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## HOPE AND FEAR: NARRATIVES OF STATE-LEVEL CLIMATE ADAPTATION

### RESUMEN

Si la planificación es ampliamente considerado como la organización de la esperanza, la planificación del cambio climático, con su necesidad de anticipar lento y desastres rápida puede ser la gestión del miedo. Pero el miedo y la desesperación tienden a desalentar a los bienes públicos compartidos. Parece que los planes de adaptación al cambio climático debe ser un equilibrio cuidadoso entre el pesimismo realista / (cambio climático está en marcha y es probable que sea grave) y el optimismo (podemos hacer arreglos ahora que importará y crearemos mejores ciudades de todo). Empíricamente, ¿es así como los

estados están interpretando el reto? Esta investigación examina un conjunto de planes de adaptación de EE.UU. a nivel estatal y se encuentra que hay prácticas que los planificadores pueden utilizar para equilibrar la esperanza y el miedo. Los planes pueden comenzar con una visión positiva que pone de relieve los diversos beneficios de la adaptación, y demostrar que las medidas de adaptación son capaces de reducir la magnitud o intensidad de los impactos. Pueden diferenciar entre la incertidumbre inherente a la ciencia y la desconfianza en la ciencia, y proporcionar los datos de monitoreo sobre impactos del cambio cli-

mático. Sostenemos que la construcción de narrativas que crean un mensaje de esperanza y atar a los valores establecidos desde hace tiempo para la planificación le ayudará a hacer una adaptación más probable que se apliquen.

**PALABRAS CLAVE: ADAPTACIÓN AL CAMBIO CLIMÁTICO - LA PLANIFICACIÓN ESTATAL - LA TEORÍA DE LA PLANIFICACIÓN - PROCESO DE PLANIFICACIÓN**

## ABSTRACT

*If planning is widely considered the organization of hope, climate change planning with its need to anticipate slow and quick disasters may be the management of fear. But fear and despair tend to discourage shared public goods. It seems that climate adaptation plans should be a careful balance between the realistic/pessimistic (climate change is underway and is likely to be severe) and the optimistic (we can make arrangements now that will matter and will create better cities all around). Empirically, is this how states are interpreting the challenge? This research examines a set of US state-level adaptation plans and finds there are practices*

*that planners can use to balance hope and fear. Plans can begin with a positive vision that highlights the diverse benefits of adaptation, and demonstrate that adaptation actions are capable of reducing the magnitude or intensity of impacts. They can differentiate between the uncertainty inherent in the science and distrust in science, and provide for monitoring data on climate change impacts. We contend that building narratives that create a message of hope and tying to long-established values for planning will help to make adaptation more likely to be implemented.*

**KEYWORDS: CLIMATE ADAPTATION - STATE PLANNING - PLANNING THEORY - PLANNING PROCESS**

## INTRODUCTION<sup>1</sup>

Climate change, with its dire future forecasts and seemingly unstoppable momentum of crumbling ice shelves, intensifying disasters, rising seas, challenges planners to manage hope and fear in ways that enable action without dismissing real risks (Seltzer, 2013, Frumkin and McMichael, 2008). The news on the climate front is unremittingly bad, with projections of emissions increasing, temperature rise consistently 'ahead of schedule,' and new projections of impacts often greater than previous estimates (Betts et al., 2011; IPCC, 2012; McKibben, 2011). But despair, perhaps the logical response to the situation, does not tend to encourage action for the good of all over the long term, instead

encouraging short-term self interest (Myers, 2012; R. M. Nesse & Ellsworth, 2009). If planning is the organization of hope and its language that of the future (Baum, 1997), there is no reason to think that climate adaptation is any different and in fact the need for hope through planning may be more intense.

Our research in this particular paper is not on the adaptation actions recommended in these plans. But it seems necessary to make a case that it is possible for adaptation to help create better communities futures, and that adaptation can align with typical planning goals. While the increase in greenhouse gasses in the atmosphere create the climate conditions for change, the impacts of that change depends on the situation met by the hazard. In the field of hazard mitigation, the magnitude of a hazard event is not determined by exposure to a risk

alone. Instead, it is a function of the intensity of the hazard event, exposure to the event, and the effectiveness of pre-event mitigation actions intended to protect people and property (Godschalk, 2003). And for climate change, the steps taken can significantly reduce impacts of hazards and thus in effect slow the experienced pace of change (Abunnasr, Hamin, & Brabec, 2013). One perspective that can be taken is that the uncertainty of the impacts is more a function of timing – when will

While some adaptive actions are only defensive (e.g. early warning systems, improving air conditioning, flood-proofing buildings), others more generally align with current best-practices in many urban areas. These include prohibition of building in floodplains and planning for wetland migration; on-site stormwater recharge to reduce run-off and manage non-point pollution;

