map to target cormorants should the proposal be passed.

Ebird.org adds two other particular diversionary framing techniques as mediated through cartography to this paper's analysis: (1) the potential deployment of citizen science data collection meant for global mappings in unpredictable manners in particular locales, and (2) the affective failings of participatory mappings. Because of these two failings, this paper does not recommend Ebird.org as a model for Toronto's DBS maps.

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[6] I define affective, following Giaccardi and Fogli, as "showing how we are "affected" by environmental settings, and in turn "affecting" the way in which we experience and interpret the mapped environmental settings" (Giaccardi and Fogli, 2008, p.1).

Conclusions and Questions

Rhetorics of ecosystem "harm" work through many diversionary frameworks to legitimize systematic neoliberal de-regulation of natural environments. Although global and local biodiversity frameworks are often presented as inimical in conservation literature, because both positions employ expansive and oppositional approaches, both frameworks are susceptible to neoliberal deployment. Frameworks that resist neoliberal de-regulation – i.e. "fight climate change!" or "save the black oak savannah in High Park!" – despite their scale variation will all too often be pulled back into neoliberal frameworks, sustaining the economic status quo instead of rupturing the discourse. For ecological conservation to be effective, then, it must explicitly engage with the particular intensities of neoliberal rhetorics that aim to deregulate natural environments. Moreover, these frameworks must be grounded in local moments of ecological disturbance. Focusing ecological conservation frameworks on the particular tangled inconsistencies that diversionary globalized neoliberal re-framing technique attempts to suppress, can reveal the ecological agents that are already resisting beneath totalizing frameworks of neoliberal rhetorics. Although these pockets of effective resistance may be only temporary effusions before they congeal once more into neoliberal frameworks, the search for these resistance methods present a pragmatic approach to ecological conservation.

To be effective, then, the biodiversity communications maps for Toronto's BDS must follow intensive, adaptable, locally-situated frameworks that also allow for resistance against global neoliberal systems. The medium of maps, however, also calls for an analysis of its own. Aesthetic and technological choices can obscure the intended framings and messages. My quick

analysis of the three mapping types and relevant policies, aims to show the types of failings typical of maps that currently inform the ways invasive species come to be understood by the public in Toronto. While ProtectNature TO's "natural heritage" maps of High Park and Tommy Thompson Park do not explicitly promote a neoliberal agenda, their lack of intensive engagement with the different ecosystems facilitates binary definitions of biodiversity often deployed by global conservation rhetoric. These maps could easily become abstracted for global conservation goals rather than being used to serve local ecosystems. By sustaining an expansive scope and ignoring the local ecological differences in urban environmental spaces, these maps could lead to policy changes in the future that also ignore these differences and thereby, harm the ecosystems in question. The EDDMS, on the other hand, demonstrates how Ontario's economic agenda (as seen through ISC) is being supported by citizen science technologies. The simple interface and aesthetics of EDDMS diverts attention from neoliberal systems towards the villainous invasive species. Finally, the framework of Ebird.org reveals two other diversionary framing techniques: the potential deployment of citizen science data collection meant for global mappings in unpredictable manners in particular locales and the affective failings of participatory mappings. These maps fail, in short, because they obfuscate rhetorically, aesthetically, and technologically the spatial, ecological, and political contexts within which invasive species and other ecological disturbances thrive.

To effectively engage Torontonians in resistance that helps maintain and even expand green urban spaces, communicators might re-consider their framing of the few species that manage to abound. We should ask: as disturbing agents, could invasive species not present more potential harm to the status quo of these neoliberal systems and rhetorics, than the ecosystems they purportedly "harm"?

