CAMNet

FIFTH ANNUAL RENDEZVOUS

Adaptive Governance in the Face of Environmental and Social Change

April 16-17, 2011
Antioch University New England
Keene, NH

Summit View, Mount Monadnock
Photo by Charles Curtin, Antioch University New England

SUMMARY

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ANTIOCH UNIVERSITY NEW ENGLAND

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Executive Summary

On April 16-17, 2011, the Collaborative Adaptive Management Network (CAMNet) and Antioch University New England hosted the fifth annual CAMNet Rendezvous in Keene, NH. The theme of the Rendezvous—Adaptive Governance in the Face of Environmental and Social Change—put the focus squarely on the importance of decision-making structures and processes that enable adjustments to management. Forty-seven participants representing government resource management agencies, conservation organizations, private industry, consulting firms, and academic and research institutions gathered in central New England to share experiences and learn from fellow practitioners and researchers working in a variety of natural resource management settings. A list of participants is provided in Appendix A.

The objectives for the Rendezvous were to:

- Share successes, lessons learned, and updates from CAM projects/programs across North America.
- Learn about innovative, collaborative, and adaptive approaches to management and governance of fisheries, forests, and climate change in New England.
- Provide a forum for discussions to explore incorporation of adaptive management and adaptive governance strategies into local and regional initiatives.
- Document characteristics of effective adaptive governance (Appendix C captures characteristics of adaptive governance identified during the meeting).

The 2011 Rendezvous was made possible by support from the Meridian Institute, the John F. and Dorothy H. McCabe Environment Fund and the Thomas W. Haas Fund of the New Hampshire Charitable Foundation, PBS&J, Antioch University New England (AUNE), Platte River Recovery Implementation Program, U.S. Geological Survey, and the Center for Tropical Ecology at AUNE.

Steven Courtney, National Center for Ecological Synthesis and Analysis, gave the keynote address on the importance of sound ecological monitoring design to good governance, leavening his insightful remarks from the field with "war stories and jokes." He stressed the need for sustained dialogue between science-competent managers and management-savvy scientists in order to design monitoring that can answer management questions and support an adaptive management approach. Updates from ongoing CAM projects included accomplishments and challenges in work at the Las Cienegas National Conservation Area and the Comprehensive Everglades Restoration Plan.

Panel discussions highlighted:

- **Climate action planning on the municipal scale**, one of the most rapidly evolving applications of adaptive management in the built environment. A Mind Map exercise led by James Gruber, Antioch University New England, stimulated a discussion of important strategies and elements of community engagement in climate action planning across sectors and on a variety of scales.

- The **reemergence of New England community forestry,** which involves innovative partnerships and collaborations that link place-based resource conservation across multiple scales. The innovative work of federal agency-community collaborations of the U.S. Forest Service and U.S. Fish & Wildlife Service were discussed.

- **Maine lobster fisheries** as one of the few examples of a sustained fishery, in marked contrast to the groundfish sectors in New England and globally. This success story is an especially inspiring

example of one way to make local resource governance work for the people whose livelihoods are dependent on the outcome.

The Rendezvous provided a forum for rich dialogue across sectors, especially between federal and private interests, large- and small-scale resource management projects, and resource users and conservationists on what makes adaptive governance and how to put it into place. The contrast of urban, forest, and fisheries examples across a range of scales highlighted the key lessons for developing durable approaches to stewardship and policy design. Participant discussions, both in the panel discussions and outside the Rendezvous venue, reflected the search for leverage points to effect the change needed to make adaptive governance happen. *Is the situation controlled from the top-down or bottom-up? Or from the middle reaching both down and up? Who has control and who has access to decision making? What type of structures facilitate adjusting course when new information becomes available? How do you bring in good science without dominating the dialogue? Which groups are needed at the table in your area for your particular resource challenge?*

Finally, CAMNet, as part of its strategic goals, values linking theory and practice. To this end, CAMNet seeks to develop relationships between scholars and practitioners via graduate student internships. At this Rendezvous, this goal got a step closer as some participants expressed interest in starting internships for graduate students.

Highlights from Rendezvous presentations and discussions follow. PowerPoint presentations can be accessed at: http://www.adaptivemanagement.net/content/camnet-rendezvous-2011-0

Overview of Collaborative Adaptive Management

Jennifer Pratt Miles, Meridian Institute and CAMNet, kicked the meeting off by welcoming participants, recognizing Program Committee members, thanking Rendezvous supporters, and asking the participants to consider the definitions of adaptive management and collaborative adaptive management from the Rendezvous handouts:

> **National Research Council Definition of Adaptive Management—**Adaptive management [is a decision process that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders

> **CAMNet Definition of Collaborative Adaptive Management—**Adaptive management is a systematic management paradigm that assumes natural resource management policies and actions are not static, but are adjusted based on the combination of new scientific and socio-economic information. Management is improved through learning from actions taken on the ecosystems being affected. A collaborative adaptive management approach incorporates and links knowledge and credible science with the experience and values of stakeholders and managers for more

effective management decision-making. Public participation in reviewing a program drafted by others is not collaborative adaptive management.

Jennifer said that although there are many definitions and variations, the basic concept is the same: to develop a systematic approach for connecting science and management in order to move forward in the face of complexity and uncertainty.

CAM is based on the premise that natural resource management can be improved by a cycle of assessing the resource→designing management options→ implementing management actions→ monitoring→evaluating→adjusting →management action→monitoring, etc., in a continuous cycle. The phase of evaluating results and adjusting management actions is where the governance piece comes in. Based on experience, groups applying this approach are documenting specific steps or activities required to put this cycle into action, including:

Assess
- Engage stakeholders and clarify their roles.
- Identify goals and objectives.
- Create a model depicting the current understanding of how the system works.

Design
- Identify management options.
- Identify management questions and strategies to answer them.
- Design monitoring plan.

Implement
- Implement management alternatives.

Monitor
- Monitor to test predictions.
- Report findings.

Evaluate
- Evaluate findings.
- Convey findings to decision makers.

Adjust
- Learn from outcomes, incorporate into decision making, and adjust management actions based on outcomes.