<sup>1</sup> The original analysis for this project is available in Pignatelli, T.M. (2013) "Despair and Hope: Narrative Negotiation in State Level Climate Change Adaptation Plans." Amherst, MA: University of Massachusetts Masters Thesis.

integration of greenways into urban regions; and increasing shade and otherwise addressing urban heat island effects (see, for example, the policy recommendations included in Hamin & Gurran, 2008; Kirshen, Ruth, & Anderson, 2008; Rosenzweig et al., 2007; Stone, 2012). Most planners would likely consider these actions, interpreted and adjusted for their particular place, as contributing to better community futures. While it was less evident in the plans examined, research suggests that adaptation provides benefits to other local municipal challenges such as public health and economic development. So there seems to be no inherent conflict between hope of a better community and plans for a climate-adapted community, even if the proximate cause for adaptation planning is a rightful fear of coming climate changes. But it is not necessarily obvious that this alignment is recognized in existing plans. How do adaptation plans thread this needle between hope and despair, and create the sorts of documents and processes that will enable forward movement toward a more resilient future? One way to investigate this question is through empirical results – how are planners balancing hope and despair in current adaptation plans? We use a set of US state climate adaptation plans as our guide, and investigate how these plans are constructed, the stories they tell, and the ways they create a sense of what is possible through addressing what is at its core a topic of despair. In the next section we will take a brief look at the uses of hope and despair in planning, and the particular circumstances around narratives of climate adaptation. We then present our research methods, findings, and conclusions as lessons for planners engaged in this field. An appendix, available on-line at [http://works.bepress.com/elisabeth\\_hamin/](http://works.bepress.com/elisabeth_hamin/), provides data and details of the state level plans we analyzed and the coding structure.

## **DESPAIR AND HOPE IN PLANNING PRACTICE AND THEORY**

Despair and hope are evolutionarily intertwined, operating as part of a complex system intended to condition expectations about the outcomes of human actions (Randolph M. Nesse, 1999). According to Nesse, despair and hope arise from expectations about whether a goal will or will not be reached (1999). The adaptive challenge of avoiding loss is associated with emotions of anxiety and fear, whereas the challenge of attaining a resource is associated with emotions of desire and enthusiasm. In the midst of taking actions towards these ends, despair and hope emerge. Despair prepares the mind for the sadness and pain associated with experiencing a loss or the disappointment of failing to attain a resource. Hope prepares the mind for the relief associated with avoidance of a loss or the happiness and pleasure associated with attainment of a resource (Randolph M. Nesse, 1999).

Evoking fear to motivate actions that lead to desirable outcomes has been shown by decades of research to be effective only under certain conditions. If actions to reduce the feared outcomes are not identified or are seen to be insufficient in mitigating or preventing the severity of the feared outcomes, despair may result (Stern, 2012). In instances such as these, fear may “neither foster engagement nor encourage proactive responses and may result in fatalism and withdrawal” (Lorenzoni, Pidgeon, & O’Connor, 2005, p. 8). At the social level, the work of Nesse (1999) suggests that the urgent, yet short-term nature of the interest generated by such appeals may be related to the fact that fear and despair are associated with a desire to protect present interests. These two processes are captured by Myers, who writes:

On a rational basis, the present holds precedence in time: benefits already held are treated as more certain and valued. Then, on an emotional basis, our protective instincts make us vulnerable to fears of loss. This primal concern for self-protection is a far more urgent concern than any hope about future achievements (Myers, 2012).

Because present interests tend to represent the status quo, despair actually functions to maintain the status quo even in the face of changes that may erode the material benefits associated with that state.

Hope plays the proverbial foil to fear, in that it allows humans to cultivate positive expectations for the future and engage in actions that shape future conditions. According to Reading (2004), hope is an anticipatory emotion that relies on the belief that through our own actions we can make something turn out better than otherwise expected. Planners have an opportunity to facilitate such behavior because their professional focus tends to be future-oriented and yet the actions they take are often more than means to ends. Communicating social and political possibilities requires planners to say not only “‘that is the way it is’, but also ‘here’s what could be done’ or ‘here’s what we could do’” (Forester, 1989, p. 21). This notion is concisely captured by Stephen Blum, whose characterization of the work of planning as the ‘organization of hope’ has been widely popularized by Baum (1997) in a book of the same title. The development of a long-term vision that depicts a better future may highlight the diverse and positive benefits of adaptation planning, providing a “horizon of hope” towards which communities can work (Ganor & Ben-Lavy, 2003, p. 106).

