



E P P

SPRING 2010

The Environmental Policy and Planning Group is a group within the Department of Urban Studies and Planning School of Architecture and Planning

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NEWS AND VIEWS

by Lawrence Susskind

This is the last time I will be writing as Head of the Environmental Policy and Planning Group. Professor Judy Layzer will be taking over as head of EPP as of July 1, 2010. For the past twenty years, EPP has built a curriculum, a research program and a community-service track record of which I am quite proud. While there is a constant need to update and modify what we teach and do research about, I hope the key elements of EPP's of our curriculum continue to serve as a foundation. We are currently ranked second among all the Environmental Planning programs in North America, and our pool of graduate applications continue to grow. We are attracting terrific candidates from all over the world. We must be doing something right!

From my standpoint, there are five distinguishing features of EPP. First, we maintain a balance between **theory** (i.e. What ought environmental policy be seeking to achieve and why?) and **practice** (i.e. how can we promote sustainable development and enhance environmental justice?). We want students to learn "about" environmental policy-making and planning as well as "how to" do both. Second, we are interested in the ways in which the tension between science, policy and politics can and should be managed. Scientific input is crucial to environmental policy-making and planning, but the political interests of all stakeholders must also be taken into account. Current politics will always dominate decision-making, but longer term policy commitments must also be honored. Working at the intersection of science, policy and politics requires a range of skills that we help students to acquire: analytic tools, implementation tools, and organizational development capabilities. Third, we focus our teaching, research and public service on collective decision-making and strategies for consensus building. Focusing only on individual decision-making (leadership) or advocacy won't get the job done. Progress depends on effective collaboration.

NEWS AND VIEWS

(cont'd from p. 1)

Fourth, we are in an urban planning department so we focus on urban sustainability and environmental graduates should be ready, willing and able to work at city, state and national levels, but we ought to maintain our urban focus. Finally, we are international and comparative in our orientation. That is, we don't assume a uniquely US orientation, but rather look for lessons that can be learned through comparative analysis. And, we try to frame our analysis in international terms. It would make no sense, for example, to try to address the problem of climate change at anything less than a global scale.

EPP has put a graduate curriculum in place with more than 15 subjects offered on an annual basis. These are organized under three headings: Systems and Sustainability; Information and Assessment; and Government and Decision-making. Under the first heading we are talking about natural and social systems and their interaction. Under the second heading we want students to learn a range of tools and techniques that can be used to forecast and assess the impacts of various kinds of development. This includes being able to model and visualize changes in natural and social systems. Under the third heading, we want students to understand how decisions get made in the public arena and how to organize to change those decisions when there are good reasons to do so. This includes knowing how to facilitate collaborative processes or to mobilize a range of stakeholders. MCP students who take this curriculum are eligible to receive an Environmental Planning Certificate. This puts potential employers on notice that they are environmentally literate and skilled in the techniques of environmental planning.

Practicums, internships, thesis advising and action-research projects offer students opportunities to "learn by doing" and develop their capacity to reflect on and learn from their own experience. We also pursue more traditional

social science research aimed at theory-building, particularly in conjunction with doctoral students writing dissertations. In the years that I have been at MIT, I have supervised more than 50 doctoral students who have completed dissertations. Many of these have subsequently been published as books by DUSP graduates who now hold senior academic positions like Mike Elliott at George Tech, Steven Yaffe and Julie Wondolack at Michigan, Jason Corburn at Berkeley, Saleem Ali at University of Vermont, Marina Alberti at University of Washington, Masa Matsuura at University of Tokyo, Gregg Macey at Fordham Law School, Eileen Babbit at Tufts University, and Adil Najam (Boston University). EPP has had an impact globally.

I will continue to teach 11.601 (Introduction to Environmental Policy and Planning), 11.255 (Negotiation and Dispute Resolution in the Public Sector), 11.364 (International Environmental Negotiation) and 11.011 (The Art and Science of Negotiation) and supervise doctoral students and MCP thesis writers. And, I will continue my efforts to push for new MIT-wide educational programs in Environment and Sustainability, including an undergraduate minor and a campus-wide graduate certificate. The MUSIC program (MIT-USGS Science Impact Collaborative) will continue, although it will be renamed the Science Impact Collaborative. And the MIT-Harvard Public Disputes Program (based at Harvard Law School) will continue to pursue research on international environmental treaty-making, the land claims of indigenous peoples and the use of mediation to resolve multilateral disputes.