Questions/comments from participants:

- In many cases the execution of adaptive management has fallen short of expectations. The evaluation step often occurs within a bounded context of preexisting policy constraints, e.g., after monitoring shows that a management change is needed, current policy may not allow change.

- While AM assumes uncertainty (e.g., "moving parts"), background conditions are also moving parts as for climate change and land use change. One needs upfront scenario planning components if background changes will affect outcomes rather than the variables for which the project is designed to test.

- It is important to define collaboration as well as adaptive management.

Welcome and Opening Remarks

Charles Curtin, Antioch University New England, welcomed participants to the conference in Keene, NH, by encouraging all present to think of this gathering not as a meeting but as a Rendezvous where

there would be much exchange, interaction, innovation, creativity, and surprise. He explained that the Rendezvous is structured to encourage cross fertilization among groups, sectors, and scales—from smaller-scale, placed-based initiatives in fisheries, municipal climate change action, and forest conservation in New England, to the regional programs of the Everglades and the Desert Southwest.

Charles pointed out that the practitioners present have been involved with a lot of 'heavy lifting' in working on CAM projects, and that the Rendezvous is a good space to share both successes and struggles. New England is an ideal place to consider adaptive governance given the multiple types of resource uses in a relatively small geographic area, the diversity and richness of the landscape and coastal areas, relatively little federally owned land, and a long tradition of reliance on local governance to tackle resource challenges.

Charles observed that divergent situations such as marine and terrestrial resource uses often have a common underpinning, e.g., fishermen can understand the challenges of ranching and vice versa. Fishermen constantly think about governance in their relatively small-scale use of a "commons" resource. On the climate change front, Charles pointed out that the City of Keene is a national leader in climate change planning and energy efficiency initiatives—the City walks the talk. Keene is focused on doing, not theory, with projects at the intersection of science, policy, and management to reduce carbon footprints and adapt to change.

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James Gruber, Antioch University New England, introduced **Susan Whittemore**, Chair of the City of Keene Conservation Commission and Professor of Biology at Keene State College.

Susan Whittemore, Chair, City of Keene Conservation Commission
Susan welcomed all to Keene and noted she was speaking as a citizen and a member of the Conservation Commission. She described her love of Keene, with its vibrant downtown with a variety of local businesses within walking distance and its parks, recreational opportunities, and conservation lands. Susan's topic was recent integrated solutions for climate change action in Keene, tying in ecological, social, and economic facets. The effort is taking a long-term perspective, while focusing on the present and the future.

The Keene Climate Protection Campaign is a sustainability effort focused on reducing carbon emissions by 10%. The process includes a climate adaptation/climate resilience community milestone process. The action plan was completed in 2007 and was made part of the Keene Comprehensive Master Plan to ensure the inclusion of climate considerations in all aspects of City planning. It contains a vision of the future and actions to attain that vision, including:

- Acquiring public input by creating groups of 8 to 10 citizens for visioning process and gathering information.
- Convening focused community workshops.
- With the information gathered in steps 1 and 2, developing a cohesive, sustainability based community vision for the City and region.

The City is now developing a recreation and open space plan infused with principles of the City's climate action planning.

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Michael Simpson, Chair, Department of Environmental Studies, Antioch University New England
Michael also welcomed participants to Antioch University New England and the CAMNet Rendezvous. He noted how the goals of CAM dovetail with Antioch University's principles that focus on serving the community and on sustainability within the context of uncertainty. Antioch University New England has the oldest graduate program in Environmental Studies in the country, and its focus has always been

science as a tool for community application and practice. It embraces the concept of transdisciplinarity, as built from the ground up. In the spirit of adaptive governance, the ES graduate programs train practitioners, researches, scholars, and educators to address complexity and work at nested scales.

Michael stressed the importance of bottom-up strategies, knowledge of place and cultural realities, and intersecting with top-down management structures. He reflected on two conferences he attended recently that shared a common theme: the inability of scientists to communicate science to managers at the local level, the ones who need this information to fund top-down initiatives. He encouraged the participants to consider carefully how scientific results are communicated to mangers and other stakeholders, including approaches from outside the United States.

Keynote Speaker

Steven Courtney, Associate, National Center for Ecological Synthesis and Analysis
As Steven was planning his keynote address, he decided the best approach was to offer "war stories and jokes," employing his sense of humor to sustain the tenacity and perspective needed for the long haul. This touches back on the theme in the opening remarks to find new ways of communicating to reach a variety of audiences. Steven chose to focus on adaptive management and governance through the lens of one crucial component of the process—the ecological monitoring plans that inform management actions. Steven has extensive experience working on monitoring projects involving management of species under the U.S. Endangered Species Act. He focused on critiquing plans for endangered butterflies, Spotted Owl, and Marbled Murrelet, and shared the following lessons learned from these experiences and based both on what works and also from mistakes:

***Lessons learned*:**

- Leave monitoring design to scientists at your own peril! In order for monitoring to be useful, managers and scientists need to work together up front to identify what information will be needed to make good management decisions. Specifically, managers and scientists should discuss: What do you want to know? When are answers needed? What will be the cost?
- It is important to clearly state your hypothesis up front so that monitoring can be designed to test that hypothesis. For example, do you only want to know if the Spotted Owl is in decline? Or do you also want to know why?
- Engage affected parties to help identify critical issues/questions that need to be considered in developing monitoring design (e.g. in the case of the Northern Spotted Owl this would have included lumber companies, wildlife scientists, environmental organizations, managers, and policy makers, in addition to experts on the Northern Spotted Owl).
- It is important for managers to have some understanding of statistics in order to understand what monitoring results mean, including: the impact of which response variables are chosen, background effects on controls, power, confidence, timeframe, and sample size (i.e. tradeoff between certainty and cost); false positives; monitoring covariates (i.e. to understand what else is going on); testing underlying assumptions; and identifying trigger points to determine whether to intervene early or later (early may be more expensive, but cheaper may be too late)
- The way decisions are made and by whom (i.e. governance) underlies many monitoring program issues.
- Triggers for management change must be identified in order to conduct AM.
- If monitoring is not informing management, why spend the money?
- Every unhappy monitoring program is unhappy in its own way. It is important to consider local context and initial conditions when designing monitoring programs. There's no "one size fits all" solution.
- The segregation of scientists and mangers is understandable, sometimes deliberate, but can be harmful to the success of the outcome.

