Middle States Geographer, 2012, 45: 57-66

LAND USE, SOCIETY, AND EVOLUTIONARY MISMATCH: A CASE STUDY OF THE BUFFALO, NY OUTER HARBOR PARKWAY PROJECT

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ABSTRACT: *The model of Land Use and Society proposes that local land use decisions are made where three layers of spatial data intersect. Namely, actions taken in (i) the human landscape, which are regulated by (ii) the institutional landscape, transform (iii) the physical landscape within a given geographic territory. When human impacts on the physical landscape create new conflicts over land use, local institutions establish new policies to manage the problems. Thus, at its core, the model describes a dialectical process in which human, political, and land use systems coevolve in space. Accordingly, coupling the model with insights from evolutionary theory might offer new opportunities for the study of land use changes. In the current paper we explore this possibility by examining a recent land use conflict in Buffalo, NY. The case study demonstrates that the model of Land Use and Society effectively identifies "evolutionary mismatches", conceptualized here as situations in which formerly productive land uses are presently detrimental. However, the case also illustrates that intervention into mismatches hinges significantly on the relative political strength of actors in the model's human and institutional landscapes. As a result, the selection and implementation of a preferred intervention is vulnerable to counterproductive political behavior. From this perspective, we argue that an evolutionary understanding of a particular land use mismatch holds vast potential for depoliticizing land use conflicts and ultimately informing new policies and regulations.*

Keywords: *land use; public policy; politics; evolutionary mismatch; evolutionary urban geography*

INTRODUCTION

Platt's (2004) model of Land Use and Society offers a general understanding of how local land use decisions are made. Actions taken in the human landscape, which are regulated by the institutional landscape, transform the physical landscape within a given municipal geography. When human impacts on the physical landscape create new conflicts over land use, local institutions establish additional rules or policies to manage the problems. In this context, land use policies are the outputs of learning processes in which information about hazards and risks are both observed directly by policymakers and fed back to them by society (Platt, 2004, 2008). The cumulative pressures from these two flows of information cause local decision-makers to reorganize the jurisdiction's set of regulated sociospatial relations.

At its core, then, the Platt (2004) model describes a dialectical process in which human, political, and land use systems coevolve in space. In other words, human activities are conditioned by their local [regulated] physical environments; while at the same time [regulated] human actions shape and modify the physical landscapes on which they operate (Knox and Pinch, 2010). Collectively the rules and processes that shape and reshape the physical form of a particular place in this way are referred to as morphogenesis (Knox and Pinch 2010). Urban morphogenesis is an undeniably "evolutionary" field of inquiry in the sense that it seeks out the causal elements of physical change in cities (Moudon, 1997). To the extent that the Platt (2004) model studies and describes processes that are of integral importance to such change, coupling it with evolutionary theory seems to be a natural marriage.

In this paper we utilize a case study for a recent land use conflict in Buffalo, NY, USA—the city's Outer Harbor Parkway Project (NYSDOT, 2006)—to build the foundation on which such a marriage can take place. More explicitly, we attempt to go beyond prior analogical or metaphorical invocations of evolutionary terminology in urban studies literature (Mehmood, 2010), and rather draw on the Platt (2004) model to propose a general framework for identifying "evolutionary mismatches" (Lloyd, Wilson, and Sober, 2011) in urban land use systems. We submit that envisaging Platt's (2004) model as tool of evolutionary analysis has significant potential for

defusing politically charged land use conflicts (see Saint, Flavell, and Fox, 2009). To support this claim, we devote much attention to the operable politics of the land use conflict from our case study. Whereas the particular mismatch we review was equally acknowledged by both of the two major sides of the conflict, the *mechanism* linking it to an adverse outcome in the conflict environment was not well-specified. Eventually lack of agreement over (understanding of) the mechanism sparked protests, citizen petitions, media editorials, outside testimony from experts, press conferences, intergovernmental disagreements, and even a lawsuit (Esmonde, 2008a, 2008b). Although these actions are ostensibly estimable reflections of democratic society, some argue that a quantitatively greater coalition of grassroots and community-based interests lost out to a coalition with qualitatively greater political capital (PPG, 2007; Esmonde, 2008a, 2008b). If this claim has a basis in reality, and insofar as such outcomes are documented throughout the history of land use politics (Walker and Heiman, 1981), then a Platt-infused evolutionary approach to pinpointing the mechanism responsible for a given land use mismatch is a promising direction for urban policy and research.