While hope is indeed associated with the

propensity of individuals to take action, hope alone may not be enough to motivate behaviors that *effectively* address complex policy issues. Hope has the potential to generate unrealistic optimism that the future will be better than both the past and present *and* that actions taken now—regardless of their size or scope—will matter. For example, hope may lead to a belief that the future climate will pose no challenges or that planning for a two-degree increase in global temperature is an appropriate strategy, regardless of the fact that current emission trends indicate such an approach may be too weak to effectively address the impacts of a changing climate. The ability of individuals to believe that the future will be much better than the past and present, even when there is no evidence to support such expectations, is often referred to as an ‘optimism bias’ (Sharot, Riccardi, Raio, & Phelps, 2007, p. 102). When facing uncertain or risky situations, the propensity of individuals “to focus and simplify their decision making...even when it provides only incremental protection or risk reduction and may not be the most effective option” is referred to as the ‘single action bias’ (Weber, 1997 as cited in Center for Research on Environmental Issues 2009, p. 21).

Conditioning expectations about the outcomes of actions in order to avert an irrational valuation of past and present conditions *and* an irrational belief that the future will be better than the past and the present, requires messages that “motivate constructive engagement and support wise policy choices” (Frumkin & McMichael, 2008, 403). Research indicates the use of persuasive narratives can aid in the creation and delivery of messages that are capable of balancing the despair and hope associated with many policy issues. Patsy Healy has argued that

planning academics and practitioners should consciously build narratives to help critical, locally appropriate planning learning (Healey, 2011); surely this is appropriate for climate change as well. Policy narratives, which suggest the background and timeline of actions and their expected outcomes, can help stabilize the assumptions underlying specific choices even in conditions of uncertainty (Roe, 1994) In the context of a changing climate, influencing societal actions requires the stabilization of assumptions that drive the doubt, anxiety and fear associated with the inherent uncertainty, complexity and polarization of climate change. Using narratives to stabilize assumptions creates space for more hopeful expectations about the outcomes of actions. The current climate change narrative is one of crisis, with human communities in great risk (Bravo, 2009). Because hope is associated with the positive emotions that follow successful negotiation of an adaptive challenge, hope encourages us to perceive future adaptive challenges as opportunities and not threats. When challenges are seen as opportunities, more aggressive actions are likely to be taken in the interest of future achievement. In light of this, “the idea of climate change should be used to rethink and renegotiate our wider social goals about how and why we live on this planet” (Hulme, 2009, p. 361). Narratives that disrupt the dominant perception of climate change as a threat can help temper the emotions of anxiety and fear that drive both simplified decision-making *and* the actions that emerge from the irrational evaluation of past and present conditions (Eckstein & Throgmorton, 2003). This increases the likelihood that comprehensive actions, as opposed to incremental actions, will be adopted in the interest of future achievement.

The focus of our research is adaptation, which the IPCC defines as the “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (McCarthy J. J., 2001, p. 365). This is often contrasted with mitigation, which explores the reduction of greenhouse gases. Planned adaptation uses information about present conditions—which reflect past changes—and projections of future changes to review the suitability of current and planned practices, policies, and infrastructure (Füssel, 2007). Adaptation relies on information about present conditions—which reflect past changes— and projections of future climate to review the suitability of current and planned practices, policies, and infrastructure (Füssel, 2007). Historically, climate adaptations were made in response to past changes. In the present context, climate adaptations need to be made in anticipation of future changes. Taken together, this literature suggests that despair and hope are evolutionarily intertwined and operate as part of a complex system designed to condition our expectations about the outcomes of our behavior. Despair and hope emerge in the midst of our efforts to overcome the adaptive challenges of avoiding loss or attaining resources. In order to prepare the mind for the sadness and pain associated with loss, emotions of anxiety and fear tend to arouse feelings of despair. To condition the mind for the relief associated with attainment of a resource, the emotions of desire and enthusiasm tend to arouse feelings of hope (Nesse, 1999). Fear may stimulate fatalism and withdrawal rather than long-term interest in an issue (Lorenzoni et al., 2005). In addition, it tends to drive an irrational valuation of present and

past interests, which increases the likelihood that behaviors intended to protect the status quo—as opposed to a desirable future state—are undertaken. However, hope alone does not always motivate effective action. Inspiring hope to motivate action has the potential to create an optimism bias that may result in adoption of either a single strategy or multiple strategies that fail to address the magnitude of the issue (Sharot et al., 2007). In ways subtle and obvious, plans can create the conditions that encourage action. To do so, these messages must be “actively communicated with appropriate language, metaphor, and analogy; combined with narrative storytelling; made vivid through visual imagery and experiential scenarios; balanced with scientific information; and delivered by trusted messengers in group settings” (Center for Research on Environmental Decisions, 2009, p. 2).