As I complete my 40th year as a member of the MIT faculty, I'm please to turn over responsibility for the future of EPP to Judy Layzer and JoAnn Carmin. I do reserve the right, though, to make suggestions or offer constructive criticism from time to time.

INNOVATION IN UTILITY/COMMUNITY ENERGY EFFICIENCY DEPLOYMENT STRATEGIES

by Harvey Michaels, Lecturer/Specialist in Energy Efficiency Strategy

How do we deliver on the promise of energy efficiency for energy balance and carbon mitigation?

Ratepayer funded utility programs are among the approaches being considered to address the barriers to efficiency. By 2012, electric and gas utilities are expected to spend over \$6 billion per year to encourage their customers to improve their building's energy use.

Beginning in spring 2009 research has been underway to consider partnership and support models between utilities and communities. The research continues, funded by utilities and the Edison Foundation, to study whether mobilizing communities is a promising approach for utilities to meet their energy efficiency goals, and how that can be accomplished through design of collaborative engagement models and community geospatial tools.

In addition to students participating in the core research, the project sponsors the Community Energy Innovation Seminar which, along with Karl Seidman and Amy Stitely (Co-Lab) brings together a cross-campus collaboration of related student and faculty research, culminating this semester with a student-led campus-wide workshop on May 6.

This semester, we are comparing emerging frameworks for utility-community partnerships. With support from utilities and communities we have begun reviews of:

- Commonwealth Edison with the city of Chicago
- Duke Energy with the city of Charlotte
- NSTAR with the cities of Boston and Cambridge

The work will recommend program model elements that may prove most valuable and transferable, propose enhancements, and seek to inform leaders in city government, community and business groups considering how to enter into arrangements with utility companies to implement energy efficiency.

Notably, the utility/community program model is being examined for transferability to larger institutions, including college campus communities, where NSTAR and MIT serve as a case study.

As well, we are in the early stages of examining whether community-level energy data presentation and analysis can be transformational to society's use of energy in buildings. This semester, the student researchers are examining utility pilots where software has been deployed, and constructing a demo community energy GIS, as a basis for considering whether such systems can be used to support efficiency resource planning, community campaign management, and program results verification.

MUSIC UPDATE SPRING 2010

MUSIC (MIT-USGS Science Impact Collaborative) is changing its name to the Science Impact Collaborative. The United States Geological Survey announced in March that its support for the internship program is coming to an end. This coincides with Dr. Herman Karl's retirement.

Current MUSIC interns will be supported through the completion of their graduate degrees, but USGS will not be funding a new class for 2010-2011. Since 2004, the MUSIC program has provided tuition plus a stipend for 29 MCP/EPP interns (including the four MCP1s who will be returning next year) as well as six doctoral students. In addition, eight post-doctoral fellows have spent a year or part of a year participating in one of MUSIC's action-research projects. Fourteen MIT undergraduates from a wide range of departments have also participated in MUSIC projects through the Undergraduate Research Opportunities Program (UROP).

MUSIC projects have involved partnerships with the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the National Oceanographic and Atmospheric Administration, the U.S. Bureau of Reclamation, the National Audubon Society, the Department of Interior's Office of Environmental Policy and Compliance, and the U.S. Bureau of Land Management as well as a state agencies and civil society groups in California, Washington, Colorado, Delaware, Maine, Louisiana, Connecticut, Rhode Island, Florida and Massachusetts.

For next year, The Science Impact Collaborative will be continuing (1) its work in the Everglades (under the direction of Professor Michael Flaxman), (2) its work on environmental restoration in Louisiana with the National Audubon Society (under the direction of Professor Lawrence Susskind); and (3) the Massachusetts Climate Change Adaptation Project (under the direction of Professor Lawrence Susskind).

During the coming year, the Science Impact Collaborative will explore new long-term partnerships with a variety of federal agencies. Our goal is to support continued field testing of joint fact-finding, scenario planning, role play simulation and other collaborative decision-making techniques. We are seeking better ways to integrate science, policy and politics in environmental decision-making. Through action-research and reflective practice we hope to improve both the theory and practice of collaborative environmental management.

