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Teaching and Researching Transition Design

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Abstract: Transition Design is a new area of study, research, and practice aimed at addressing complex, wicked problems as a strategy for intentionally directing systems transitions toward long-term futures that are more sustainable, equitable, and desirable. This paper will discuss the applied Transition Design approach for addressing complex, wicked problems and explain how it can also serve as a strategy for changing the transition trajectories of our communities, organizations and entire societies.
We will also report on a series of workshops delivered between July of 2020 and August 2021 to several hundred participants in five countries from both the non-profit and industry sectors. The workshops were conducted entirely online using a combination of Miro and Zoom technologies and had two objectives: 1) to introduce participants to the applied Transition Design approach for addressing wicked problems and understanding the anatomy, dynamics, and behavior of complex systems and systems problems; 2) to conduct qualitative stakeholder research that gathers a range of perspectives on the wicked problem as well as potential systems solutions to it.

Keywords: Transition Design - Workshop delivery - Design theory - Sustainable design - Ecological design - Wicked problems - Systems change - Systems thinking - Systems principles - Sustainability transitions

[Abstracts in spanish and portuguese at pages 257-258]

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philosophical and scientific holism, the emerging ecological world view and the decentralist tradition. Gideon worked for many years at Schumacher College, in Devon, UK, an international centre for ecological studies, and his PhD thesis (*'Holism and the Reconstitution of Everyday Life: a Framework for Transition to a Sustainable Society')* introduced the concept of transition design. A selection of Gideon's writings on transition design and related topics can be found on his academia.edu page.

The Transition Design Approach

Transition Design is a transdisciplinary approach aimed at addressing the many "wicked" problems (Irwin, 2011a; Irwin, 2011b; Australian Public Service Commission, 2007; Coyne, 2005; Buchanan, 1992; Rittel & Webber, 1973) confronting 21st century societies: climate change, forced migration, political and social polarization, global pandemics, lack of access to affordable housing/healthcare/education, and countless others.
These problems are considered systems problems because of their many challenging characteristics such as the following: every wicked problem is connected to other wicked problems; they are comprised of multiple stakeholder groups with conflicting agendas and no clear shared understanding of the problem; they are constantly changing and evolving; and wicked problems always manifest in place and culture-specific ways. Further, because of their high level of complexity, wicked problems cannot be solved by a single group of people or discipline. Addressing such problems requires radical collaboration among many fields and disciplines, but even more importantly, it requires leveraging the knowledge and perspectives of the stakeholder groups connected to and affected by the problem. Transition Design argues that new knowledge and skill-sets are required to address these problems, and that wicked problem resolution is a strategy for igniting positive, systems-level change, and societal transitions toward more sustainable, equitable, and desirable long-term futures (Irwin, 20011a; Irwin 2011b; Kossoff, 2011; Irwin, 2015; Irwin *et al*., 2015a; Irwin *et al*., 2015b; Kossoff *et al*., 2015; Irwin *et al*., 2015c; Tonkinwise, 2015a; Tonkinwise, 2015b; Mulder & Loorbach, 2016; Boehnert, 2018, pp. 22-26; Escobar, 2018, pp. 137-164; Auger, 2019; Irwin, 2019; Irwin & DiBella, 2019; Boylston, 2019, p. 12, 99, 146; Gaziulusoy, 2019; Hanington & Martin, 2019, pp. 230-231; Kossoff, 2019a; Kossoff, 2019b; Tonkinwise, 2019; Ceschin & Gaziulusoy, 2020, pp. 124-136; Irwin & Kossoff, 2020; Kossoff & Irwin, 2021).
The Transition Design approach emphasizes the following:

- The need to frame problems within radically large, spatio-temporal contexts that include the past (how the problem evolved over long periods of time), present (how the problem manifests at different levels of scale), and future (visions of the long-term future in which the problem has been resolved).
- The need for the stakeholders "connected to" and "affected by" the problem to be involved throughout the problem framing, visioning, and solutioning process. This chal-

lenges many dominant processes in which professional or disciplinary experts from outside the system solve/design "for" the communities affected by the problem(s). Transition Design aspires to continually leverage the knowledge and wisdom from inside the system and build community capacity to self-organize, advocate, and problem solve (Carlsson-Kanyama *et al.*, 2008; Simon & Rychard, 2005; Dahle, 2019).