Along these lines the paper proceeds as follows. First, we introduce the Platt model and highlight its connections to the concept of evolutionary mismatch. Next, we couple the model with evolutionary theory to advance a general framework for analyzing land use mismatches through the specification of certain key elements. Third, we provide a succinct overview of the Buffalo case study, with a particular emphasis on the associated political conflict. Given that description, we then apply the Platt-evolutionary framework to our case study and demonstrate its potential for moderating the political debate and creating a more productive discourse. The paper concludes by expanding on this observation and offering suggestions for future research.

LAND USE, SOCIETY, AND EVOLUTIONARY MISMATCH

As intimated above, the Platt (2004) model of Land Use and Society is an elegant tool for illustrating and describing the learning process that results in land use management decisions. Figure 1 presents the model graphically, where the three circles represent the three layers of spatial data, or the three "landscapes" that interact within a given set of geographic and political boundaries (Platt, 2004). Circle 1, the physical landscape, is modified by activities from within Circle 2, the human landscape. Humans, for example, build infrastructure, mine raw materials, and emit pollutants during production and consumption. To that extent, human modifications to the physical landscape can lead to tensions over land use—e.g., factory pollution causes neighboring residents to become ill, and over-exploitation of local resources leads to dependency on imports. Such tensions are then observed as risks and hazards by actors in both Circle 2 and Circle 3, the political/legal landscape. That is, decision-making officials in Circle 3 directly observe land use conflicts stemming from the interaction of Circles 1 and 2. They also receive indirect information about those conflicts as feedbacks from society (Circle 2). Over time, the cumulative pressures from these direct and indirect information flows cause Circle 3 decision-makers to adopt new or modify extant land use policies and regulations.

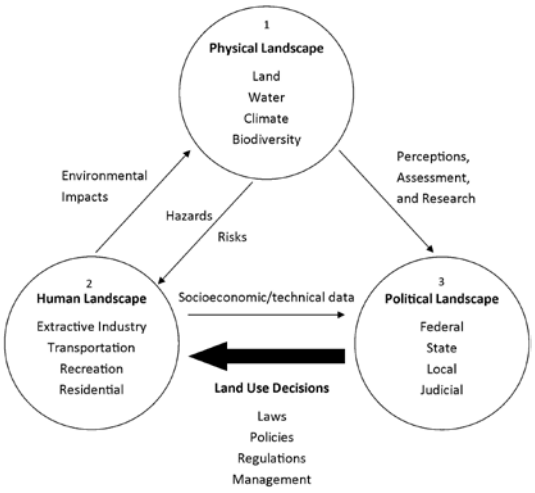

Figure 1. Platt (2004) model of Land Use and Society.

Although unstated, embedded in the Platt (2004) model is an explication of evolutionary change. Briefly, evolution (of the Darwinian variety) is said to operate on populations comprised of heterogeneous members, whose individual-level differences gradually produce population-wide changes (Mayr, 2001). On that backdrop, consider the three conditions that "embody" Darwinian evolution (Lewontin, 1970): (1) variation in a particular attribute; (2) differences in "fitness" due to differences in the attribute of interest; and (3) heritability of that attribute (Lewontin, 1970; Okasha, 2006). Now observe that "land use" is a characteristic that varies across a cadastre. Moreover, at any point in time, some land uses will be more productive (i.e., "fitter") than others in their environment (Verburg et al., 2004). Finally, land use tends to change gradually, such as when individual property owners apply for and receive variances (Platt, 2004), implying that parcel usage during a given time period tends to resemble parcel usage during some prior period. Even in the case where land uses change quickly in response to regulatory overhauls, such as zoning code updates, new land uses are often crafted within the context of the path-dependencies that gave rise to existing patterns (Verburg et al., 2004). Thus citywide land use appears to meet the criteria for being subject to evolutionary forces.

Platt's (2004) model recognizes this without explicitly drawing on evolutionary theory. Indeed, the evolutionary nature of land use policy change is illustrated quite clearly by Platt's (2004) own application of the Land Use and Society model to the Great London Fire of 1666. Prior to 1666, rapid medieval urbanization exerted pressure on the land both inside and outside of London's city walls. Lack of regulation with respect to common spaces and building materials led individuals to erect "a labyrinth of narrow, twisting streets with pervasive overhanging upper stories" that blocked daylight and obstructed access to water sources (Platt, 2004, p. 83). While this configuration offered immediate benefits to rent-seeking individuals, the resultant land use patterns unarguably enhanced the dangers associated with different types of fire-dependent activities such as cooking (Kinsey, 1964). In evolutionary parlance, the unsafe building practices and high impact land uses were *adaptations* to the pre-Fire urbanized London environment. Such actions increased the "fitness" of urban property owners and therefore spread throughout the population over time. By 1666, however, those adaptations led directly to the historical fire that destroyed over 13,000 built structures and hollowed out much of the city (Platt, 2004).