## METHODS AND PLANS

Given this theoretical background, we sought to explore how state-level climate adaptation plans negotiated the complex terrain of the despair and hope associated with climate change. In the interest of reducing variability in the dataset, research efforts focused on plans adopted in the United States where analogous social, political, and economic factors influence climate change activities. Within the United States, adaptation plans adopted at the state-level were selected for analysis, as the majority of existing research focuses on local-level adaptation efforts and there is a paucity of research available on state-level adaptation efforts.

Adaptation plans appropriate for analysis were identified using the Center for Climate and Energy Solutions website (2013)<sup>2</sup> and the Georgetown

Climate Center Website (2013).<sup>3</sup> The initial data collection process yielded a potential ‘universe’ of fourteen officially adopted state-level climate adaptation plans. In the interest of reducing variability in the dataset, only comprehensive, standalone adaptation plans, endorsed by a state-government body between the years 2010 and 2013 were considered for analysis. For the purposes of this research, plans identified as ‘comprehensive’ are those that acknowledge multiple climate-related stimuli and identify specific adaptation strategies appropriate for more than one sector. ‘Standalone’ adaptation plans are those that explicitly address adaptation rather than being integrated into a larger action plan, and were not published incrementally nor were they undergoing official revision and review at the time of our analysis. The selection of plans endorsed by a state-government body within the three-year period of 2010-2013 increases the likelihood that the plans possess the political backing necessary for implementation and the content contained within has been informed by the most recent climate science.

These parameters narrowed the dataset to five plans, comprised of plans from Massachusetts, Oregon, Pennsylvania, Washington, and Wisconsin. These five plans reflect the geographic diversity of the United States by representing the adaptation efforts undertaken by east coast, west coast, and mid-western states (see Table 1).

We used an iterative process of data coding, based on the ideas of qualitative inquiry (Glaser & Strauss, 1967; Strauss & Corbin, 1994) to explain elements shared amongst adaptation plans. Initial coding of the five

state-level climate adaptation plans generated 38 discrete codes. During the phase of axial-coding, the 38 plan elements were grouped into the following six discrete meta-categories, also called plan elements:

- 1) Plan Justification
- 2) Plan Validity
- 3) Communicating Climate Science
- 4) Process of Plan Creation
- 5) Adaptation Policy Choices
- 6) Plan Implementation through Monitoring

For purposes here, we will focus only on those elements that are in bold – the justifications for the plan, the way climate science was marshaled in them, the ways that policy choices were explained, and one particular aspect of implementation – monitoring outcomes. The final phase of selective coding generated the tables of plan data shown in the on-line Appendices A, B, C, D and E, available at [http://works.bepress.com/elisabeth\\_hamin/](http://works.bepress.com/elisabeth_hamin/).

<sup>3</sup> <http://www.georgetownclimate.org>

<sup>4</sup> The IPCC defines climate-related stimuli as “all the elements of climate change, including mean climate characteristics, climate variability, and the frequency and magnitude of extremes” (IPCC, 2001).

<sup>2</sup> <http://www.c2es.org/>

State	Publication Date	Plan Title	Gov't Body Endorsing Plan
Massachusetts	2011	Climate Change Adaptation Report	Office of Energy and Environmental Affairs
Oregon	2010	Climate Change Adaptation Framework	State of Oregon
Pennsylvania	2011	Climate Adaptation Planning Report: Risks and Practical Recommendations	Department of Environmental Protection
Washington	2012	Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy	Department of Ecology
Wisconsin	2011	Wisconsin's Changing Climate: Impacts and Adaptation	Department of Natural Resources

Table 1: Plans Analyzed

## THE PLANS

Massachusetts Climate Adaptation Plan  
 In August 2008, Governor Deval Patrick signed the *Global Warming Solutions Act (Chapter 298)*. The Act established greenhouse gas reduction mandates and called for the creation of a Climate Change Adaptation Advisory Committee to analyze strategies for adapting to predicted impacts of climate change in the Commonwealth. In May 2009, an advisory committee comprised of five sub-committees

was formed. In December 2009, the five sub-committees, representing different sectors, presented their adaptation recommendations to the Legislature. These recommendations were compiled into a climate adaptation plan, which was filed with the state's Legislature in September 2011 by the Secretary of the Massachusetts Executive Office of Energy and Environmental Affairs (Massachusetts Office of Energy and Environmental Affairs, 2011). The climate adaptation plan is organized into

two parts. Part 1 of the plan includes three chapters that provide a comprehensive overview of observed and predicted changes to Massachusetts' climate and the anticipated impacts of and potential adaptation strategies to prepare for these changes. Part 2 includes five chapters that detail the contributions of each of the five sub-committees: 1) *Natural Resources and Habitat*; 2) *Local Economy and Government*; 3) *Human Health and Welfare*; 4) *Key Infrastructure*; and 5) *Coastal Zones and Oceans*. Each sub-committee chapter is then broken down into relevant sub-sectors, which provide more detail on specific impacts and strategies. For example, the *Key Infrastructure* chapter includes information on the following sectors: *Energy*; *Transportation*; *Water*; *Dam Safety and Flood Control*; *Solid and Hazardous Waste*; *Built Infrastructure and Buildings*; and *Telecommunications*.