- The need for stakeholders to co-create long-term visions of desirable futures, as a way to transcend their differences in the present and focus on a future space in which they are more likely to agree.
- The need to develop "ecologies of synergistic interventions" (solutions) that are connected to each other and the long-term vision as a strategy for transitioning entire societies toward a desirable, equitable, and long-term futures.
- The need to think and work for long horizons of time. Resolving wicked problems and transitioning entire societies toward sustainable long-term futures will unfold over many years or even decades and will require patience, tenacity, and an ongoing process of visioning and solutioning to remain on course during the transition.

Moreover, Transition Design has both a theoretical and an applied component. The framework (Irwin *et al.*, 2015b; Irwin, 2015) brings together knowledge and methodologies from diverse fields and disciplines that explain the anatomy and dynamics of complex systems and systems problems. This knowledge also helps us understand how large systems change and transition over long periods of time.

Meanwhile, the applied Transition Design approach first emerged out of the need for practical tools and approaches for use by transdisciplinary teams working in the field on actual projects (Hamilton, 2019; Irwin & Kossoff, 2017; Irwin *et al.*, 2017; Irwin & Kossoff, 2020). It has since been adapted for use in in-person and online workshops to do the following: 1) teach systems thinking and problem solving; 2) teach the Transition Design approach; 3) use as a research method for gathering stakeholder perspectives, knowledge, and concerns about the problem in question. In this context, this paper focuses on the development and delivery of both educational and research workshops, reports on insights and shortcomings, and also suggests areas in which further research might happen.

The Applied Transition Design Approach

The Transition Design applied approach was developed to provide transdisciplinary teams with the tools and strategies necessary to address wicked problems and develop "ecologies of systems interventions" that have the potential to ignite positive, systems-level change. The applied approach argues that wicked problems can only be resolved by framing them within radically large problem contexts that include the past, present, and future *(See Figure 1).*

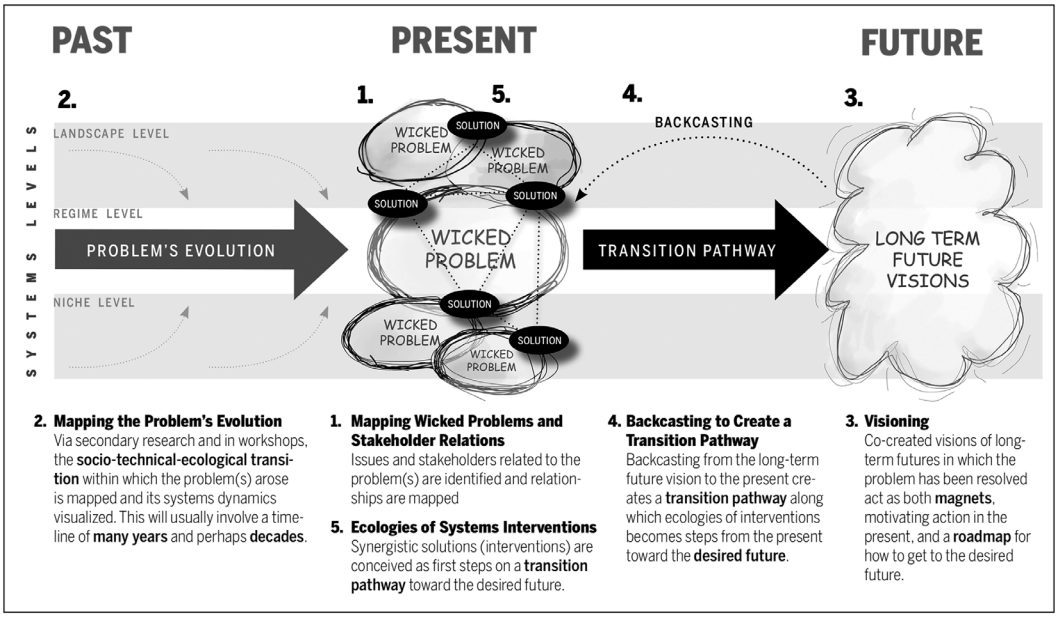

Figure 1. The Six Steps Undertaken to Frame a Wicked "Systems Problem".