Platt's (2004) example allows us to articulate the remaining concepts that are critical for marrying the Land Use and Society model to evolutionary theory. First, the notion that human-environment interactions create hazards and risks within an existing [regulated] land use system implies that adaptations within that system can become maladaptive (Platt, 2004, 2008). The biological literature labels such situations "evolutionary mismatches" (Lloyd, Wilson, and Sober, 2011). In Platt's (2004) medieval example, by 1666 the adaptive land uses of London's urban geography brought about an evolutionary mismatch that led to the Great Fire. From this example it is straightforward to infer that Platt's model in general detects states of evolutionary mismatch in land use systems—i.e., situations in which existing regulations are no longer suited to their current environment and are therefore in need of revision or expansion (Platt, 2004). Second, there is the crucial distinction between ultimate and proximate causation. Ultimate causation explains the *function* of a given adaptation, or why it exists (Lloyd, Wilson, and Sober, 2011). Proximate causation relates to the adaptation's *mechanism*, or that which immediately enables it to manifest (Lloyd, Wilson, and Sober, 2011). For the London example, the ultimate cause of the Great Fire was the city's urbanized land use pattern (Platt, 2004). The proximate cause was, by contrast, the interaction of wooden building materials and sparks generated by the heat from untended burning ovens (Kinsey, 1964).

In light of this, we claim that the Platt (2004) model can tenably be construed as part of an evolutionary framework, the components of which are summarized in Table 1. In this regard we posit that the combined Platt-evolutionary framework has appreciable utility for land use policymaking. To illustrate the potential benefits associated with implementing this framework, we examine a case study for the Buffalo, NY Outer Harbor Parkway Project (NYSDOT, 2006). The case was marked by pronounced political conflict, whereby two vastly different interventions into a known [land use] evolutionary mismatch gained formidable support during the planning stages of the project (CNU, 2007). By contextualizing the case within the Platt-evolutionary framework, we find that the origin of the conflict is likely traceable to disagreement over the mechanism, i.e., the proximate cause, of the relevant land use mismatch. With that in mind, it is reasonable to conclude that greater attention to the evolutionary nature of land use conflicts, including the specification of all elements in Table 1 prior to adopting an environmental intervention, can help to minimize the political friction and rent-seeking that presently typify clashes over land use.

BUFFALO AND THE OUTER HARBOR PARKWAY PROJECT

The city of Buffalo, NY can be summarized as a once-burgeoning manufacturing and industrial center, with inherent locational advantages for energy and transportation, and a large supply of skilled blue collar labor, whose

workforce and economic opportunity sets were not sufficiently adaptable to mid-century American deindustrialization and movements toward suburbanization and sprawl (Glaeser, 2007; Goldman, 2007). From the time macroeconomic and global forces began to close the doors of Buffalo's steel mills and manufacturing plants in the 1950s, the city found itself in a downward spiral characterized by self-reinforcing feedbacks acting on the interrelated subprocesses of depopulation, job loss, geographic poverty concentration, and a decaying built environment (Kraus, 2000; Glaeser, 2007; Goldman, 2007; Silverman, Yin, and Patterson, 2012).

Table 1. The Evolutionary Mismatch Framework (see Lloyd, Wilson, and Sober, 2011)

Element	Description of Element
Population of interest	The population that is subject to evolutionary forces
Trait/attribute of interest	The formerly adaptive attribute that is now maladaptive
Fitness of population elements	An operational definition of individual "success" in the population
Evolutionary mismatch	The detrimental outcome that results when a given attribute evolves in one environment and is then placed in a new environment to which it is maladaptive
Ancestral environment	The context/environment in which a now-maladaptive trait evolved
Present environment	The context/environment in which a now-maladaptive trait exists
Ultimate cause	The functional reason for the evolutionary mismatch
Proximate cause	The mechanistic basis for the evolutionary mismatch

Especially relevant to the current research is the issue of Buffalo's worn and outmoded infrastructure. Constructed for more than double the current city population (Silverman, Yin, and Patterson, 2012), and large volumes of now negligible ground and water industrial traffic (Graebner, 2007), many of Buffalo's mid-20th century waterfront roadways and commercial spaces are presently viewed as functionally obsolete (National Bridge Inventory, 2011) or brownfields (City of Buffalo, 2007), respectively. Put differently, what were highly successful adaptations to the steel, automotive, and grain production booms in early 20th Century Buffalo became severely maladaptive once those industries crashed in the face of globalization and deindustrialization (Goldman, 2007).