What would it take to do better?
In conclusion, Steven made the following suggestions to improve the effectiveness of monitoring and adaptive management design:

- Conduct sustained dialog between science-competent managers and management-savvy scientists.
- Offer education and training (e.g., what do managers need to know about statistics)?
- Consider who will be making decisions and what information they will need at every step along the way.
- Create resources, blueprints, and boilerplates for those wanted to conduct adaptive management.

Collaborative Adaptive Management Panel: Updates from CAM Programs Around the United States and Beyond

Moderator: ***Jennifer Pratt Miles, Meridian Institute***
This discussion updated and informed participants on large-scale ongoing CAM projects:

- Las Cienegas National Conservation Area, *Karen Simms, U.S. Bureau of Land Management.*

- Comprehensive Everglades Restoration Plan, *Sarah Bellmund, Ecologist, Kent Loftin, HydroPlan LLC, Jim Vearil, U.S. Army Corp of Engineers, Everglades Division.*

Las Cienegas National Conservation Area, *Karen Simms, U.S. Bureau of Land Management*
Karen shared successes and challenges in her ongoing work at Las Cienegas National Conservation Area (LCNCA), established in 2000. LCNCA is home to high-value natural resources, including rare riparian, wetland, and grassland habitats and endangered fauna. LCNCA also serves multiple uses for livestock grazing, recreation, and wildlife. The intent of the CAM management program was to develop an ecosystem-based management approach to manage the area for vibrant ecosystems and multiple uses. Limited participation of the public in management effort, especially shortly after LCNCA's establishment, initially undermined the ability to manage the area successfully. Karen stressed that building stakeholder involvement was instrumental to effectively protecting the landscape. Factors that contribute to the success of CAM for this area include:

- Developing a management plan that includes a process for adjusting management (i.e. the number of grazing permits issued) annually based on monitoring results;
- Conducting experimental vegetation treatments to learn which are most effective;
- Convening a series of regular meetings with stakeholders;
- Building a partnership with The Nature Conservancy to help refine monitoring to ensure it is focused and effective;
- Coordinating with stakeholders to review monitoring results; and
- Ensureing that the science and review steps are completed in a timely manner to facilitate BLM decisions on management activities.

Comprehensive Everglades Restoration Plan (CERP) Update
Sarah Bellmund, Ecologist
Sarah provided an update on Everglades Restoration focusing on what makes for effective CAM. The CERP program is a CAM effort in that it:

- Is highly dependent on incorporating good science-based approaches (e.g. use of conceptual ecological models and a comprehensive Monitoring and Assessment Plan) to help inform whether adjustment of management practices is needed.

- Calibrates intended project benefits with actual measured outcomes and stakeholder expectations.

Sarah noted that the trust building takes time and continual communication with stakeholders to include their diverse interests.

Kent Loftin, HydroPlan LLC
Kent highlighted three recent accomplishments of the Everglades Adaptive Management Program:

- Publication of the CERP Adaptive Management Integration Guide which identifies nine activities for applying adaptive management and explains how to implement these nine activities as part of the U.S. Army Corps of Engineers six-step planning and project life cycle processes (http://www.evergladesplan.org/pm/pm_docs/adaptive_mgmt/040611_am_guide_final.pdf);
- Completion of the CERP Guidance Memorandum 56 which provides guidance on how to incorporate the principles of AM into CERP program and project management (http://www.cerpzone.org/documents/cgm/CGM_56_Adaptive_Management.pdf); and
- Approval to implement an active adaptive management field experiment to test multiple designs and operational plans associated with a project that is key to restoration success.

Jim Vearil, U.S. Army Corp of Engineers, Everglades Division
Jim outlined lessons learned from the efforts to apply AM to Everglades restoration to date:

- The foundation for AM has been laid in the CERP. It's time to put theory into practice.
- Stakeholder engagement and interagency coordination are keys for effective adaptive management.
- It is important to create mechanisms for effective communication of science.
- Linkages between science and decision making are critical
- Results from monitoring and assessment need to be used to shape new management practices.
- Implementing organizations need to be learning organizations.
- Robustness (i.e. the ability to perform well under a number of different circumstances) and flexibility (i.e. the ability to adjust) are needed to help address uncertainty about how to system will respond to management actions.

In the participant-panelist discussion session, the following issues were highlighted:

- Interactive dialogue with stakeholders concerned with the AM process is critical to build trust and understanding.
- Challenges associated with bringing together various stakeholders include the accommodation of a variety of interests that are sometimes conflicting.
- Allowing decision makers the flexibility to adjust course without a rigorous, science-based design for answering questions and agreed upon triggers for making adjustments can be risky and lacks mechanisms for accountability. A collaborative adaptive management approach enables managers to move forward when the best course of action is not clear by combining a rigorous, science-based plan to answer key questions with flexibility to make adjustments to management actions if management goals are not being achieved. It follows that analysis of options makes it easy to foster various possible alternatives.
- Good management practice should be able to take risks that override uncertainties.

Climate Adaptation Panel

Moderator, ***Herman Karl, University of New Hampshire***
Herman kicked off the panel with an insight on use of the term 'compromise." Politicians, he said, should not use it as a derogatory term. Instead, they should engage us all to work together to create value. As it

stands, we often don't listen to each other and there are barriers to talking among different groups. *So how do we keep communication channels open and tie together community and regional efforts?* This panel addresses those concerns specifically in relation to climate adaptation issues across scales.

Mikaela Engert, City Planning, Keene, NH

Mikaela said the City of Keene has been addressing climate change for 20 years and was the first member of the Climate Resilient Communities group. In response to severe flooding of the Ashuelot River in Keene in 2005, climate change adaptation was incorporated into the hazard and flood mitigation process. There is a committee of all City Department Heads where they discuss roles that they will play with the climate adaptation planning. Each Department Head must review that Master Plan each year to see where climate adaptation activities can be included or modified. Transparency is a major part of the process, keeping the public informed on what they are doing.