The diagram above shows the steps undertaken to frame a wicked, "systems problem" within a radically large spatio-temporal context that includes the past, present, and future. Workshop participants undertake these six steps in multiple sessions.

Six steps have been developed for use in both educational and research-oriented Transition Design workshops that can be delivered in either analog or online formats. This paper reports on a series of online educational and research-oriented workshops delivered in 2020 and 2021. The six steps correspond to several questions that must be asked and answered in order to frame wicked problems within radically large spatio-temporal contexts as shown in *Figure 2* below.

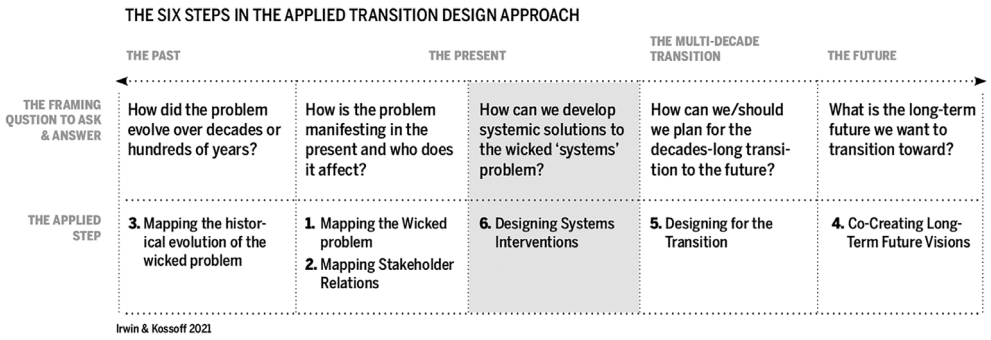

Figure 2. The Six Steps Undertaken in Transition Design Workshops and the Five Questions They Correspond To.

The six steps shown above correspond to five questions that must be asked and answered about the problem. Here, the tools and templates introduced in workshops represent just one way of answering the questions. However, many other existing tools and methodologies can also be used to answer them.

1. Mapping the Wicked Problem

Wicked problems are always comprised of multiple interconnected and interdependent issues that manifest in place –and culture– specific ways. Moreover, the different stakeholder groups connected to and affected by the problem often have divergent perspectives on the problem and lack a shared understanding of it. In this context, step one in Transition Design workshops aims to leverage the diversity of stakeholder perspectives, knowledge, and expertise that already resides within the system by having participants co-create a map of the wicked systems problem. In educational workshops, participants must conduct internet research to try and understand these multiple issues and divergent perspectives (prior to the workshop). In research workshops, actual stakeholders participate to contribute their perspectives and knowledge.

Workshop participants map the myriad issues connected to the wicked problem in five archetypal societal sectors based upon the STEEP (Social, Technological, Environmental and Political), PESTLE (Political, Economic, Sociological, Technological, Legal and Environmental) and related frameworks (Bishop & Hines, 2012; Smart *et al.*, 2019; Watkins & Wilber, 2015): **1**) Social issues (how/what stakeholders think and do); **2**) Infrastructure and technology issues; **3**) Economic and business issues; **4**) Policy, governance, and legal issues; **5**) Environmental issues. ***Figure 3*** shows the dynamics (interconnections and interdependencies) between issues in these five categories that can be leveraged in "ecologies

of systems interventions"; these are solutions that are connected in ways that amplify and scaffold each other.