MUSIC UPDATE SPRING 2010

From Advocacy to Engagement – Update on the MIT-USGS Science Impact Collaborative in the Atchafalaya Basin

How can an environmental advocacy group work within – or around – existing government processes to enhance the ecosystem services provided by Louisiana's rivers, bayous and marshes? In May of 2009, the National Audubon Society asked the MIT-USGS Science Impact Collaborative (MUSIC) to help them tackle this question.

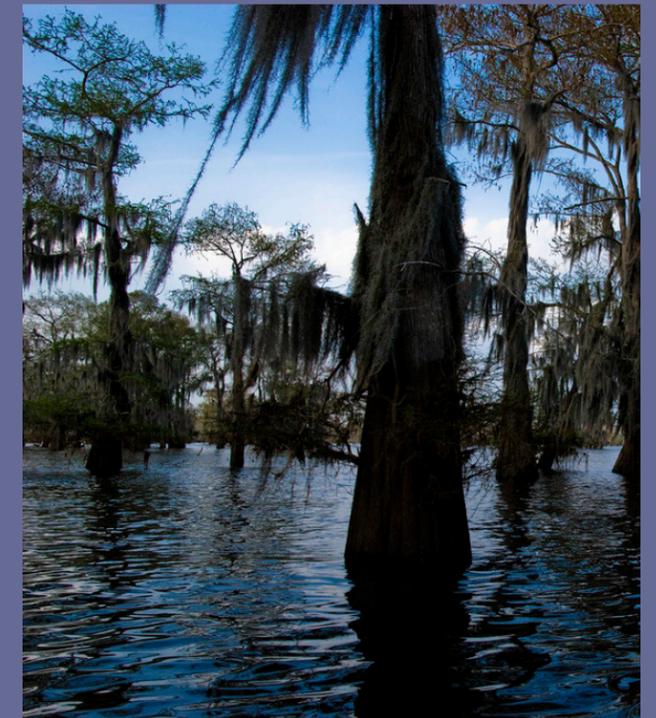
In the wake of Hurricanes Katrina and Rita, the National Audubon Society ramped up its efforts to advance the health of coastal Louisiana and the Lower Mississippi River Valley. As a part of this work, the Audubon Society focused on improving the management of the Atchafalaya River that feeds nutrients and sediment to the coast. However, Audubon immediately realized that, alone, they had little chance of effecting change in the Atchafalaya Basin. Audubon and their partners sought to involve other individuals and organizations with an interest in the Atchafalaya, and MIT PhD student Tijs van Maasackers brought MUSIC's consensus-building tools to the project.

For the past eight months, Tijs and fellow MUSIC student Deborah Lightman have been leading Audubon's stakeholder engagement campaign. Through conversations with diverse stakeholders, they are building an understanding of the diverse issues and interests regarding the future of the Atchafalaya Basin. They are also writing a negotiation simulation exercise to introduce stakeholders to new types of communication and group problem solving.

Thus far, the products of over two-dozen interviews include a third draft of a negotiation simulation exercise, a preliminary stakeholder assessment, and a follow-up agreement with Audubon to conduct additional interviews. After

a first round of stakeholder interviews in the fall, Tijs and Deborah developed and tested the negotiation simulation exercise in Cambridge, MA. They subsequently ran it in Louisiana with Audubon and their partner organizations where it met with substantial enthusiasm. Tijs and Deborah then analyzed the original interviews and provided Audubon with a preliminary stakeholder assessment in March. Audubon was sufficiently impressed with the model and findings that they requested a new round of interviews to increase the comprehensiveness of the stakeholder assessment.

Pursuant to more than twenty new interviews over the summer months, Tijs, Deborah, and new team member Amanda Martin will provide Audubon with detailed recommendations on building consensus regarding management of the Atchafalaya Basin. These recommendations will be carefully crafted to consider Audubon's activities within the complex array of stakeholders, government agencies and inter-related issues that are relevant within the Basin.