## OREGON CLIMATE ADAPTATION PLAN

In May 2006, Governor Ted Kulongoski established the Governor's Climate Change Integration Group, which was charged with assessing the impacts of a changing climate and developing a report detailing adaptation strategies appropriate for the state. In 2008, the group released their first report, *A Framework for Addressing Rapid Climate Change*. This report addresses high-level opportunities for adaptation, mitigation, education and outreach, and identifies areas for future research. Ultimately, it provided overarching principals and recommendations that informed subsequent adaptation planning efforts. In 2010, these efforts resulted in the publication of the state's first comprehensive adaptation plan, *The Oregon Climate Change Adaptation Framework* (State of Oregon, 2010). The plan identifies eleven key risks that are

likely to impact the state. Confidence intervals are used to describe the likelihood of each risk occurring. For each of the eleven risks, the plan provides the following: 1) risk assessment results; 2) consequences of the risks to key sectors and communities; 3) current state agency efforts to address the risks; 4) gaps in agency capacity; 5) needed actions; and 6) priority implementation actions including coordination, research, and resource needs. Actions identified as 'short-term priorities' were selected from the complete list of 119 recommended state agency actions. To be identified as a 'short-term, priority', actions had to be capable of being implemented in two to three years, even if their effects might not be realized until further into the future.

## **PENNSYLVANIA CLIMATE ADAPTATION PLAN**

The *Pennsylvania Climate Change Act of 2008 (Act 70)* authorized the Department of Environmental Protection (DEP) to form a Climate Change Advisory Committee (CCAC), responsible for preparing a report recommending mitigation actions that could reduce the Commonwealth's contribution of greenhouse gas emissions. Although not a requirement of Act 70, the DEP and CCAC recognized the need to also identify adaptation strategies. In 2010, an adaptation planning process formally received the support of the CCAC. This process resulted in an initial report, *Weathering Climate Change: Framing Strategies to Minimize the Impacts on Pennsylvania Ecosystems and Wildlife*. This report later informed development of the statewide, multi-sector climate adaptation plan, *Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations* (Pennsylvania

Department of Environment Protection, 2011). The Pennsylvania state plan includes recommendations compiled by four different working groups assigned to identify risks, vulnerabilities and adaptation strategies for the following sectors: 1) *Infrastructure*; 2) *Public Health and Safety*; 3) *Natural Resources*; and 4) *Tourism and Outdoor Recreation*. Each of these four chapters also includes information on sub-sectors. For example, the *Infrastructure* chapter analyzes the following: *Transportation, Energy Systems, and Water*. The plan also includes crosscutting recommendations that were developed independent of the efforts of working groups or were recommended by multiple working groups.

## **WASHINGTON CLIMATE ADAPTATION PLAN**

In 2009, the Washington State Legislature approved the *State Agency Climate Leadership Act (E2SSB 5560)*, which provided for the development of an integrated climate change response strategy designed to better enable state and local agencies, public and private businesses, nongovernmental organizations, and individuals to prepare for, address, and adapt to the impacts of climate change. A Technical Advisory Group led by the Department of Natural Resources was formed to spearhead the task. Building upon earlier efforts, the group developed a comprehensive statewide adaptation plan that was passed in 2012. The report, *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy*, offers recommendations on how existing state policies and programs can better prepare Washington State to respond to the changing climate (Washington Department of Ecology, 2012). The plan

details observed climate trends and future predictions for the state of Washington. Strategies and actions intended to prepare the state to adapt to these changes are identified for the following seven sectors: 1) *Human Health*; 2) *Ecosystems, Species and Habitats*; 4) *Oceans and Coastlines*; 5) *Water Resources*; 6) *Agriculture*; 7) *Forests*; and 8) *Infrastructure and the Built Environment*. Seven high-priority, overarching adaptation strategies applicable to all sectors are also identified. In addition, future opportunities for *Research and Monitoring* and *Climate Communication, Public Awareness, and Engagement* are explicitly addressed.