Understanding the connections and interdependencies among issues in the five categories is key to understanding the problem's complex systems dynamics, which inform the design of location of interventions that solve for multiple issues simultaneously. Problem maps serve several functions: **1**) they become focal points for discussions among stakeholders that often diffuse tensions and create a shared understanding of the problem; **2**) they become a dynamic, evolving, and visual representation of the collective knowledge about the problem(s); **3**) they serve as a continually updated agenda for further research of all kinds (to refute or confirm the perspective of stakeholders about the problem); **4**) they help identify "zones of opportunity" where early/easy solutions (interventions) or what we often refer to as the low-hanging fruit in the system.

The process of building an initial, comprehensive problem map may take months of direct interaction with stakeholders, scaffolded by both desktop and field research to ensure accuracy. The map is conceived as a continually evolving storehouse of knowledge about the problem that informs stakeholders and researchers/practitioners alike.

The dynamics shown above explain why wicked problems are resistant to change and resolution, but they can also be used to create "ecologies of systems interventions" (solutions) that solve for multiple issues simultaneously, while igniting positive, systems-level change.

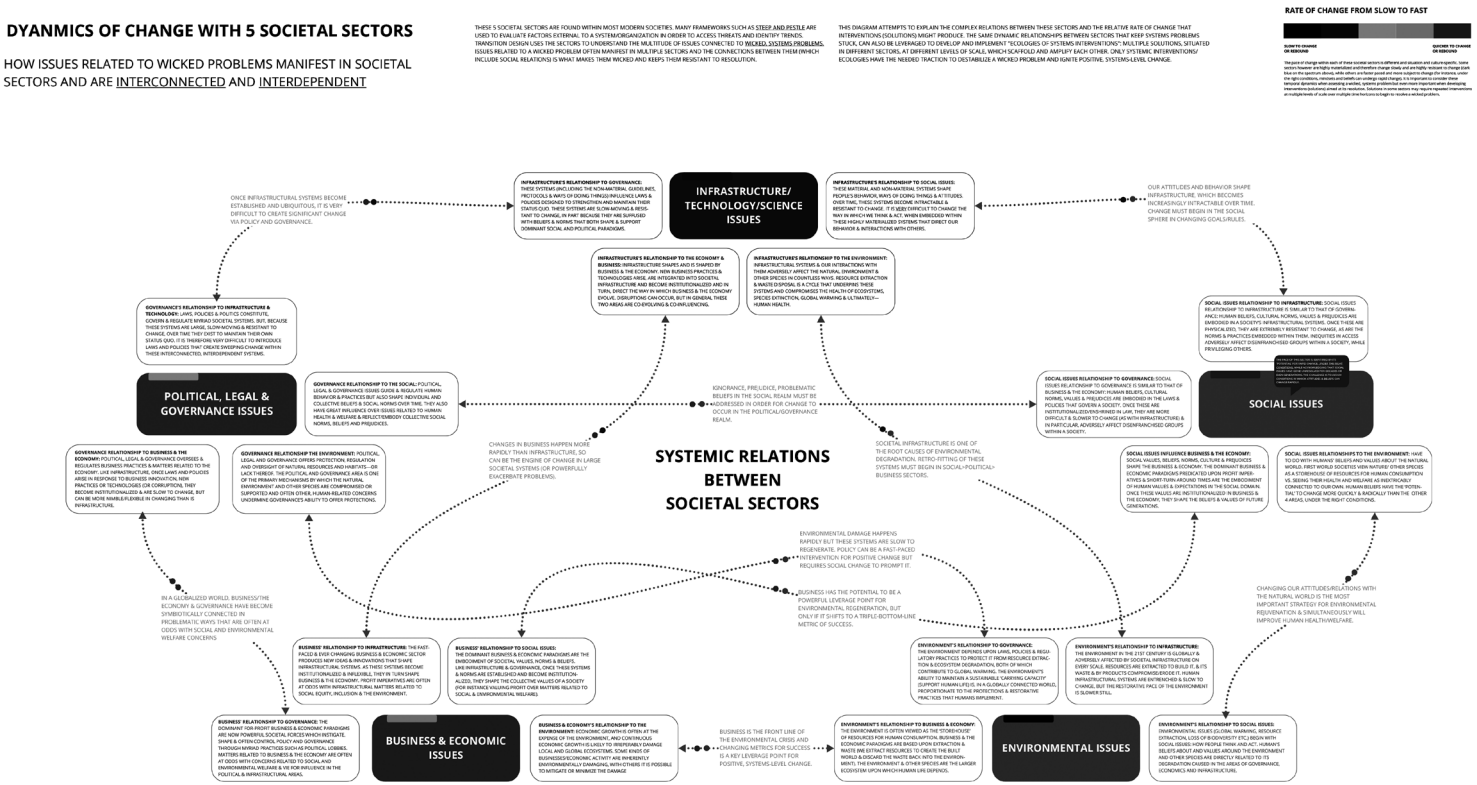

Figure 3. The Complex Interconnections and Interdependencies Between Issues Related to the Wicked Problem in the Five Societal Sectors.

2. Mapping Stakeholder Relations

Wicked problems are always comprised of multiple stakeholder groups with differing perspectives and concerns about the problem. The roots of many wicked problems are connected to conflictual relations among the stakeholder groups connected to and affected by the wicked problem in question (Kossoff & Irwin, 2021; Irwin, 2019). These conflictual relations can include uneven power dynamics, conflicting agendas and concerns as well as problematic beliefs and assumptions, to name a few. Such conflictual relations are barriers to problem resolution as well as societal and organizational transitions to more sustainable and desirable long-term futures because they often go unseen and unaddressed by traditional problem-solving approaches (Irwin *et al.*, 2015b). Transition Design argues that stakeholder relations are the "connective tissue" within wicked problems, and these nuanced "systemic relations" must be "mapped" and analyzed to serve as the basis for problem resolution.

