**Workshop on Mitigation and Adaptation Research in Virginia**

**Decision making:**

* Do we have an overview of the main processes, incentives and limitations for decision-making leading to more resilience, preparedness and adaptation?
* Limitations:
  + Cost: Where will funding for adaptation come from?
  + Lack of a regional consensus on what needs to be done. Each municipality has its own projects and priorities.
* Values: Need to address social aspects of sustainability to build consensus on courses of action for adaptation
* Many people are taking small actions locally to adapt and enhance resilience. Need to understand this and how it relates to larger scale governmental decision making
* Decision makers at different levels have different time scales – how far they look into the future when making decisions. The lower the level of decision-making, the shorter the time scale.
* Decision makers at different levels have different scale (size) of adaptation and resilience efforts. Local government efforts are small scale. State and Federal efforts can be much larger scale.
* Process: bottom up approach is needed to generate pressure on government decision makers to take action.
* Need to address the public as well as government decision makers.
* Civic leagues promote community engagement. They need to be included.
* Need to address the business community as decision makers and influencers.
  + Businesses are not motivated to invest in adaptation – government needs to exercise leadership.
  + This is difficult due to reluctance to discuss issues that may generate negative perceptions of their future prospects, and self-interest driven opposition to government measures that could harm profitability by eroding markets or raising the cost of doing business.
* Small communities and rural counties have their own unique issues.
  + Limited resources for adaptation
  + Lack of motivation to take action
  + Many do not want to hear about the problem, they want to hear about solutions.
* What are the main gaps in the knowledge that limit decision support?
* What will be the cost of adaptation?
* What financing options are available?
* What are the economic impacts of climate change?
* How does the public view adaptation and resilience? How do adaptation impact decisions by individual households influence their view of government actions?
* What research on decision-making should be prioritized to close the knowledge gaps?
* What changes in decision making (such as regional vs. local planning and projects) and changes in financing mechanisms would allow more to be done?
* Need to study the economic impact of climate change.
* Need to understand the different levels of decision making, from individual households, to local governments, to state and Federal Government.
* Need better understanding of the “chain of communication” between different levels of government down to the public. There can be gaps in that chain if a particular level of government is not paying adequate attention to adaptation and resilience.

**Options:**

* Do we have an overview of socially, legally and economically viable mitigation and adaptation options?
* Need to identify areas the will not be livable and relocation sites for the residents of those areas.
* There are two additional dimensions of viability: technological and moral/ethical. Decision-makers need to understand and these and take them into account in their decision-making.
* Need to understand what are the socially viable options. This requires understanding individual adaptation decisions versus community (neighborhood) and local government adaptation decisions.
* Need to ensure that social justice and social inequality are included in the assessment of options.
* Should climate change and sea level rise be included in the design criteria for new buildings, public infrastructure and private infrastructure? If it should, what tools do local governments have (zoning, building codes) or need (transferrable development rights) to ensure that this happens?
* What are the main gaps in the knowledge about options?
* What new careers and businesses will emerge with adaptation efforts?
* Example: Could wetlands farming emerge to replace conventional farming as farmland in low-lying areas is subjected to inundation?
* The legal issues that arise from property owners abandoning buildings and land experiencing inundation.
* What research on mitigation and adaptation option should be prioritized to close the knowledge gaps?
* Need research not just on what options there may be, but more importantly research on how to select options.
* Need research on the viability and cost of mitigation and adaptation options. Which are most cost effective?
* Temporal dimension of options: near-term adaptation measures that can be implemented to alleviate immediate problems, then follow-on measures to address longer term, more extensive issues.
  + Need to research the limitations of near-term versus long-term options in terms of the time span of their viability, and executability, considering cost, public acceptance and difficulty.
* Need to develop policy and regulatory options for retreat and relocation for low lying areas where protection/defenses are not a viable option.
* Need a decision-making tool for assessing the vulnerability of low lying areas for which protection may not be a viable option.
* Hybrid infrastructure: combinations of gray infrastructure (man-made structures) and green infrastructure (natural infrastructure, such as wetlands and living shorelines). When is hybrid infrastructure preferable to gray infrastructure, considering its value for filtering of runoff as well as attenuating storm surge, and when is it preferable when green infrastructure alone does not offer sufficient protection.
* What are the tradeoffs between adaptation and mitigation? To what extent can mitigation reduce the need for more extensive adaptation measures, extending the effectiveness lifespan of near term adaptation measures? Conversely, would greater investments in mitigation detract from adaptation measures, especially near term measures, that need to be implemented regardless of the pace of mitigation?
* Can financial incentives (tax breaks) and regulation (zoning and building codes) be used to leverage regular building replacement (normally every 30 years) to migrate development from low-lying, vulnerable areas to higher ground? This has the potential to reduce the cost of protecting low-lying areas.
* Need to research neighborhood and community views on adaptation.