## **WISCONSIN CLIMATE ADAPTATION PLAN**

In 2007, the Wisconsin Initiative on Climate Change Impacts (WICCI) was formed as a joint initiative between the Wisconsin Department of Natural Resources and the University of Wisconsin - Madison's Nelson Institute for Environmental Studies. Unlike the other adaptation plans reviewed in this paper, the Wisconsin plan was not initiated by state legislation or an executive order from the Governor. It is a bottom-up effort based on voluntary staff capacity and expertise, funded through existing budgets and foundation grants. WICCI seeks to engage scientists, researchers, and management agencies in understanding the impacts of climate change on natural resources and communities across the state, and developing strategies to make them more resilient to climate change. Fifteen Working Groups voluntarily formed during the WICCI process and covered sectors including, water resources, wildlife, and agriculture. In 2011, WICCI released its first comprehensive statewide adaptation plan, Wisconsin's *Changing Climate:*

Impacts and Adaptation, which serves as a resource for decision-makers and stakeholders across the state (Wisconsin Initiative on Climate Change Impacts).

The plan is organized into three parts, the first of which summarizes historic and future climate change and provides information on understanding adaptation. Part 2 describes the impacts of a changing climate on five sectors: 1) Water Resources; 2) Natural Habitats and Biodiversity; 3) Agriculture and Soil Resources; 4) Coastal Resources; and 5) People and Their Environment. The final section of the plan identifies future actions that will allow for strategy implementation.

## ANALYSIS

### PLAN EMPHASES: WORD CHOICES

To shed light on the use of specific words within the state level adaptation plans, rough word counts of the five state-level adaptation plans were conducted. The following words were selected for the count: 1) *Danger/Dangerous*; 2) *Catastrophe/Catastrophic*; 3) *Risk*; 4) *Death*; 5) *Resilience*, and 6) *Opportunity/Opportunities*. For the purposes of this research, the first four words were seen to have potential for invoking fear and despair, while the last two words were associated with possible feelings of hope. In all plans, 'risk' was the most commonly used word and, with the exception of the Massachusetts State Plan, 'danger/dangerous' was the least frequently used word.

Analysis of the use of the word 'death' within plans illuminates the significance that lies in the way in which the word is used, rather than use of the word itself. The Wisconsin State Plan uses 'death' as follows: "...putting them in danger of death..." and "...can lead to high death rates..." (Wisconsin Initiative on Climate Change

Impacts, 2011, p. 79 & p. 122). Neither of these examples assumes that death is inevitable. This is in contrast to the use of the word 'death' in the Oregon State Plan, which reads, "heat waves will result in increased deaths..." (Oregon State of Oregon, 2010, vii). While this may be true, the portrayal of death as inevitable may inspire despair that adaptation actions may not be effective in reducing the 'deadly' impacts of increasing temperatures. In contrast, the word opportunity played a range of roles in the plans. The Pennsylvania plan, for instance, intends to "take advantage of opportunities before they become crises..." (p. 40); "...in some cases new directions or opportunities should be pursued to help meet the anticipated impacts..." (p. 25)

### PLAN JUSTIFICATION

The issue and challenge of justifying adaptation plans, as unfamiliar activities among most communities, was complex and varied. Plans sought to show that climate change is an issue of present concern to residents, forming the 'call to action' employed in all of the climate adaptation plans analyzed. The Oregon State Plan reads, "climate variability and change already affect Oregon" (State of Oregon, 2010, preface). Other calls to action include, "we need to adapt to the impacts that are occurring today" and "the time to address climate change is now" (Wisconsin Initiative on Climate Change Impacts, 2011, p. 10; Massachusetts Office of Energy and Environmental Affairs, 2011, p. 5). Calls such as these place the issue both *in the present* and *close to home*. This combats unrealistically hopeful perceptions that climate change is a future problem or an unimaginable distant threat that is affecting other people and other countries (Lorenzoni et al., 2007). Additionally, such calls capitalize on the

hardwired propensity of individuals to take action when fearing their present interests are threatened (Nesse, 1999, Myers 2012).

In creating a vision of a positive future, the approach taken was to focus on resilience. For example, the Washington State Plan puts forth the objective to build "a climate-resilient community that *can* meet the challenges of *anticipated* climate impacts in the years to come" (Washington Department of Ecology, 2012, p. 92). The use of 'can' highlights what is possible and the use of 'anticipated' suggests that climate impacts may be avoidable. The use of qualifying words, such as 'could' and 'may' also aid in this end. For example, the same plan reads, "Climate change *could* worsen our current challenges..." (Washington Department of Ecology, 2012, p. 50).

### COMMUNICATING CLIMATE SCIENCE

Trust in science and uncertainty in science are not one and the same --climate science is inherently uncertain, but that does not mean it is not trustworthy. Unfortunately, this nuance can be hard to communicate to a lay audience – but the plans nevertheless tried.