James Gruber, Antioch University New England

Jim kicked off his presentation with a Mind Map exercise on approaches to address climate change for a sustainable society and ecosystems. The goal was to look at ways that adaptive management and governance can be applied in addressing climate change at a range of scales. In the exercise, participants came up with themes (limbs), strategies and applications (branches), tools (twigs), and examples (leaves) of successful approaches that were listed on a drawn tree posted on paper on the wall. The roots of the tree symbolize a sustainable society and healthy ecosystems. Following are a few of the examples of successful approaches to climate adaptation that were identified: the Climate Adaptation Knowledge Exchange (http://www.cakex.org/), scenario planning to examine options for responding to sea level rise caused by climate change in Florida, the Sky Island Alliance's simulated climate change adaptation planning, LCC Climate Change Implementation Plans, Florida Governor's Climate Change Task Force, Climate Change Backpacks (educational tool), and Lake Sunapee Watershed Climate Adaptation Plan. Several of these initiatives feature:

- collaborative approaches to ensure affected stakeholders are informed and have opportunities to contribute to plans for responding to climate change,
- adaptive management as one tool to help adapt to climate change, and/or
- mechanisms for adaptive governance to enable decision makers to make adjustments as they learn more about how climate change will affect their area.

After the issues and strategies were identified, participants put dots next to the components they felt were most important to successful adaptation to climate change. Viable funding, leadership, and accountability emerged as critical factors. A reproduction of the tree in table format is available in Appendix B.

James Gruber, Lake Sunapee Watershed Climate Adaptation Plan

After the Mind Map discussion, Jim presented his work with the Lake Sunapee Watershed Climate Adaptation Plan. In response to projected effects from climate change and an already felt increase in storms, the community wanted to plan for climate change effects on town assets and infrastructure. The strategy to develop this plan was:

- First and foremost, listen to the community and what it needed.
- Engage local community leaders and get their commitment to an open inclusive process.
- Build networks and social capital.
- Increase local understanding of the issues by acquiring data and providing information.
- Assess options and identify barriers/challenges to their implementation.

Christa Koehler Daniels, Clean Air-Cool Planet

Christa presented on Cool Monadnock, a program that works within the region to help communities devise actions for climate change mitigation/adaptation. Projects involve:

- Community energy planning
- Sea level rise planning
- Regional public transportation
- Regional food supply

- Green job training/Regional markets
- Interconnectivity of trails and open space

Christa discussed communicating climate change ramifications to the public. She said that the term "mitigation strategies" is not well understood by the public and suggested using terms such as "climate preparedness" instead. She said it is helpful to translate the effects into threats and results, e.g., more frequent storms and agricultural disruptions that harm crops and food supply. Effective messages acknowledge disagreement, point toward common ground, and conclude with benefits such as energy independence and fighting pollution for children. It is important to choose the right messenger for the audience and encourage dialogue. Christa highlighted a project with a coastal adaptation working group in New Hampshire in which Clean Air-Cool Planet works with towns using a coastal resiliency tool, showing where sea level rise is likely to occur, who the vulnerable populations will be, and what potential actions could be taken to minimize damages.

Eric Walberg, Manomet Center for Conservation Sciences

Eric's theme for discussion was climate change adaptation and the challenge of governance. He discussed helping communities in southeastern Virginia plan for sea level rise. Eric explained that with the expectation that global temperatures will probably exceed those discussed at the climate meetings in Copenhagen in 2009, sea level rise is almost certain to occur and, in fact, may be much higher than originally expected. As the planning timeframe extends, he said that planning must shift from incremental adaptation to transformative adaptation. In an example of how adaptive management can be used as part of the climate adaptation tool box, Eric recommended that communities identify decision points - the circumstances that will trigger the need to change climate adaptation strategies - and monitor so they know when they need to make the transition from incremental adaptation to transformative adaptation. He called for improvements in both top-down and bottom-up governance to meet the challenge.

Sea Level Rise Planning in Southeastern Virginia

Hampton Roads in Virginia is currently experiencing one of the fastest rates of sea level rise on the East Coast at >4 mm/yr. Most of the decision making power in communities in this area is held at the local level, and the state level Climate Change Plan does little to address adaption questions and concerns at the local level. Consequently, the governance challenge context is that the majority of land use decisions are at the local level, there is competition among neighborhoods for limited resources to deal with flooding effects, and the regional planning has good ideas but little regulatory authority. To help municipalities plan for current and future sea level rise effects including storm surge and increased erosion, nongovernmental organizations (NGOs) have stepped in. NGOs are working to improve the governance situation by helping communities:

- Develop nested plans that address both varying temporal and geographic scales of sea level rise impacts.
- Balance response to both ecosystem service and infrastructure impacts of climate change.
- Facilitate neighborhood-level planning process to educate citizens and address social and infrastructure issues.

The goal of many of the these initiatives is to develop a dialogue, make social capital networks active, and encourage change and planning from the bottom up, given the weak state role in this process.

Conservation and Management Across Boundaries and at Different Scales in the Northeast

Moderator: ***Marcy Lyman, Community Forest Collaborative***

Marcy prefaced the panel—involving a series of local to regional forest conservation projects—nicely by pointing out how New England community forests are nested within the Northern Forest System and, in

turn, the Northern Appalachian Ecosystem. Consequently, management and strategies can be built to nest and synergize with each other at local to regional scales.

Governance Context for Forest Conservation in the Northeast
The human footprint in the Northeast is huge, with high populations and intensive forest harvesting going back centuries. In addition, there is a strong tradition of home rule; local governance is a tradition through the town hall system, and state oversight of forestry issues is relatively weak. Most of the forest resources are in private hands, and land ownership is changing. Marcy used the word 'churning' to describe the long-term trend of large industry selling land to private concerns resulting in fragmentation of the land base and moving away from large land holdings, which allowed for the persistence of large unfragmented blocks of forest. The goal of many of the initiatives discussed by the panel is to keep large blocks of forest intact by engaging landowners, conservation and civic groups, and citizens at the local level to build the coalitions needed to advance change. Marcy highlighted the need to adapt to changing ownership by stabilizing the land base to slow fragmentation. The panel she put together represents a range of new models for taking on this timely forest conservation challenge.