The resulting "evolutionary mismatch" is especially apparent along the city's outer harbor, where commercial, industrial, and transportation land uses effectively separate the Lake Erie waterfront from the rest of the city (NYSDOT, 2006; City of Buffalo, 2007)(Figure 2). In the context of the Platt model, historical activities in Circle 2 (Figure 1) necessitated significant infrastructural investments such that, in a zero sum fashion, the city's

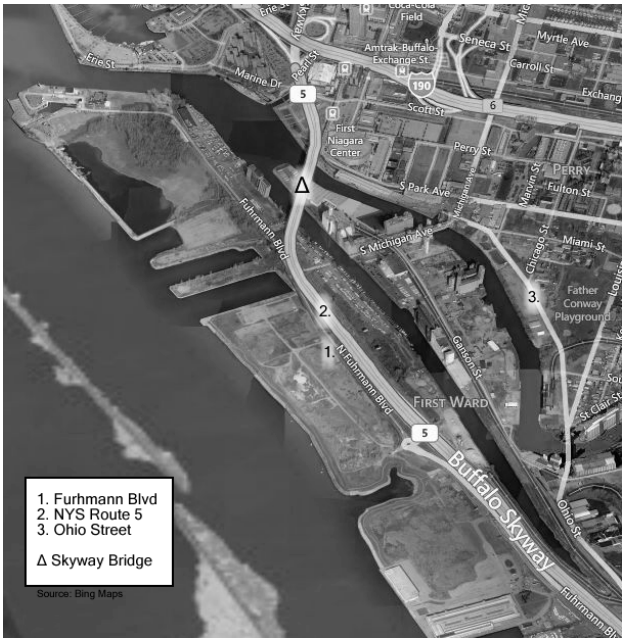

Figure 2. Buffalo Outer Harbor Parkway Project site.

outer harbor lands were devoted almost exclusively to heavy industrial uses (City of Buffalo, 2007). Once Buffalo's industrial base collapsed, however, the necessity and productivity of these past investments rapidly declined. Over time, Circle 2 and Circle 3 actors began to observe that maintaining the existing transportation and land use systems along the outer harbor was contributing to, rather than mitigating, the city's economic decline (PPG, 2007). The ghosts of Buffalo's industrial past were occupying territories that could feasibly contribute to its economic future. As early as the 1980s and 1990s, a diversity of local stakeholders recognized this land use mismatch, and there was a collective call for new and improved infrastructure to support non-industrial waterfront-based economic activity in the city (NYSDOT, 2006). In response, Circle 3 political actors planned, funded, and initiated what has come to be known as the Outer Harbor Parkway Project (NYSDOT, 2012).

The Buffalo Outer Harbor Parkway Project is a collaborative effort to reclaim and revalorize the underutilized lands along the city's waterfront. More precisely, it is an intergovernmental partnership between federal, state, and local agencies and officials intended to reconfigure the road system along the city's outer harbor, with the goal of improving public waterfront access and opening lands for economic development (NYSDOT, 2006). Officially a venture of the New York State Department of Transportation (NYSDOT), both the federal and Buffalo city governments are major funding and resource partners (NYSDOT, 2006). For reasons determined by the NYSDOT (2006), the project focuses exclusively on three similarly situated roadways that run alongside Buffalo's Lake Erie waterfront (Figure 2). The roadway nearest to Lake Erie is Fuhrmann Boulevard, a two-lane, one-way street heading away from the city. The central roadway, Route 5, is an elevated/embanked four-lane highway that connects to the 1.4-mile-high Skyway Bridge. The Skyway serves the city as a point of ingress and egress, and it is a byproduct of formerly robust industrial water traffic (i.e., the height of the Skyway enabled ships to easily pass below the bridge). The third roadway, Ohio Street, is a local two-way, four-lane road that runs along the east side of the Buffalo River.