For example, the Pennsylvania State Plan reads, "While there is uncertainty as to the extent and timing of these impacts, there is agreement from several impact assessment reports with the expected outcomes" (Pennsylvania Department of Environmental Protection, 2011, p. 1).

With regards to trust, the Pennsylvania plan reads, "The evidence is well supported by the scientific literature and is consistent with the findings of the National Academy of Sciences and other institutions that have a high degree of credibility" (Pennsylvania Department of Environmental Protection, 2011, p. 6). Generally, the lack of state- and regionally-specific



climate science information causes significant uncertainty in the plans. Central to the question of certainty is the issue of which emissions scenarios plans use as their base for developing climate projections. While presenting emissions scenarios makes explicit the uncertain nature of the adaptation project, including a discussion of emission scenarios also highlights the potential for individual and collective action to alter the trajectory of emissions, which in turn could reduce the intensity of projected changes. Providing individuals with the knowledge that their actions can influence the climate of the future has the potential to stimulate hope that can inspire actions capable of altering the current emissions course, as long as the proposed actions appear likely to be effective in preventing the feared outcome (Lorenzoni et al., 2005; Stern, 2012).

Most adaptation efforts are informed by at least one emissions scenario, but explicit discussion of emissions scenarios within adaptation plans is not a given. Of the five state-level adaptation plans analyzed, three (Massachusetts, Washington and Wisconsin) contained information on the emission scenario or scenarios that informed projections. Information regarding emission scenarios tends to be conveyed using graphs that show different emissions trajectories. Generally, steps to reduce emissions is the province of mitigation plans, and so it is not surprising that this was not included in these plans. But the separation of mitigation from adaptation does reduce the opportunity to address the reduction of impact.

Visualizations such as photographs, graphs and maps can help communicate the complexities of climate science by translating scientific data into concrete experience. All of the analyzed climate adaptation plans, with the

exception of the Oregon State Plan, feature photographs; state plans from Massachusetts, Wisconsin, and Washington include both graphs and maps. Analysis of the featured photographs found that the majority of images are positive, showing attractive landscapes, individuals interacting with the environment and examples of adaptation strategies. All of the plans featuring photographs include a significantly larger number of positive images than negative images. For the purposes of this research, negative images are those depicting the damaging impacts of climate change on infrastructure and landscapes. The majority of graphs included in the plans are used to show projected changes in climate and the majority of maps show the projected impacts of climate change on specific geographic areas. For example, the Massachusetts State Plan includes a map showing the projected inundation of East Boston at high tide in 2100 (Massachusetts Executive Office of Energy and Environmental Affairs, 2011, p. 111).

#### ADAPTATION POLICY CHOICES

Plans had to balance appeals to evolutionarily predisposed desires to protect present interests with appeals that foster a long-term commitment to achieving a desirable future state – in other words, find current reasons to fund long-term collective benefits. This happened in several ways. Plans could show that adaptation is really in line with current policy anyway, and thus not a change; promote current direct benefits; and/or identify indirect or co-benefits. Despite strong research literature on co-benefits to public health and other municipal concerns, co-benefits were not addressed in any of the state plans.

The most common approach was to promote

integration of short-term and long-term investment horizons. The Pennsylvania plan calls this “the most effective response to climate change” (Pennsylvania Department of Environmental Protection, 2011, p. 2). State-climate adaptation plans from Massachusetts, Oregon and Wisconsin adopt this strategy explicitly. The Oregon State plan reads, “Adapting to the effects of climate change does not necessarily mean there is a need for new programs, but rather there is a need to implement some programs differently” (State of Oregon, 2010, p.1). While the Pennsylvania State Plan does not explicitly site continuity between past adaptation efforts and those called for in the adaptation plan, it does include a section on next steps, which includes mention of a number of programs and activities that will remain ‘ongoing’. The Washington State Plan includes little on past strategies or activities, but mentions that existing laws and policies may be the vehicles appropriate for addressing changes in climate (Washington Department of Ecology, 2012, p.19).

The Massachusetts State Plan was the most explicit about promoting current benefits, viewing adaptation as an opportunity. It presents adaptation as a “business friendly” approach which reduces “...risks and costs... for new development and redevelopment” (Massachusetts Office of Energy and Environmental Affairs, 2011, p. 3). Chapter 1 of the Massachusetts State Plan reads, “At the same time, it is important to recognize that, even with these potential negative economic impacts, climate change may create new economic opportunities” (Massachusetts Executive Office of Energy and Environmental Affairs, 2011, p. 8). Pairing discussion of opportunities with challenges is useful because