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The Atchafalaya Basin by Deborah Lightman

The Atchafalaya Basin is a classic illustration of the challenges of decision-making in the face of competing demands and scientific uncertainty. The Basin currently provides a medley of services to its diverse users. It protects the region against floods and supports fishermen, timber and oil companies; it is also central to culture, recreation, and tourism, and is among the most ecologically varied regions in the country. Within the last century, dams, levees and infrastructure projects have drastically altered the Basin's ecosystem, and the majority of stakeholders are unhappy with the changes that have occurred. However, any large-scale management changes would have unpredictable effects and the resultant costs and benefits would be distributed unequally across space and user groups. Additionally, many stakeholder groups are mistrustful of each other and of the government agencies charged with management of the Atchafalaya Basin. Conflicts between user groups span generations and lawsuits are ongoing. Stakeholders blame the Army Corps projects for the Basin's degradation, and recent decades of unimplemented restoration projects have eroded confidence in the government's ability to get things done.

What can a non-profit organization such as Audubon bring to this landscape? Our preliminary results indicate that they may be able to play a valuable role in convening stakeholders, in providing access to technical resources, and in framing issues

and options in new ways. However, the success of this effort will hinge on many different factors, including the presence of incentives to bring stakeholders to the table, and the willingness of stakeholders to imagine a different approach to management of the Atchafalaya Basin.

MA Climate Adaptation Project by Ivan Paul

In MUSIC over the past few years, we've been conducting action research projects to better understand how to help build the capacity of communities to adapt and strengthen their resilience in the face of climate change. One of the strategies that we've been pursuing is using multi-stakeholder negotiation role-play simulations to engage real-life stakeholders in grappling with the tough choices created or exacerbated by climate change. With support from the Barr Foundation, our team has been focused on understanding the history of climate adaptation planning in Massachusetts communities to date and designing several role-play simulations focused on specific climate change impacts. This work builds upon the climate adaptation role-play simulation we developed for the State of Maryland last year.

I've been working on the project with MUSIC Researchers Tyler Corson-Rikert (MCP, '11) and Sarah Hammitt (MCP, '10). Several Undergraduate Research Opportunities Program (UROP) interns have also been working on the project,

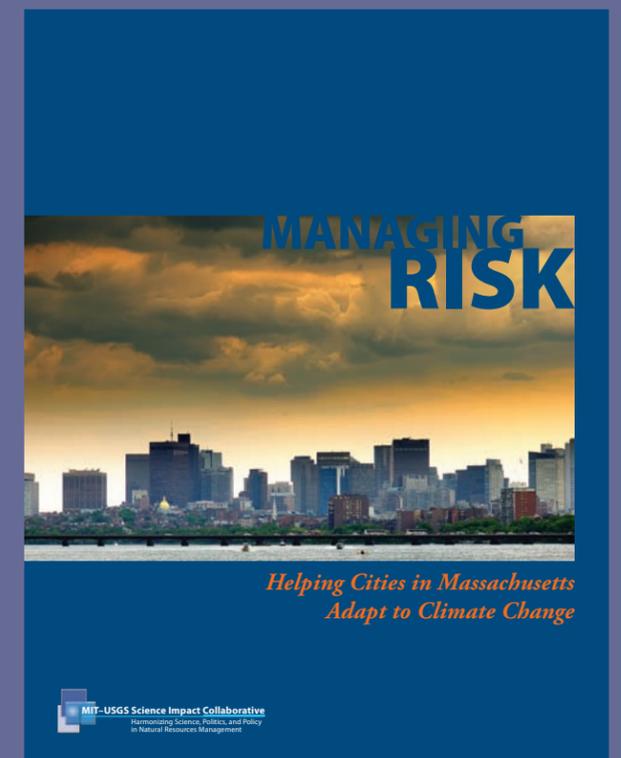
MUSIC UPDATE SPRING 2010

including Jessica Agatstein (DUSP, '12), Mónica Oliver (Civil And Environmental Eng, '12), and Jessica Artilles (Mechanical Engineering, '12). Throughout the fall, several of us researched and wrote a 60-page report evaluating city-level climate adaptation efforts in Massachusetts titled "Managing Risk: Helping Cities in Massachusetts Adapt to Climate Change". This report has helped to inform what kinds of challenges Massachusetts' communities are currently facing in their adaptation efforts and provided us with some real-world cases to develop role-play simulations from.