In Transition Design workshops, participants attempt to map the fears and concerns as well as hopes and desires (relative to the problem) for each stakeholder group. Once these have been listed, lines of affinity and agreement as well as conflict and opposition are mapped between the different groups. In an educational workshop, participants must speculate and advocate for the views of a particular stakeholder group. Meanwhile, in a research workshop, the stakeholder groups themselves are able to map their feelings onto the templates provided.

More specifically, stakeholder relations of conflict and opposition always require the greatest investment of time and energy to resolve, but relations of affinity, agreement, and alignment (that are always present) often go unseen and acknowledged. Here, Transition Design argues that relations of affinity and alignment are the "low hanging fruit" in a system and show us where work should begin. Relations of affinity can be immediately leveraged in the co-creation of visions, projects, initiatives, and other types of interventions. These early, tangible steps can yield positive, mutually beneficial outcomes, which help establish trust and bridge the divides in areas in which there are disagreements.

In this context, participants in workshops are asked to write about fears and concerns and hopes and desires in the first person singular or plural in order to give voice to the very real feelings that permeate wicked problems. These fears and concerns are mapped, and the resulting map reveals a rich and dense web of social relations that does the following: **1**) provide diverse stakeholder groups with a better understanding of the complex social relations that infuse the problem; **2**) acquaint groups with the multi-perspectival nature of the problem; **3**) lead to an understanding that there is no single, "silver bullet" solution; **4**) reveal where there is affinity and agreement among stakeholders where early solutions and "quick wins" can be achieved; **5**) reveal where the most challenging relations of opposition lie (one of the most difficult lines of relation is where one group's fondest hope about the problem resolution is another group's worst fear). These types of conflictual relations take multiple interventions over long arcs of time to resolve and are counterbalanced by the short-term solutions based upon relations of agreement and affinity. Figure 4 shows an example of a stakeholder relations map.