List of Figures

FIGURE 1
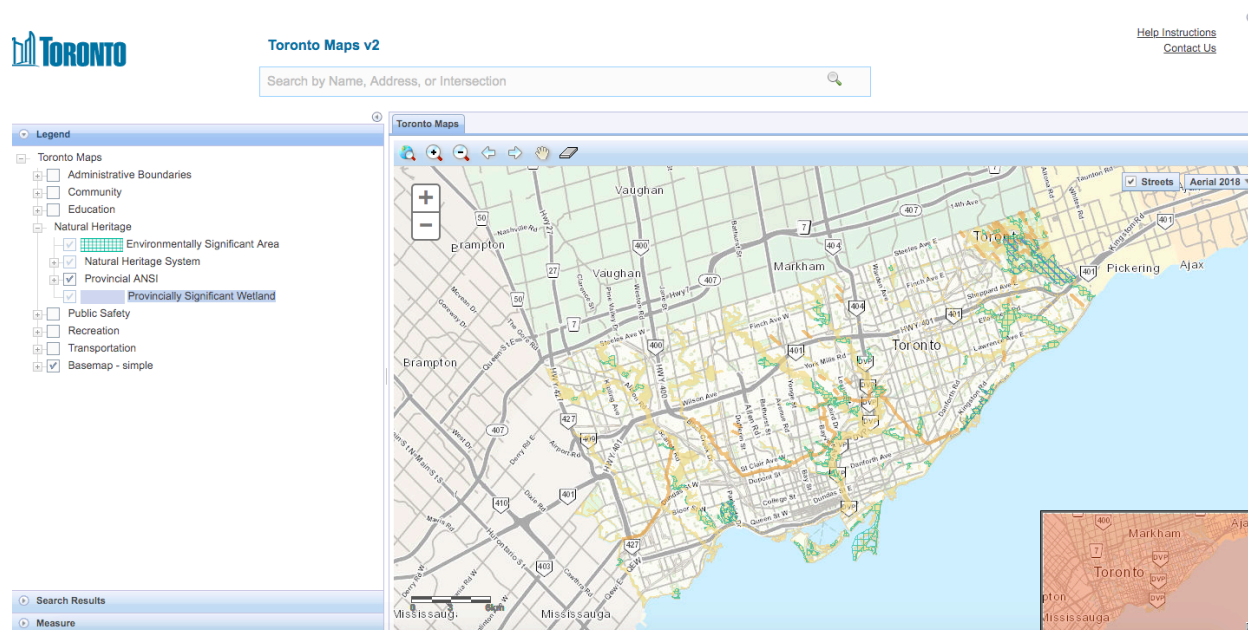
The City of Toronto's "interactive" map.

FIGURE 2

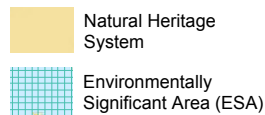**Our city's important natural areas are designated as:**

Natural Heritage System: habitats that diverse plants and animals need to live and thrive (e.g. meadows and forests that support pollinators, birds and mammals); this includes lands with the potential to be restored to natural habitat and become more interconnected.

Environmentally Significant Areas: ESAs are special spaces within Toronto's natural heritage system that support the greatest richness of plant and animal life and are most in need of protection. Some of these also have provincial ANSI (Area of Natural and Scientific Interest) designation.

These are the designated natural areas in Ward 4: Parkdale-High Park

Natural heritage protection includes:

- **Official Plan and zoning**
- **Ravine and Natural Feature Protection Bylaw and Parks Bylaw**
- **Toronto Ravine Strategy**
- **Pollinator Protection Strategy**
- **Biodiversity Strategy (draft)**
- **Provincial Policy Statement 2014**

Natural Heritage System

Environmentally Significant Area (ESA)

SOURCE: City of Toronto, Toronto Maps v2

Ward 4 includes 1 shared provincially significant wetland (Humber River Marsh), 1 Life Science ANSI (High Park Oak Woodlands including Grenadier Pond), 5 additional ESAs (South Kingsway East & West Flanks, Ellis Avenue, Rennie Park, Lambton Park Prairie)

For more information and links to key City documents, visit ProtectNatureTO.org

Protect TO map of Ward 4.

FIGURE 3

Our city's important natural areas are designated as:

Natural Heritage System: habitats that diverse plants and animals need to live and thrive (e.g. meadows and forests that support pollinators, birds and mammals); this includes lands with the potential to be restored to natural habitat and become more interconnected.

Environmentally Significant Areas: ESAs are special spaces within Toronto's natural heritage system that support the greatest richness of plant and animal life and are most in need of protection. Some of these also have provincial ANSI (Area of Natural and Scientific Interest) designation.