it communicates that while opportunities do exist, they cannot obscure the challenges that remain. The plan includes a section detailing the potential positives economic opportunities associated with climate change adaptation. Examples of opportunities include “the expansion of sectors such as clean energy... research and development in an array of high tech sectors, and development of drought- and pest- resistant crops” (Massachusetts Office of Energy and Environmental Affairs, 2011, p. 25). All of the plans analyzed include mention of constraints, the most common of which are inadequate climate related data and lack of funding for adaptation efforts. Some plans framed constraints as opportunities. As an example, the Wisconsin State Plan reads, “Land protection is of increasing importance, but given financial constraints, it should be grounded in climate-sound strategies...” (Wisconsin Initiative on Climate Change Impacts, 2011, p. 216). This suggests that financial constraints pose an obstacle to land protection, but there exists the opportunity overcome that barrier by identifying climate-sound strategies. This contrasts with the Oregon State Plan, which relies on a less inspiring framing, “...given the state general funding budget situation that has developed since early 2010, new resources are not likely to be available to implement any more than only a few of the needed actions, if any.” (State of Oregon, 2010, xi).

#### PLAN IMPLEMENTATION THROUGH MONITORING

All of the state-level climate adaptation plans analyzed call for the ongoing monitoring of climate changes and associated impacts. Some plans are more explicit than others in identifying specific strategies that can be employed toward this end. The Washington State Plan includes a

chapter exclusively dedicated to providing for such efforts and each of the seven chapters addressing key sectors include specific monitoring strategies. For example, the chapter pertaining to public health calls for actions to “Maintain, rebuild, and increase overall efficiency of current surveillance systems...to monitor and identify outbreaks of climate-related health diseases and illnesses” (Washington Department of Ecology, 2012, p. 56). This differs from the approach taken in the Pennsylvania State Plan, which provides for more general monitoring in the form of “an integrated monitoring system” and a “consortium to promote collaborative research, monitoring and data” (Pennsylvania Department of Environmental Protection, 2011, p. 24). While all of the plans expressed the need for ongoing monitoring to inform the continued updating of existing data and policies, only the Pennsylvania State Plan called for regularly scheduled updates of the plan itself. It reads, “the commonwealth should consider establishing the authority and funding to proceed with implementation and monitoring of a state adaptation plan once it has been developed” (Pennsylvania Department of Environmental Protection, 2011, p. 16).

Ongoing monitoring that generates usable climate information can assist toward overcoming the lack of state and regionally specific climate science. This simultaneously improves plan outcomes and reduce the uncertainty that drives fear. Plans that identify data of interest, specific actions that will allow for data collection, and the parties responsible for that collection will be most effective in establishing an effective monitoring system. Identifying a timeline for the review and revision of state- level climate adaptation plans, can help ensure that monitoring progresses as intended.

#### CONCLUSIONS: WORKING THROUGH DESPAIR TO ENABLE HOPE AND ACTION

Climate change is awful – huge, seemingly insolvable, and unpredictable in effects and timing. Fortunately, many of the planning approaches that reduce climate change’s impacts can also create better communities. Successful framing of the issue is integral to negotiating the despair and hope associated with climate change. Overemphasis on the challenges of a changing climate may stimulate despair and lead to inaction, whereas the presentation of the issue as one with simple solutions may lead to strategies that fall short in addressing the scope of the issue. The climate adaptation plans we reviewed presented different balances between the difficult reality of adaptation (climate change is underway and is likely to be severe) and hopeful outcomes (we can make arrangements now that will matter and will create better cities all around). Some focused more on the sunny side, some on preventing disaster. Taken together, a summary of how the message is presented might be: *climate change presents challenges and opportunities that can be overcome and capitalized upon if we can trust in uncertain science and accept that our actions exacerbate climate change and, as such, also have the potential to reduce the rate of change and the scope and intensity of impacts.* The moral of the story in a policy narrative is often portrayed to prompt action (Stone, 2012) and as a policy solution (Verweij et al., 2006).

Based on these findings, what contributes to creating a balance between hope and fear within state level adaptation plans? Plans can begin with a positive vision for the future that highlights the diverse benefits of adaptation action – current economic opportunities,

prevention of loss both economic and human, creation of better communities in the long run, achieving existing goals. Adaptation actions should be presented as capable of reducing the magnitude or intensity of impacts. Plans can differentiate between the uncertainty inherent in the science and distrust in science, laying the groundwork for an understanding of the two issues as separate. Effective plans balance visualizations of the very serious impacts of climate change with those that convey a more hopeful image of the future. Plans can provide for monitoring data on climate change impacts, and adjustment to the plan over time. There may well be other important aspects as well – the role of the public and the overall process were not part of our work, for instance, but no doubt play a large role in the local interpretation of the plan. The approaches recommended in the sections above may help adaptation planners to constitute persuasive narratives capable of inspiring hope for the future and more resilient communities.

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