Amid the spaces occupied by the three roadways in Figure 2, and expansive acreage of post-industrial waterfront brownfields, very little of Buffalo's outer harbor has been developed for public or recreational uses (City of Buffalo, 2007). This is evident in Figure 2, which shows that the lands from Lake Erie (western water body) to the Buffalo River (eastern water body) are predominately vacant and undeveloped. Following decades of depopulation and accompanying economic distress (Silverman, Yin, and Patterson, 2012), the Buffalo community, seeing missed opportunities stemming from the now maladaptive land uses, began demanding better public access to the outer harbor. In particular, citizens and organizations called on officials to open and reconfigure the lands for "mixed uses…with emphasis on retail, recreational, and residential uses" (NYSDOT, 2006). It is in response to these public outcries that the Outer Harbor Parkway Project was undertaken (NYSDOT, 2006). Hence, as the Platt (2004) model predicts, information about the hazards and risks of a particular land use mismatch was both observed by and fed back to political actors, who in turn decided to intervene in the problem. Nevertheless, the form of the intervention was the subject of significant political conflict, with some claiming that political interests superseded popular interests (Esmonde, 2008a). For that reason we provide a brief overview of the politics of the issue, with the aim of discovering what an evolutionary perspective might have contributed to the discourse. Toward that end, we use the Platt-evolutionary framework of Table 1 to trace the source of the conflict to a disagreement over the *mechanism* of the mismatch (inaccessible and unproductive waterfront lands).

Alternatives, Actors, and Outcomes

A comprehensive narrative of the 20-plus year history and politics of the Outer Harbor Parkway Project is beyond the scope of this paper. For parsimony, we choose to key in on three of the foremost issues that fueled the political conflict. First, there is the issue of an elevated, embanked Route 5 highway (Figure 2). Proponents of contemporary planning ideas such as walkability and new urbanism argued that retaining an elevated/embanked highway on Buffalo's waterfront effectively favors "auto-oriented" (if any) economic activity, as well as "short-term gains," over a "long-lasting waterfront neighborhood" with "world class development" (CNU, 2007). On the other hand, an elevated Route 5 promotes high speed traffic that serves to move commuters in and out of the city efficiently, where an at-grade road would likely add several minutes to commute times (NYSDOT, 2006). Thus there was, at least to some degree, an urban-suburban tension underlying the conflict. Adding to that tension was a cost component, insofar as replacing the existing embanked highway with an at-grade boulevard was estimated to raise the price of the project by approximately $30 million (NYSDOT, 2006). Note that both options putatively address the land use mismatch of inaccessible and unproductive waterfront lands by promoting roadways that facilitate enhanced access to the outer harbor, and opening areas for development (NYSDOT, 2006); however, urban planners observed that the at-grade option would achieve these objectives with greater success, due to the holistic fashion in which it considers all outer harbor land use mismatches—including the Skyway Bridge (see below)—and

not just the three roadways selected for the project (CNU, 2007). Pointedly, the option to retain the embanked highway outwardly appears to consider poor existing connectivity between the three roadways, as well as the one-way path of Fuhrman Boulevard (Figure 2), to be the key inhibitors of waterfront access—contending that improving connections and transforming the lakeside roadway into a two-way parkway will fix the problem (NYSDOT, 2012).

Second, there was the issue of the Skyway Bridge (Figure 2). The current generation of politicians and citizens in Buffalo almost uniformly agrees that the Skyway has outlived its original purpose, which was to facilitate high-speed automotive traffic while enabling robust water traffic to and from the harbor below—i.e., it embodies an evolutionary mismatch (Graebner 2007). This observation notwithstanding, the NYSDOT decided that the Skyway Bridge was outside the scope of the Outer Harbor Parkway Project (NYSDOT, 2006). Still, many actors formulated their positions on the project in terms of which alternative would most actively contribute to eventual removal of the bridge (CNU, 2007). In particular, supporters of the urbanist position attempted to strengthen their case by using the Skyway as leverage. They asserted that an at-grade Route 5 boulevard would allow for surface-level bridges and thus the long-run removal of the Skyway, whereas an elevated highway would not (CNU, 2007).