Panelists:
David Willcox, Randolph Community Forest
William Dauer, U.S. Forest Service (USFS)
Chris Wells, Society for the Protection of New Hampshire Forests and Quabbin to Cardigan Initiative
Bill Labich, Wildlands to Woodlands, Highstead Center

David Willcox, Randolph Community Forest
David shared that community forests are a tradition in New England, a legacy of the early colonial era when most towns boasted "town lands" or "commons." He explained that most of those common lands were lost in the wave of land speculation which characterized the early eighteenth century. Since then, some towns again accumulated town-owned lands through foreclosure or by gift. He stated that recently there has been a concerted effort to link forest ownership structure to a new model of community forest conservation to slow the trend of forest fragmentation that Marcy highlighted in the introduction. In this model, the land is preserved as community land in perpetuity. It is open to the public for hunting, fishing or other recreational activities except for areas where logging is taking place.

In the Town of Randolph, a 13,000 acre tract of land was commercially harvested for timber for over a century. David stated that, on earlier days, at a time when the land was locally owned by a neighboring paper mill, everyone in town assumed their recreational land would be there forever. But, in recent years, as ownership of the mill and the land associated with it moved to more distant corporate entities, decision making about the land's future shifted to distant corporate landowners. Increasingly, the people of the town worried that these decisions would be made by individuals with little understanding or sympathy for local culture and recreational uses.

In 1997, the Randolph Planning Board learned that the current corporate owners of the land had made application for a Federal Legacy conservation easement to be placed on 10,000 of its acres. This would have meant that the owners could continue to use the land for timber harvesting, but would be unable to subdivide or otherwise develop it. Such development would have an overwhelmingly adverse effect upon the nature of the town and the Board decided to support the application. With the help of many partners, it was eventually successful, but in the meantime there had been an ice storm and much of the timber on the land had been damaged. For that, and other reasons the owners decided they wanted to sell the land completely. The Town of Randolph was left with money for a conservation easement but no owner. After some hesitation and a lot of hard work, using the Federal Legacy Program to buy the development rights, and raising the money needed for the restricted fee, the town purchased the land and created the Randolph Community Forest which is managed by the Town subject to the conservation easement held by the State

of New Hampshire. The Forest is dedicated to traditional outdoor recreation, promotion of wildlife habitat, and sustainable timber harvesting.

The remaining 3000 acres, not covered by the conservation easement, were purchased by the U.S. Forest Service. Since this land, too, had long been part of the town's recreational and cultural backyard, the town was concerned to preserve its ability to influence decisions regarding it. So, the town and the Forest Service reached an agreement. That agreement was formalized by being entered into the congressional record as part of a recommendation to allocate funds to the Forest service to purchase the land. The agreement states in part that the land will be managed in consultation with the elected officials of the town of which it is a part.

A New Governance Model for Town Forests

There are two ways to set up management/governance for a town forest in New England: management by Conservation Commission or by the town Selectmen. Most often the role falls to the Selectmen, in which case sometimes logging revenues may be used for purposes other than forest maintenance. The Town of Randolph wanted a long-term plan to sustainably managing the forest for multiple uses, with the stipulation that the logging revenue go into forest maintenance and the authority for policy remains on the Planning Board, an elected body. Randolph chose to write the agreement so that the Conservation Commission would oversee management of the forest.

William Dauer, Forest Engineer, U.S. Forest Service, White Mountain National Forest

Bill followed on the heels of David to discuss the community forest model from the perspective of the USFS. Bill discussed the USFS's goal of connecting towns in the region to the White Mountain National Forest and developing more forest connectivity in northern New Hampshire. He noted that he now has to work with a Memorandumof Understanding—replacing the good old fashioned handshake. In making forest conservation connections outside the National Forest, the USFS is required to develop and implement a long-term forest stewardship plan outlining local, state, and Forest Service roles, which requires meetings, negotiations, and an agreement for funding for land and infrastructure management. In terms of monitoring, there needs to be agreement on permanent transects for wildlife research on both community forest and USFS land. The recent changes in this model mean that we can now use federal money for cost sharing on community forest projects. The most important outcomes are that we get to keep the larger local landscape intact and preserve local influence in management. Bill noted that the Forest Service is very open to collaboration and will work with any organization to conserve land.

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In introducing Chris Wells, Marcy summarized the point about the rich civic and institutional capacity in New England for cooperative forest conservation practices, which the following two panelists would show working at the next larger scale up.

Chris Wells, Society for the Protection of New Hampshire Forests and Quabbin to Cardigan Initiative

Chris introduced participants to the Quabbin to Cardigan Initiative (known as Q2C), a network of 26 nonprofits and public agencies in two states working to protect approximately 1 million acres of a relatively unfragmented forest landscape in central New England as part of a regional corridor. These forests have multiple resources values, including water supply, wildlife habitat, recreation, wood products, and climate change resilience (i.e., carbon sink and adaptation corridor).

Chris described how the partners collaborate and coordinate on communications and project finance. He said that most of Q2C's funding comes from public sources such as Forest Legacy Program priorities, NRCS earmark funding, National Marine Fisheries Service Fish Habitat Funds that are used for conservation of areas of historic spawning habitat stream reaches, DOI/USFWS refuge funding, and DOI/NPS rivers and trails funding. Q2C is at a moment of opportunity to help better integrate UFWS/NRCS landowner assistance programs in the region to help achieve landscape-scale conservation

goals. Chris noted that Q2C continues to struggle to get money for conservation easement monitoring, and that Q2C is approaching that through raising endowment funds.