**These are the designated natural areas
in Ward 14: Toronto-Danforth**

Ward 14 includes 6 ESAs (Leslie Street Spit complete (ie, Leslie Street Spit, Tommy Thompson Park, Base of Spit, Cherry Beach and Cherry Beach Extension), Todmorden Mills), 1 shared ESA (Don Valley (Central Section)), shared ravines, ravine along the Don

Natural Heritage System

Environmentally Significant Area (ESA)

SOURCE: City of Toronto, Toronto Maps v2

Natural heritage protection includes:

- **Official Plan and zoning**
- **Ravine and Natural Feature Protection Bylaw and Parks Bylaw**
- **Toronto Ravine Strategy**
- **Pollinator Protection Strategy**
- **Biodiversity Strategy (draft)**
- **Provincial Policy Statement 2014**

For more information and links to key City documents, visit ProtectNatureTO.org

ProtectTO map of Ward 14.

FIGURE 4
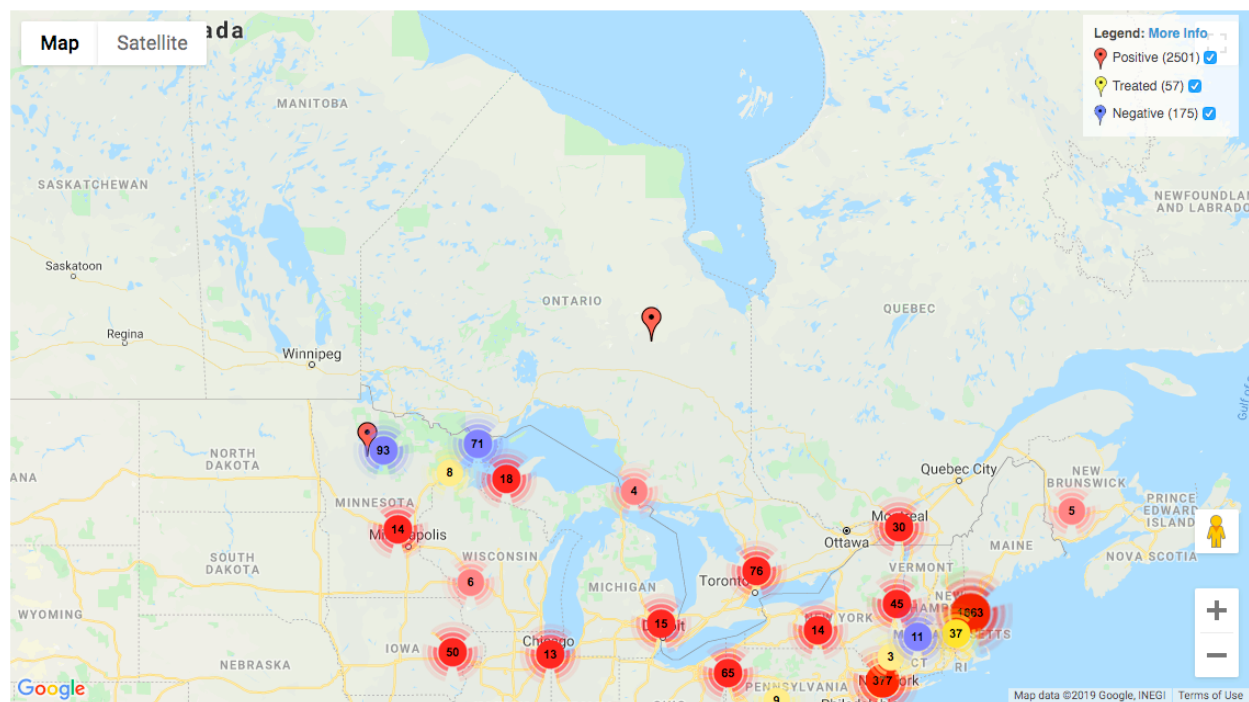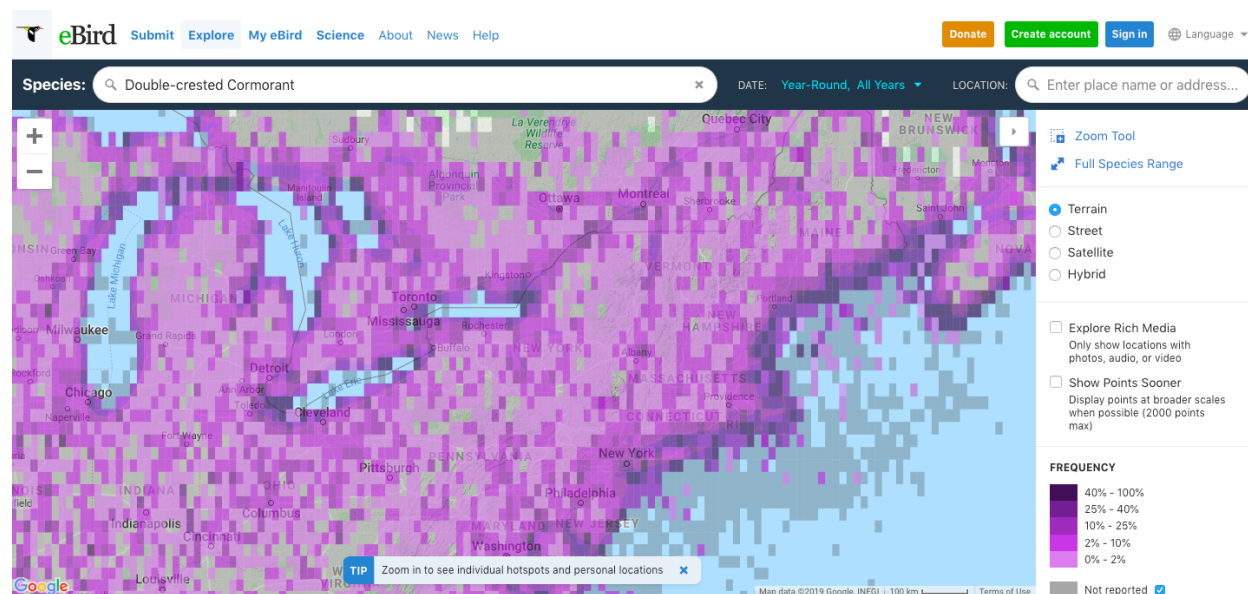