Third, there was a possible politico-temporal issue worth articulating, even if it was globally unobservable. Explicitly, one of the most prominent players in the project was a local Congressional representative. The representative secured much of the project's funding, and was well-known for being a strong advocate for waterfront development (Esmonde, 2008a). The Congressperson had a history of taking swift action in the community, and often utilized political capital and dexterity to "slash red tape" and take the "shortest distance between two points" (Esmonde 2008a). This localized reputational knowledge led some activists, as well as a respected editorialist from Buffalo's only daily newspaper, to speculate that a particular alternative could be selected for expediency—and the most expedient alternative in the project involved retaining the elevated/embanked Route 5 (Esmonde, 2008a)

Within the context of the above issues, we can summarize the major project tensions as follows. At one end there were urban, long-term interests in an at-grade boulevard; and at the other there were suburban, financial, and short-term political interests in an elevated/embanked Route 5 highway. Among the three alternatives identified by the NYSDOT in the project planning phase, two exemplified the sides of this conflict, and each therefore received formidable support (Bonfatti, 2007; Meyer, 2007). Table 2 summarizes critical points about each of these alternatives, including influential Circle 2 actors and the "socioeconomic and technical data" that they fed back to Circle 3 policymakers (refer to Figure 1).

Table 2. Comparison of Project Alternatives

	Modified Improvement (MIP)	Boulevard
Notable Circle 2 and 3Supporters	U.S. House Representative (for Buffalo); Buffalo City Mayor; New York State Assembly Member (representing Buffalo); New York State Dept. of Transportation	Buffalo City Council; Hamburg Town Board; Congress for New Urbanism; Buffalo Niagara Riverkeeper; Baird Foundation; League of Women Voters; Sierra Club; Buffalo Building Owners & Managers Association; Buffalo Business First
Notable Circle 2 and 3 Data	$29M less expensive than Boulevard; Minimum commute times; Maximum traffic flow; $99M in business sales;* $44M in household income;* $1M in local tax receipts*; Most immediate	More developable land relative to the MIP; $130M in business sales;* $61M in household income;* $1.3M in local tax receipts;* Possibly contributes to eventual removal of the Skyway Bridge
Has advantages for:	Commuting, maintaining existing traffic flows, and achieving progress in the short-term (e.g., Bonfatti 2007; Esmonde 2008b)	Long-term economic development; Skyway Bridge removal; creating a waterfront "sense of place" (CNU 2007)

* Indicates one-time economic benefit forecast made by NYSDOT (2006, at Table 5.1-1)

It is important to note that Table 2 is non-exhaustive. The items presented here are selected for their reiterative mentions in the media and available technical studies (NYSDOT, 2006; CNU, 2007; Meyer, 2007), and their collective ability to capture the essence of the major land use tensions articulated above. On the whole, the information in the table does not imply that either alternative has an absolute advantage for dealing with the land use mismatch. Still, recall that the Outer Harbor Parkway Project was motivated by the desire for public access to underutilized spaces and waterfront-based, mixed-use economic development (NYSDOT, 2006). In that regard, the cumulative data from both sides of the conflict outwardly suggest that the Boulevard Alternative had a comparative advantage in these areas. A study by the Congress for New Urbanism (2007) asserts that the Boulevard Alternative would open 235 additional underutilized waterfront acres relative to the Modified Improvement, and could increase the value of that land by 365% or more. Even the NYSDOT project report, which recommends and states preference for the rival Modified Improvement (MIP) alternative, acknowledges that the one-time economic benefits of implementing the Boulevard plan would exceed those of the MIP (NYSDOT 2006, at Tables L11-L12).

Considering both one-time economic benefits and the fact that the Boulevard Alternative opens more land for development than does the MIP, it is reasonable to conclude that the lasting and long-term economic effects of the former strategy would likely top those of the latter (CNU, 2007). Indeed, this conclusion was reached by well over a dozen influential local groups, including the Buffalo City Council, the Hamburg Town Board (a suburban legislative body), environmental organizations such as the Sierra Club and the Buffalo Niagara Riverkeeper, good government advocates such as the League of Women Voters and the Partnership for the Public Good (PPG), and even business interests including the Greater Buffalo Building Owners & Managers Association (Meyer, 2007; PPG, 2007). Yet despite the vocal and readily observable grassroots and organizational support for the Boulevard Alternative, the NYSDOT favored the MIP. Not only was it the lowest-cost plan, but it also maintained extant speed limits and would not alter existing traffic patterns (NYSDOT, 2006). Thus, from the perspective of a state transportation agency, the MIP had more pros than cons (PPG, 2007).

Since the project was officially in the purview of the NYSDOT, the agency was recognized as a pivotal player that could control the pace of the project (Bonfatti, 2007). Perhaps to avoid politically inconvenient delays, then, or because of a genuine interest in not disrupting existing traffic patterns, the local Congressional representative who secured much of the project funding sided with the NYSDOT (Bonfatti, 2007). In sequence, the Buffalo city Mayor joined in support of the MIP (Meyer, 2007). While that decision was at odds with the city legislature's unanimous support of the Boulevard, it was potentially an expression of the Congressperson's accumulated political capital. Supporting this argument, the MIP was officially adopted as the final Outer Harbor Parkway Project in 2007 (Meyer, 2007).