Bill Labich, Wildlands to Woodlands, Highstead Center
Bill described how Harvard Forest and the University of Massachusetts (among other partners) developed the initial vision, and gathered 45 partners to work for conservation in Massachusetts. In 2010, the mission was revised to protect 70% of forestland in New England by 2070, which would mean doubling the current rate of conservation of wildlands within working woodlands. He noted how land trusts are using a process referred to as "aggregation" to move from a parcel-by-parcel, single landowner approach to \projects with multiple land owners implemented through a loosely associated network of grassroots efforts, landowners, councils, and regional conservation partnerships.

In grappling with the challenge of how to advance a regionwide vision, Bill began looking for models of collaboration/governance structures designed to hold and promote a conservation vision over time at multiple scales in a system with increasing uncertainty. He started by initiating conversations with many groups and individuals. What emerged was the consensus that leadership was a key to success, and that this initiative should be a network of partnerships and that Wildlands to Woodlands should take on a convening role. To learn what was most likely to lead to success organizationally, Bill also studied successful group and found the following commonalities.

Important Attributes of Successful Partnerships:

Capacity of Lead Group
- Strength of professional networks
- Staffing level (>1 FTE)
- Territory size (> or = Partnership Region)
- Financial knowhow of partners

Strategy
- Conservation vision maps with targets
- Real municipal engagement
- Scheduled meetings
- Well-coordinated activities and fundraising

As Wildlands to Woodlands looks ahead to sustainable management of the lands being conserved, adaptive management may be a useful tool, and Bill invited suggestions for how they can incorporate adaptive management strategies into their network of partnerships.

Lessons Learned
- Mechanisms such as memoranda of understanding and long-term forest stewardship plans enable agencies and municipalities to document how they will work together, what projects will be undertaken, and how decisions will be made.

- When working on resource conservation that involves landowners at multiple scales and jurisdictions, partnerships and networks are key to achieving goals.

- Leadership, strong professional networks, sufficient staff support, and well-coordinated activities and fundraising contribute to successful partnerships.

- As initiatives to conserve forested lands in New England acquire more land, adaptive management may be a tool for identifying optimal management strategies for those lands.

- Community Forests and regional partnerships such as Q2C and Wildlands to Woodlands have some of the elements of a CAM approach in place – collaborative processes for decision making and plans for monitoring. If a CAM approach is determined to be useful, these initiatives could build on this foundation by developing models of the systems they are working on, articulating their management objectives, identifying management options and triggers that would cause them

to re-evaluate, implementing a selected management action or actions, monitoring to determine if the selected approach is achieving the intended outcomes, and making adjustments if needed.

The Maine Lobster Fishery and New England Groundfish Fishery: Lessons Learned and Opportunities for Adaptive Management and Governance

Moderator: ***Jennifer Pratt Miles, Meridian Institute***

Panelists:
Ted Ames, Penobscot East Resource Center
David Cousens, Maine Lobstermen's Association
David Goethel, New England Fishery Management Council
Boyce Thorne Miller, Northwest Atlantic Marine Alliance)

Ted Ames, Penobscot East Resource Center
Ted brings a unique perspective to this discussion of fisheries governance as both a commercial fisherman and a fisheries scientist. He began by explaining that the New England groundfishery (i.e., those fish that inhabit the benthic and seabed area of the coastal zone, as opposed to surface schooling fish) has been depleted for 18 years. He then shared how through research that involved tracking cod fish movement he learned that cod are grouped into different subpopulations that spawn and migrate in distinct areas of the GOM. At Bowdoin College, Ted has been involved in research that ties the riverine system to the marine foodweb system by tracking alewife (a member of the herring guild) migrations in two of the remaining rivers that have not been impeded by damns. His research shows how cod migration has changed since the nearshore crash in herring populations from overfishing. He showed that historically (1920s) cod used to congregate in large number at the mouths of the major Maine rivers in the fall. Today they head offshore looking for food.

Ted pointed out that federal fishing regulations do not take into consideration local stock movements and interspecies interactions. Under the current federal management system, fish are managed at the level of the entire GOM, so, in effect, stocks can be depleted in one area, but still be fished throughout the region because overall it looks like the population is healthy. Yet, Ted asks, how can stocks rebuild in the north if there is no finer scale protection? He said that this management-ecosystem mismatch is harmful for fish population viability, for the health of the local owner-operated fishing industry, and for the viability of many coastal Maine communities.

David Cousens, Maine Lobstermen's Association
David is a lobsterman and head of the Maine Lobstermen's Association, which advocates for lobstermen and a sustainable lobster fishery. He explained that there are 6,200 lobster licenses in Maine: 75% are inside coastal waters and 25% beyond 3 miles offshore. Catch size dropped in 1994 (to 25 million lbs), but last year the catch was 93 million lbs. Future harvests look good given juvenile recruitment levels.

Successful Local Governance
David explained how when the lobster industry was thought by some to be on the verge of collapse, the lobsterman worked with researchers and graduate students to assess the state of the fishery. From the information gathered, they devised a management regime from Cape Cod to the Canadian border that involved a zone council system in which small-scale lobstermen are restricted to zones within coastal waters and larger fleets are restricted to offshore waters. The lobstermen voted by secret ballot and approved these regulations, and the lobstermen's involvement in designing these regulations has resulted in strong self-enforcement. Landings of lobster have gone from less than 30 million pounds in the 1980s to more than 93 million lbs in 2010. They are not sure why there has been an explosion of lobsters in mid-coast and central Maine, but some of the rules they have put in place through the zone council

management system that are described below may be responsible. Another contributing factor may be fewer fish predators in the ecosystem. Farther south, where local governance is not in effect and waters are warmer, populations are not doing as well.

David described a tiered matrix of governance structure that oversees the lobster fishery in Maine:

- Federal—NOAA Fisheries and Marine Mammal Protection Act
- Regional—Atlantic States Marine Fisheries Commission
- State—Authority to create laws and regulations in state waters
- Zone Councils—Authority over local fishery issues as allowed by the legislature
- Local—Traditional fishing territories and stewardship enforcement

He then explained the following local owner-operator structure and conservation practices that are key to keeping the lobster population vibrant and responding to conservation concerns:

Local Owner-Operator Structure

- Apprentice program to let newcomers into the fishery
- License and tags assigned to an individual with a vessel; no corporate ownership; no sale or transfer of licenses or traps allowed
- Territory fishing structure in which fisherman are not allowed to cross into other territories. Territory access is handed down generationally.