This spring, we have developed three negotiation simulations focused on real decisions that many communities are facing, that are affected by climate change – a riverfront development scenario, an urban heat island scenario, and a water allocation scenario. In the riverfront development game, stakeholders negotiate the potential siting and regulation of a proposed project, made more complex by the uncertainty of future flooding given the volatility created by climate change. The urban heat island game consists of a multi-stakeholder negotiation on which strategies a city should pursue to diminish the urban heat island effect and adapt its housing stock after experiencing an extreme heat event, and in particular who should bear the financial burden of housing retrofits. In the water allocation game, stakeholders need to decide on which uses water should go to given a limited supply and costly upgrades to improve the efficiency of the system. These different scenarios were based upon real-world decisions that communities are

facing into which climate science should be brought into consideration.

We will be testing all three games in the coming weeks and hope to get them out this summer and fall to communities in Massachusetts and elsewhere. Based upon experience with other games, we think these will be helpful stakeholder engagement exercises to strengthen their understanding of the relationship of climate change to day-to-day issues that they're already talking about, as well as how engaging diverse interests can be a strategy to identify effective solutions that everyone can live with. This work continues MUSIC's track record of supporting communities and regions in engaging stakeholders in planning on science-intensive issues.



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The Everglades Project by Chris Horne

The Everglades Project—formally titled “Addressing the Challenge of Climate Change in the Greater Everglades Ecosystem”—is a research project funded by the US Fish and Wildlife Service (USFWS) and the US Geological Survey (USGS), initiated in the fall of 2008. It is part of a broader partnership between MIT and USGS known as the MIT-USGS Science Impact Collaborative (MUSIC), which aims to enhance the integration of science with policy making and planning. Dr. Larry Susskind and USGS scientist Dr. Herman Karl jointly direct the program.

Everglades is the largest current MUSIC project, involving over a dozen faculty, visiting scholars, PhDs, masters students, and undergraduates. The project managers are Dr.

Juan Carlos Vargas-Moreno, postdoctoral fellow, and Dr. Michael Flaxman, assistant professor.



MIT Everglades Study Region



Spring 2010 Team: Michael Flaxman, Stephen Lloyd, Juan Carlos Vargas Moreno, Vanessa Ng, Holly Moeller, Chris Horne, Gates Gooding

The goal of the project is to explore some of the most important management and conservation challenges posed by climate change and urbanization over the next 50 years in the greater Everglades region in order to provide an initial assessment of future challenges and support long-term strategic planning.

To accomplish our goal, we are using a scenario-based simulation modeling approach heavily influenced by stakeholder participation. The first step was to develop, collaboratively, a set of regional scale scenarios that capture the most important assumptions in conservation, agriculture, urban development, and climate change. Having accomplished this, we are now fully engaged in the creation of simulated “alternative futures” based on those scenarios, that geographically and statistically express likely climatic and land use dynamics at a given set of futures time intervals.

We are using an alternative futures approach in recognition of the irreducible uncertainty associated with many aspects of climate change. Our goal is not to attempt to predict future conditions, but rather to use the scenarios and their resulting alternative futures as tools for learning, creating awareness of trade-offs and plausible outcomes, and ultimately for making better informed, tactical and strategic decisions.

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Every stage of the project has involved consultation with the clients and other local experts. Our set of stakeholders includes representatives from FWS, USGS, the US Army Corps of Engineers, the water management districts of Florida, The Nature Conservancy, Audubon Society, the National Park Service, the Fish and Wildlife Conservation Commission, the agriculture extension offices, planning offices, the Florida Farm Bureau, the National Oceanic and Atmospheric Administration, and others. Through a series of workshops and meetings, we first identified key stakeholders and built working relationships with them; next, we developed the architecture of the scenarios based on their priorities and knowledge; third, we began developing and calibrating aspects of the model from topical experts; and recently we returned from a week long trip to the study area during which we presented our initial simulations, elicited feedback on our major assumptions, and developed priorities for further model refinement.

There are several tangible outputs of this process, including: a set of geo-visualizations in the form of scalable land use maps at multiple time intervals; a web-based tool allowing users to input their own set

of assumptions to generate an alternative future and explore its consequences; academic publications, one of which is already in review¹, with additional scholarship forthcoming; two MCP theses², and the social and political capital built through the process of multi-agency stakeholder collaboration.