Hence despite indications that the Boulevard Alternative had a comparative advantage in the project's overall goals (CNU, 2007; Esmonde, 2008a, 2008b), the rival interests of cost-savings, traffic flow, and expediency seemed to exert undue influence on Circle 3 decision-makers, which led to hostile reactions from a mass of the Boulevard's grassroots supporters (Esmonde, 2008a). Indeed, a "Waterfront Coalition" of 16 organizations, armed with expert testimony and empirical data attesting to the Boulevard Alternative's relative advantages, initiated a lawsuit to stop the NYSDOT from moving forward with the project (Esmonde, 2008b). Ultimately, the lawsuit lost steam, and the MIP went under construction. Presently, the project is still in progress, although it is well beyond its expected completion date (NYSDOT, 2012).

A PLATT-EVOLUTIONARY EXPLANATION OF THE POLITICAL CONFLICT

The preceding section applies Platt's (2004) model of Land Use and Society to the case of the Buffalo, NY Outer Harbor Parkway Project. As we argue above, the model of Land Use and Society unpacks situations of evolutionary mismatch, defined as cases in which attributes that adapted to some earlier state of nature are presently maladaptive (Lloyd, Wilson, and Sober, 2011). Clearly the Buffalo waterfront example fits this description. The city's booming industrial economy required significant infrastructural investments and high impact land uses along its outer harbor (Goldman, 2007). Deindustrialization then rendered such formerly adaptive Circle 2 activities maladaptive, and information about the resultant mismatch was perceived by Circle 3 actors in the form of hazards and risks both directly and indirectly through societal feedback (Figure 1). As Platt's (2004) model predicts, the cumulative pressures from these information flows led to the Outer Harbor Parkway Project.

Here we couple the Platt (2004) model with the evolutionary mismatch framework laid out in Table 1 so as to tease out policy implications and attempt to systematically explain the political conflict detailed above. Table 3 specifies all of the framework elements for the Buffalo case study, with one ambiguous entry to be clarified shortly. First, the "population" of interest is all land parcels found in the Buffalo outer harbor. The attribute or trait that

varies across members of the population is land use. Clearly, different land uses differentially impact the "fitness" or economic productivity of parcels (Verburg et al., 2004). In addition, land use patterns reflect path-dependencies, implying that the attribute of interest is "heritable" for parcels in the population (Verburg et al., 2004).

Table 3. Application of the Platt-Evolutionary Mismatch Framework to the Buffalo Outer Harbor Project

Element	Description of Element for the Buffalo Case Study
Population of interest	The set of land (parcels) located in the Buffalo outer harbor
Trait/attribute of interest	Land use
Fitness of population elements	Economic productivity
Evolutionary mismatch	Land use patterns left over from collapsed industrial economy inhibit new post-industrial economic develop along the waterfront and cut off waterfront from the city
Ancestral environment	Booming early 20th Century industrial economy
Present environment	Deindustrialized economy, declining "rustbelt" city
Ultimate cause	Industrial land use patterns are locked into the outer harbor
Proximate cause	(1) Poor connectivity of existing roadways, and one-way traffic patterns on roadway nearest to the lakefront, constrain waterfront access and development; (2) Excessive transportation footprint in the outer harbor, Skyway Bridge and elevated highway act as barriers to development

Next, the Platt (2004) model illustrates that the land use [evolutionary] mismatch for our case study is, as mentioned above, inaccessible and unproductive waterfront lands that are locked into industrial uses despite the deindustrialization of Buffalo's economy (Glaeser, 2007; Goldman, 2007). Recall that these industrial land uses were initially adaptations to a booming early 20th Century industrial economy (the "ancestral environment"), but became highly maladaptive after industrial activity effectively ceased (the "present environment"). In that sense, it was evident that all stakeholders in the Outer Harbor Parkway Project shared an understanding of the ultimate cause, or function, of the land use mismatch—generally speaking, the residual land use patterns of industrialization constrain the abilities of new types of economic development to integrate into a city's deindustrialized economy (NYSDOT, 2006). As Table 3 imparts, however, the same level of accord was not observable for the proximate cause, or the mechanistic basis of the mismatch. Proponents of the Modified Improvement (MIP) policy alternative, which retains the elevated/embanked Route 5, seemingly viewed the proximate cause of an inaccessible and underproductive outer harbor as poor connectivity between the existing three roadways from Figure 2, in addition to the one-way traffic flow of the street closest to the lakefront (NYSDOT, 2006; Table 2). By contrast, proponents of the Boulevard option appeared to define the proximate cause of the mismatch as an excessive infrastructural footprint along the outer harbor, as both the Route 5 embankment and the Skyway Bridge were purported to be barriers to "world class [productive] development" on the waterfront (Bonfatti, 2007; CNU, 2007; Table 2).