Lobster Conservation and Fishery Stewardship

- No take of pregnant females (v-notch individuals) or oversized and undersized lobsters (all caught lobsters are measured).
- Trap fishing only (no dragging) and trap limit (social economic measure).
- Escape vent (so undersized lobsters can get out of traps).
- Biodegradable escape panels—no 'ghost' gear.
- Designated fishing areas by uniquely colored buoys.
- Transitioning to sinking ground lines for Right Whale conservation.

David Goethel, New England Fishery Management Council

David began by saying that a lot has happened since the Magnuson-Stevens Act in 1970s tightened federal oversight on local fisheries in the name of conservation. He told a story about how in previous generations, the fishermen figured out that if they fished at night in the spring, then two or three years later there would be no harvest of cod. More recently, science has shown that the reason for this observed phenomenon is that cod spawn at night.

David noted that poor enforcement in the 1980s was one of many factors in the overfishing of Georges Bank and the entire region. By the1990s when Georges Bank was closed, enforcement was quite vigorous. The movement of large offshore boats into the Gulf of Maine caused overfishing there and resulted in the 30 pound trip limit for Gulf of Maine cod, which was often less than the weight of a single fish. David said that one size fits all federal management does not work because it does not account for regional differences.

David recommended that the inshore and offshore fisheries need to be managed differently by the federal government. He suggested establishing a regional fisheries council to create local regulations that work. David described how in 2010, the fishing areas were divided into sectors, which he said reflects economics not place-based resource realities and is having several unintended consequences. He observed that the policies of the federal government are resulting in consolidation of the fishing industry and reductions in the small-scale fishery. He stressed the need for major changes in the fishing industry to address these issues.

Boyce Thorne Miller, Northwest Atlantic Marine Alliance (NAMA)
Boyce discussed options that NAMA is helping make possible to prevent large changes in the character of the fishing industry in New England and to help enable community fishermen to fish sustainably and profitably. Through marketing and policy initiatives, they are helping respond to some of the unaddressed consequences of the current management regime, which is driving consolidation of the fleet into fewer and larger boats and fishing operations. She said NAMA believes that the small-scale fishing fleet consists of fishermen who have a greater sense of stewardship, and by virtue of size are less damaging to the fish habitat. So retaining diversity in the New England fishing fleet is a priority. She suggested an approach that would initially separate the small scale boats inshore and larger scale fishery offshore, and ultimately establish smaller, ecologically defined inshore areas, similar to the lobster fishery model. Boyce said that the input of fishermen is vital and necessary to providing finer scale information about the status of fish populations and to provide input about how these fisheries are managed. She emphasized that an effective collaborative interaction between management officials and fishermen is needed.

In order to help maintain small scale fishery operations through the transition to management based on catch limits or catch shares, NAMA is helping establish collaborations between fishermen and consumers through Community Supported Fisheries (CSFs) modeled after Community Supported Agriculture. Consumers pay up front for a weekly share of the catch from participating local fishermen. The direct marketing enables the consumer to get fresher fish at a reasonable price, and it provides a better price to the fishermen for sustainably caught fish. This establishes a direct relationship between fishermen and consumers that develops a base of political support for local fisheries and keeps local catch in the local food system. As an example, Cape Ann's CSF in Gloucester, Massachusetts, has built to about 900 shareholders per season and annually brings an estimated $1 million into the fishing community. This approach helps bring income to fishermen struggling to make a living under the changing federal fishery management system. NAMA advocates a bottom up approach to management that would give fishermen and their communities more influence over how the major federal law governing fishing is implemented and how goals to recover fish populations are best achieved.

Questions from participants to the panelists:

Why can't the groundfishing industry implement the same type of governance as the lobster industry?

Lobster is just one species whereas the groundfishery consists of many species located farther offshore for which federal jurisdiction does not allow for local governance structures.

Why isn't species habitat included in the current fishery research?

The groundfishery uses mobile gear and can move from area to area, while lobstermen are responsible for one home area. They "own" it and are responsible for it. Lobstermen are highly territorial. As David Goethel mentioned earlier, fish spawn at night. So "12 hours for the fish and 12 hours for the fisherman" is good conservation policy. It is the way it used to be informally, but it is not like that now, which is the reason for the collapse. The groundfishery, which is mostly done in federal waters, is not regulated by territory so there is a disproportionate amount of large to small vessels taking fish. This led to a crash in the local fishery industry. The larger commercial boats are not new, and they won't go away. They are a result of tax policy from the 1990s, a 15% tax break off total take, which is a large tax credit encouraging many new fishers to fish. There used to be fishery infrastructure along the whole of coastal Maine that would support local fishery economies. The catch share system also rewards big boat operators and penalizes small boat operators. There are no provisions for getting smaller boat operations back into business once they get out. And in Downeast Maine, if you are a small boat operator it is hard for you to lose 2 or 3 days catch traveling to where you can interact with management representatives.

From participant: Case in point from Florida: Coastal gillnetting caused lots of problems in Florida and 80% of the public was in favor of banning it, so it passed.

Response from panel: That wouldn't work in New England because the federal government wouldn't allow the state to go off on its own. Very little of groundfishing gear is in state waters; unlike Florida The catch share system rewarded the larger vessels with larger shares because it was not possible for the smaller boats to go out and fish. This means that the smaller scale fishing industry is limited and most likely in the future, not viable—unless there are major changes in management. To put it in perspective in terms of equity, the GOM coastal fleet almost never produced more than 15% of landings. They need to manage this area so that the 85% that is used by the inshore fleets can be productive.

Why isn't there more political support to help out the smaller fishing industry?

The large fishing boats and multiple boat operations have more money and more political clout.

Lessons Learned:

- Match the scale of the boat to the scale of the resource; and the scales of management to critical ecosystem scales.