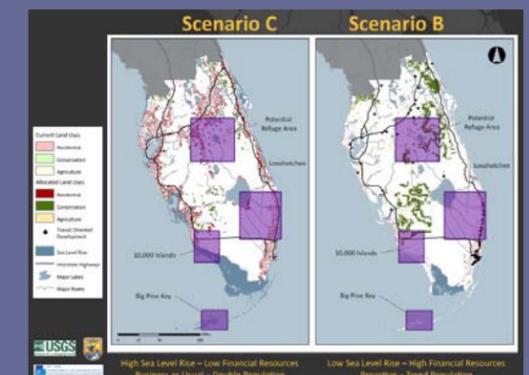
The next steps are to refine our stimulation model, continue developing the project deliverables, enhance the integration of biophysical indicators with growth modeling, and focus on key geographic areas to model at higher precision. There is a possibility of scaling up the project to include additional core collaborators from other academic and scientific institutions.

¹Barreteau, O; Vargas-Moreno, J.C.; Ciesielski, L; Karl, H; Flaxman, M. 2009 *Collaborative Cognitive Mapping to Design the Scope of Planning Everglades Restoration with Climate Change: an Assessment of Social Learning Occurring*

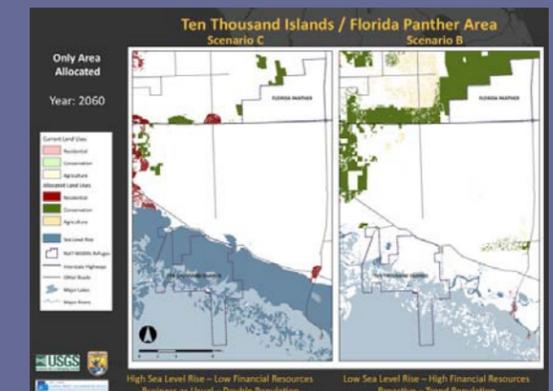
²Lassiter, A. 2009 *Assessing Land Conservation Strategies: the Case of the Florida Everglades*; and Horne, C. 2010 *Mixed-Use at the Landscape Scale: Integrating Agriculture and Water Management as a Case Study for Interdisciplinary Planning*



One of several stakeholder workshops



Regional Scale Alternative Futures (above)



Landscape Scale Alternative Futures (right)

INCOMING EPP STUDENTS

Justin Bates joins EPP from Portland, Oregon, where he's an AmeriCorps member working on local government sustainability initiatives. Prior to this, he was the Zoning Administrator in Brattleboro, Vermont. Justin holds a BA in Biology from Williams College.

Jenna Kay joins EPP from Outward Bound, a wilderness education organization, where she works with adjudicated and struggling teenagers. She holds a B.A. in Earth and Environmental Science from Wesleyan University.

Angela Hadwin is currently a garden educator and food justice advocate with Sustaining Ourselves Locally in Oakland, CA. Previously, she spent 8 years in New York City working with a variety of non profits, community-based organizations, and city agencies on issues of environmental, food, and social justice. She received a BA in Biology from Bryn Mawr College.

Gil Kelley joins EPP as a Master of Science candidate after extensive urban and environmental planning experience, including holding positions as the Director of Planning for the Cities of Portland, Oregon and Berkeley, California. Gil is focusing his study at MIT on the design of cities for climate change mitigation and adaptation. He holds a BA degree in political economy from the Evergreen State College.

Jungwha Kim holds a A.B. in International Relations from Brown University. She has spent the past two years working as a consultant at KPMG, where she has helped to develop business models based on environmental consulting practices.

Ksenia Mokrushina holds a M.A. and B.A. in economics from the State University Higher School of Economics in Moscow, Russia. She is currently a research analyst with the Moscow Office of the World Bank, Sustainable Development Department, Infrastructure and Energy Team, working mainly on energy efficiency policy issues at the state and city level.

Brendan McEwen worked the last two years in Community Energy Planning and Green Building consultancy with HB Lanarc, one of Canada's leading sustainable planning and design firms. He received a double major BSc. in Environmental Science and English Literature from the University of British Columbia.

Nikhil Nadkarni joins EPP from Washington, DC, where he has been working in the field of climate change and sustainability policy at the state and city levels. Prior to this, he completed his undergraduate education at MIT, earning a B.Sc. in Management Science.

Dominick Tribone joins EPP from Abt Associates, where he has been performing economic analysis of EPA regulations. He holds a BA in Economics and French from NYU and currently lives in Cambridge.