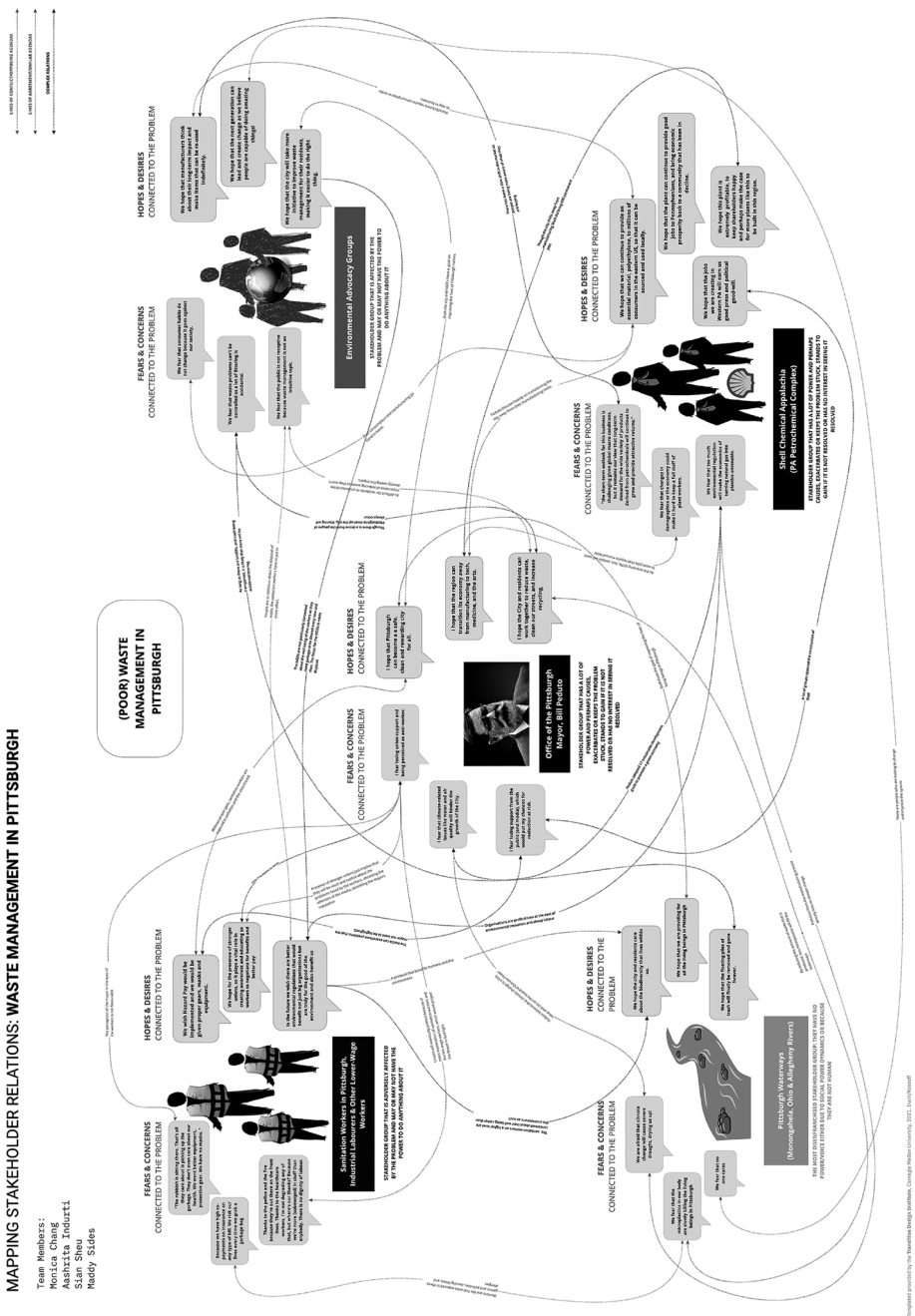

Figure 4. Mapping the Relations Among Five Stakeholder Groups Connected to the Wicked Problem of Poor Waste Management in Pittsburgh. Problem Map Research and Design: Maddy Sides, Monica Change, Aashrita Indurti, and Sian Sheu.