Ebird.org map of Norway Maples in Ontario.

FIGURE 5
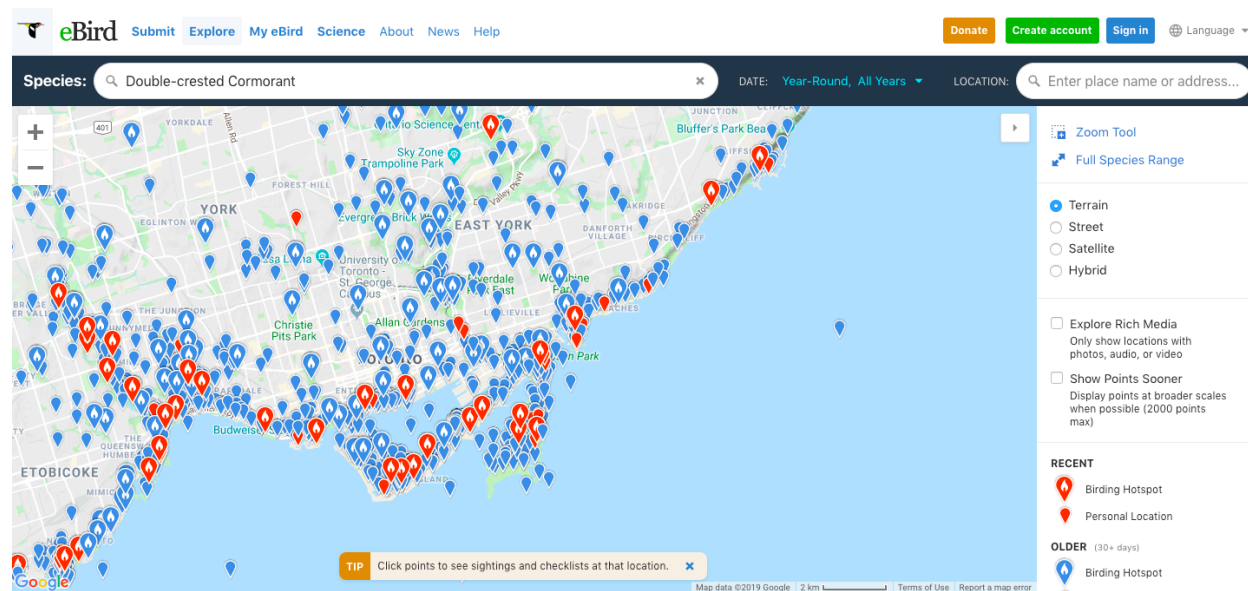
Ebird.org map of double-crested cormorant.

FIGURE 6

Ebird.org map of double-crested cormorant.

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