MCP THESIS SUMMARIES

Mainstreaming Climate Change Adaptation in South African Cities by **Leanne Farrell**

Efforts to adapt to climate change risks will be irrelevant unless adaptation becomes part of every municipal agency's ongoing activities and planning processes. In Cape Town and Durban, South Africa, housing and stormwater management departments are "mainstreaming" adaptation by incorporating climate change considerations into almost all their everyday decisions. The key is to make sure that responding to climate change is at the heart of their mandate. A hidden "output" of adaptation mainstreaming is an increasing emphasis on collaborative governance. In-house adaptation efforts require complementary actions by other departments and external stakeholders. A central city climate adaptation office can help to channel funds for adaptation.

Waiting for the Interurban: The Politics of Light Rail Planning in Seattle by **Kim Foltz**

As the fastest growing source of greenhouse-gas emissions, transportation systems pose some of the most intractable challenges to sustainable, climate-friendly cities. Yet transportation planning is complex, involving dynamic, multi-modal systems, and requiring the collaboration of multiple jurisdictions. Efforts to implement a more sustainable transportation system, therefore typically confront multiple barriers. This thesis examines a 20-year effort to establish a light-rail system in Seattle, Washington and explores the opportunities for and obstacles to devising sustainable metropolitan transportation systems.

Overcoming Barriers to Green Infrastructure by **Sarah Hammitt**

Much of the stormwater in cities runs offsite and causes flooding, sewage overflows, water pollution and habitat degradation. Cities are finding it increasingly difficult to rely on traditional stormwater sewers to protect receiving waters and are looking for ways to capture stormwater onsite. The term "green infrastructure," refers to the use of soil, vegetation, or permeable materials to capture, and sometimes treat, stormwater onsite, including raingardens, green roofs, permeable pavement, street trees, and vegetated swales. There are numerous strategies that cities can use to overcome the barriers to switching to less expensive green infrastructure of this kind.

Citizen Implementation of Sustainability Measures at the Neighborhood Scale by **Ingrid Heilke**

Human or built landscapes need to be consistent with ecological landscapes. Working at the neighborhood scale makes it easier to achieve this equivalence by filling the gap between individual and institutional action.

Integrating Agriculture and Water Management in the Everglades by Chris Horne

The effort to save the Everglades involves the largest environmental restoration project in history with a budget over \$10 billion. The central challenge is restoring natural water flow patterns across the region. This requires finding a place to store approximately 1 million acre-ft of water on a regular basis. Despite significant investment in land acquisition, research, and development, the problem persists. The Florida Ranchlands Environmental Services Project (FRESP) shows that the public sector can pay private ranch owners to retain water on their property. This offers a cost-effective addition to other regional water management approaches and shows how a market-based approach to environmental planning at the landscape scale can be effective.

Redeveloping Contaminated Lands Using Large-Scale Renewable Energy Facilities by Bjorn Jensen

Four case studies of brownfield-to-renewable energy projects identify the barriers to such projects and how they can be overcome. The cost of cleanup, liability risk, uncertainty, technical and legal complexity, and the need to coordinate multiple stakeholders make the task difficult. Strong partnerships involving full cooperation among developers, property owners, regulators, and local officials offer a remedy. Political and public trends to be driven by the idea of improving the city's image and stimulating economic development locally. Carving out less polluted pieces of large properties for phased development is an important way to proceed.

Political Obstacles to Implementing Congestion Pricing in New York City by Patrick Lynch

Patrick is looking at the political reaction to New York City Mayor Bloomberg's congestion pricing proposal in 2007. He found that aspects of the mayor's plan created readily identifiable opponents unified along geographic lines. They claimed that the city was inflexible in its policymaking process, focused exclusively on enhancing revenues. The Mayor and his supporters were unable to build a coalition that could navigate New York's challenging institutional environment, and the proposal failed to clear the state legislature.

Adopting a Green Infrastructure Approach in Philadelphia by Sarah Madden

Modern cities are characterized by paved roads, rooftops, parking lots, and impacted soils that make it hard to manage stormwater. Historically, cities have built complex infrastructure to address this problem, but this is costly and causes rather than solves environmental problems. A green infrastructure approach would be better. Philadelphia has recently embraced green infrastructure in a big way. The 1990 withdrawal of federal funds for infrastructure improvement forced the city to remake impervious surfaces. The City Water Department created an office to oversee watershed protection. And, a particularly enterprising policy entrepreneur in the city helped "re-brand" itself (as a green city) and won support for a \$1.6 billion green infrastructure plan.