One of the stakeholder groups represented above are the three rivers that surround the city of Pittsburgh and that are adversely affected by the wicked problem.
On actual Transition Design projects, multiple approaches for reaching all stakeholder groups and eliciting their views on the problem would unfold over a period of several months in order to create a comprehensive enough map to address stakeholder relations and inform the development of systemic solutions.

3. Mapping the Historic Evolution of the Problem

Wicked problems arise within complex, socio-technical systems as they change and transition over long periods of time (Irwin, 2019; Irwin & Kossoff, 2020; Kossoff & Irwin, 2021). These transitions involve highly complex interactions at different levels of scale between people, the built world (artifacts, infrastructure, laws/guidelines, scripted interactions etc.) and the natural environment –wicked problems arise as the unintended consequences of all of these. Transition Design argues that an understanding of the historical evolution of the problem within a large, spatio-temporal context (problem frame) can inform more appropriate and synergistic interventions (solutions) in the present.
In order to map the problem's historic evolution, Transition Design draws upon the multi-level-perspective framework (MLP) from socio- technical transition theory (Grin *et al.*, 2010), which explains how change happens within socio-technical systems at different, interconnected levels. The MLP identifies three distinct systems levels in which events unfold, infrastructure and artifacts arise, and webs of interaction occur:
The Landscape Level: at this macro systems level, the societal landscape is determined by changes in the macro economy, political culture, demography, natural environment, and worldviews and paradigms, which are usually slow moving and resistant to change. These seismic undercurrents can play an important role in speeding up or slowing down a transition, but their geology is for the most part unyielding.
The Regime: this meso system level comprises the social norms, interests, rules, belief systems, technologies, infrastructures, and built environments through which the status quo operates and reproduces itself. The regime is managed through networks of companies, organizations, and institutions as well as politics and governance (policies and laws) at multiple levels of scale (local, national, international). Within the regime, system dynamics are determined by dominant practices, rules, and shared assumptions that are most geared towards optimizing rather than transforming systems.
The Niche: this micro systems level consists of individual actors, technologies, and local practices. Variations to and deviations from the status quo can occur as a result of new ideas and new initiatives, such as new techniques, alternative technologies, and innovative social practices. "Incubation" is a term often used to describe how innovative, risk-taking experiments are protected from regime norms and have the opportunity to take root and sometimes destabilize the Regime.
Interactions among the three levels (landscape, regime, and niche) are social, technical, institutional, infrastructural, behavioral, and normative and involve both material and non-material factors. The networks of relationship within the regime and landscape be-

come progressively more entrenched, inertial, and resistant to change as their scale and complexity increases. Eventually, large systems become "locked in" to particular trajectories or transition pathways (Grin *et al.*, 2010). In other words, although socio-technical systems (and wicked problems) are constantly "in transition," they get set in their ways, just like people do. Moreover, problem evolution maps are ideally created by a number of different groups over a period of several months or longer, including the related stake-holder groups who hold historic perspectives as well as researchers and experts of all kinds who may be connected to different events and aspects of the problem.

Framing a wicked problem within an MLP context is useful for several reasons:
1. It aids in understanding the historical evolution of the problem. This historical understanding is essential in identifying and addressing root causes of the problem (which always exist at multiple levels of scale).
2. It is useful in identifying both intractable, entrenched areas within the system and opportunities for disruption (often incubated at the niche level, but large events at the landscape level can open up opportunities at lower levels).
3. It provides a large enough context to reveal connections and interdependencies among other wicked problems that can inform strategies for more powerful interventions aimed at exponential change (i.e., killing two birds with one stone).

In this context, "reading" the social-technical terrain with the MLP can reveal what systems theorist, Donella Meadows called "places to intervene in a system." (Meadows, 1999). *Figures 5.1 and 5.2* show an MLP map for the wicked problem of deforestation in Pittsburgh. In the former, factors related to the problem have been mapped at three levels of scale along a timeline that extends from 1500 AD to the present day.