When one takes stock of this Platt-evolutionary explanation of the Buffalo Outer Harbor Parkway Project, it is relatively plain to see how the political conflict can be reframed in ways that contribute to a more positive discourse, as opposed to the harsh political criticisms and anger that characterized the reality of the situation (Meyer, 2007; Esmonde, 2008a, 2008b). Namely, the evolutionary view of the conflict is not about which politician is lying (Myers, 2007), which option is politically convenient (Esmonde, 2008a), or whether urban or suburban interests are favored (Table 2). Neither does it involve the use of frequently empty political rhetoric such "anti-development" or "get something done" (Esmonde, 2008a, 2008b). Rather, by requiring that the elements that factor into a causal history of the mismatch be explicitly specified, the Platt-evolutionary framework overtly traces the given land use mismatch to its proximate cause, or the mechanism linking it to a detrimental outcome in its current environment (Lloyd, Wilson, and Sober, 2011). Thus implementation of the Platt-evolutionary approach transforms a complex, politically-charged problem into an arguably more manageable debate over the relative efficacy that alternative mechanisms have in terms of explaining a specific land use mismatch. For example, in the Buffalo case, do poor connectivity and restricted traffic patterns explain inaccessible and underproductive post-industrial waterfront land use patterns better than an excessive outer harbor infrastructural footprint? According to the Platt-evolutionary framework, it is the answer to this question, and not resignation to the politically-sensitive tensions summarized in Table 2, which is relevant for establishing an appropriate environmental intervention. We therefore submit that framing land use conflicts in this manner is likely to have substantial utility for creating more affable and, ultimately, effective political discourses in land use management.

CONCLUSIONS

In this paper we draw on the Platt (2004) model of Land Use and Society to study a land use conflict concerning the outer harbor area of Buffalo, NY. Expectedly, the model performs well for the selected case, insofar as it clearly illustrates how historical industrial activities in the study area led to the present-day inaccessibility and under-productivity of lands along the city's waterfront. We go onto show that the Platt model's ability to explain the process by which hazards and risks are borne out of the [regulated] interaction of the human and physical landscapes of a given area is tantamount to diagnosing cases of "evolutionary mismatch", which occur when attributes that adapted to some pre-existing environment are maladaptive in their present setting (Lloyd, Wilson, and Sober, 2011). For our case, the demands of a burgeoning industrial economy in the early 20th Century mandated that Buffalo decision-makers obligate the preponderance of its waterfront to heavy industrial uses. While these land uses were profitable in the context of their "ancestral environment", deindustrialization eventually rendered them incompatible with the goals and needs of a declining "rustbelt" city (Goldman, 2007).

From a policy intervention standpoint, attempting to resolve an evolutionary mismatch such as the Buffalo waterfront problem minimally requires the specification of the elements presented in Table 1 (Lloyd, Wilson, and Sober, 2011). This specification process forces adopters to come up with a causal explanation of the relevant land use mismatch, consisting of both its ultimate and proximate causes. In this way stakeholders can pinpoint the source(s) of their political disagreements. Consequently, coupling the Platt (2004) model with the evolutionary mismatch framework meaningfully contributes to a productive political discourse.

To support this notion we devote significant attention to the land use politics that operated in the Buffalo Outer Harbor Parkway Project. The selected project involved potentially counterproductive finger-pointing, accusations, inflammatory rhetoric, and political head-butting (Meyer, 2007; Esmonde, 2008a, 2008b), only to end in a way that many interpreted to favor short-term political interests over popular sentiments (Esmonde, 2008a, 2008b). In response, the Platt-evolutionary framework demonstrates how this type of debate might be carried out more dispassionately, i.e., by unambiguously proposing mechanisms that link a given maladaptive attribute to its detrimental outcome, and then assessing the relative explanatory power of those mechanisms from an evolutionary perspective. Future research will evaluate this claim by implementing the framework in real world decision-making environments in which the goal is to resolve land use conflicts brought about by evolutionary mismatches.

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