Collaborative Methods in Social Movement Organizing: A Case Study of Long-term Alliance Development and Energy Efficiency Planning in Massachusetts by Eric Mackres

Some social movement organizations have begun to participate in more collaborative and less adversarial efforts to create decentralized network power. Through an analysis of the work of Community Labor United, a Boston-based community-labor coalition, he examines the contributions that both organizing and collaborative methods offer for efforts to promote neighborhood energy efficiency. The prerequisites for effective collaboration—diversity of interests, interdependence of interests, and authentic dialogue—are used to analyze collaboration in multiple venues. He concludes by offering recommendations regarding "the co-application" of social movement organizing and collaborative planning practices.

Complexity and Collaboration for Regional Sustainability by Evan Thomas Paul

Evan Paul's thesis explores the challenges of modeling, scenario development, public participation, political management, and organizational change related to a comprehensive regional planning effort in the Metro Boston area called MetroFuture. MetroFuture was organized by the Metropolitan Area Planning Council (MAPC) over the course of eight years. The agency's intention was to create a more comprehensive and action-oriented regional plan through larger-scale participation than what had previously been attempted. They engaged more than 4,000 participants and created a plan with over 400 specific recommendations for dozens of actors in the Boston metropolitan region on topics ranging from transportation and land use, to public education and clean energy. Evan found that while the resulting plan has helped to shape federally required regional transportation policy and bolstered smart growth efforts in the region, it could have had a larger impact by engaging state-level political leaders, real estate, and business interests more regularly and systematically. Evan provides numerous recommendations to other regional agencies seeking to learn from the MetroFuture story.

Energy Consumption and GHG Emissions in the Residential Sector in Urban China by Jiyang Zhang

This thesis assesses current energy consumption and GHG emission patterns in the residential sector of Jinan, a medium-size city in east China. Four neighborhood typologies (Traditional, Grid, Enclave, Superblock) unique to the urban context, in China have a strong influence on energy consumption and GHG emissions, not only because of thermal and ventilation effects, but also because these different patterns of urban development influence urban behavior.

DISSERTATION SUMMARIES

Addressing Agricultural Salinity in the American West: Harnessing Behavioral Diversity to Institutional Design

Beaudry Kock

Salinization in the Lower Arkansas Basin of Colorado threatens environmental quality, the agricultural economy and the interstate water compact with Kansas. Since salinization is primarily driven by inefficient agricultural water management, dealing with the problem will require incentivizing shifts in water user behavior towards more sustainable practices. Delivering these incentives through institutional solutions is preferable, since infrastructural solutions are expensive, can be disruptive to the environment and do not necessarily get at the root of the problem.

One particular institutional solution, the water quality trading market, has often been applied to deal with salinity problems around the western U.S. Unfortunately, these institutions have been largely ineffective, despite considerable theoretical promise. Explanations for this failure typically assume that water users are all boundedly-rational economic actors, but I review evidence that this assumption is empirically unjustified. Through the application of an integrated social-environmental simulation model, I demonstrate that this assumption precludes a more nuanced discussion of institutional failure, and limits potential options for enhancing institutional effectiveness. I also demonstrate a potential practical solution for the Arkansas Basin in Colorado.

I developed my agent-based and hydrologic model - “ArkAgent” - through collaborative work with basin stakeholders and researchers at Colorado State University. The model simulates a water quality trading market; the water use and market interactions of basin actors; and basin hydrology. I used the model to conduct experiments demonstrating that a neoclassical market institution is less effective at reducing salinity levels when we make more realistic provisions for attitudinal and behavioral variation among water resource users. I show how the use of sustainability feedback information as an alternative non-monetary institutional incentive can address this performance issue, even in the face of conflicting economic pressures.

This work makes new theoretical contributions by showing how our models of institutional performance are critically dependent on behavioral assumptions; and that consequently our institutions for addressing sustainability challenges in large and complex water systems may have incentives poorly matched to real behavioral complexity. This work also shows how an appropriately designed market institutional intervention in the Lower Arkansas Basin could achieve salinity reduction benefits over an 8-year period. Many of the model’s practical insights are also relevant to large salinity-threatened basins across the western United States.