- An effective mechanism for collaborative interaction between management officials and smaller scale fishermen is needed to provide finer scale information about the status of fish populations and to provide input about how the Gulf of Maine fisheries are managed.

- Employ alternate mechanisms, such as Community Supported Fisheries (CSFs), to help economically sustain local fishery until fundamental governance changes can be made. However, at this point, CSFs and other local markets need to be at a much larger scale to economically sustain fishery owner-operators in New England.

- When you're able to establish good relationships between fisherman and scientists, you can identify the right questions for effective management.

- In an adaptive management approach, recent spatially focused research findings could help identify and propose adjustments to federal fisheries management, and localized pilot studies could help determine the most effective approach to recovering the fishery.

National Policy Panel: Enhancing Adaptive Decision Making in Collaborative Settings

Moderator: ***Lynn Scarlett, Resources for the Future and former Deputy Secretary of the U.S. Department of the Interior***

Panelists:
Robin Alden, Penobscot Bay East Resource Center
Charles Curtin, Resilience Design Group, Antioch University New England, and North Island Science Collaborative
Will Hopkins, Cobscook Bay Resource Center
Marvin Moriarty, U.S. Fish & Wildlife Service, Northeast Region

Opening Remarks by Lynn Scarlett

Lynn touched on the importance of deciding where we want to get to and design a governance route to get us there. She defined governance as the formal and informal rules, processes, and structures used to make decisions. She noted that if you have prescriptive rules instead of performance rules, you may not be able to adjust your course of action when necessary. She posed the following questions to consider when designing a governance infrastructure that can make adjustments in response to new information:

- What is the ability and mechanism to incorporate new participants in the process?
- To what degree does government allow a chosen course of action?
- What is the ability of any governance structure to identify, correlate, and prioritize management options?
- How do we set up rules that reward adaption and collaboration?
- To what degree do management constraints differ across institutions, jurisdictions, and sectors and, given those constraints, how can collaboration be encouraged?

Lynn then posed a series of questions directly to the panelists, inviting them to speak about how their organizations are managed and governed, who is involved in decision making and how decision makers are selected, how partnerships can be developed and function between organizations that operate under different rules for decision making (e.g. agencies and nonprofits), what kind of process is needed to make fair decisions about resources that are important to both local and national populations, how to design a dialogue about complicated scientific and policy issues with individuals who may have limited knowledge in these areas, and how to move forward when researchers and resource users reach different conclusions about a resource issue. From this roundtable discussion the following insights emerged:

- At small scales, collaborative approaches may involve anyone who is interested, and structures for decision making can be informal.

  For example, Will Hopkins described how the Cobscook Bay Resource Center, a community-based, grassroots effort, identified and successfully executed a project to improve water quality and rejuvenate the soft shell clam industry which significantly improved the local economy of Eastport, Maine. This was done through a collaborative process involving interested community members. At this scale, an informal, collaborative decision making structure that includes all interested parties worked very well because the people who made decisions were the same people who contributed time and energy to implement the project and make it a success. Over time, the Center formed a board of directors that now conducts a yearly program review and scales programs for the coming year to interest and funding available.

  In another example, Robin Alden shared the Penobscot East Resource Center's philosophy that "the people who come to the meeting are the right people to be there". With this approach, PERC has developed successful programs that support both a sustainable ecosystem and fishery in their community.

- Clear guiding principles, transparency, buy-in, and accountability are key to good governance and in turn to adaptive governance.

  Charles Curtin observed how these variables are common to effective governance structures across resource types and around the world.

- The scale of governance structures should match the scale of the resource.

  Charles identified the approach to fisheries in Maine as an example of this. In the lobster fishery, a regional body with mechanisms for input from resource users established a management system that restricts small-scale fishermen to individual zones within three miles of the coast, and larger vessels to offshore waters. A multi-state

organization with a structure that enables input from each state oversees the management of the inshore fishery, while a federal agency enforces the rules associated with the offshore fishery.

Robin Alden observed that governance structures that enable participation and input from local resource users are more likely to achieve resource conservation goals because local users have a direct stake in the sustainability of the resource.

Will Hopkins recommended first determining which scale of decision making will have an impact on the issue being addressed, and based on that, identifying which decision makers to invite to be part of the discussion. Robin noted that some issues can be affected by decision making at multiple scales, so communications and policy strategies need to be targeted to decision makers at multiple levels.

- Some agencies are trending toward collaborative approaches with communities because this is seen as more effective than litigation in achieving desired resource outcomes.

  Marvin Moriarity talked about how he encourages his staff at USFWS to begin by working with NGOs and other organizations within communities to ask what is valuable to the community. He also mentioned efforts underway to coordinate among agencies with overlapping objectives before approaching a community so that community members are not asked to duplicate their efforts to provide input.

  Will noted that even for NGOs, training in collaboration skill is required to ensure staff are able to work in a cooperative way.

  Lynn shared how when she was at DOI, she created a conservation working group that pooled knowledge, created collaboration training for staff, and incorporated performance measures for collaborative measures. In addition, DOI developed regulations for NEPA that allowed for an option developed through a collaborative effort to be included as one of the alternatives considered in the decisionmaking process.

- To get the most accurate information about a resource, it is critical to review both local knowledge based on direct observation and experience with the resource and scientific research.

- When findings from research conflict with observations based on local knowledge, it is important to ask questions to determine the cause of the divergence in findings. A process for joint fact finding - collaboratively designing research, monitoring, and evaluation of findings – can result in more comprehensive and accurate information.

- It is important to design decision making structures that are capable of funding, tracking, and managing an issue over long time periods.

  Charles observed that in some cases it takes about 20 years to even know if you have success and most funding lasts about 3 to 5 years, saying "We're working on decadal solutions to 100-year problems."

Appendix A
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Appendix B

Mind Map Exercise:
Successful Adaptive Management and Governance Approaches for Addressing Climate Change

Trunk of tree Viable funding*******		
Themes (Limbs)	**Applications (Branches/Twigs)**	**Examples of Successful Approaches (Leaves)**
Develop climate change management tools**	Advisory Boards Provide want managers need	
Scenario planning*—rising water	Contingencies—USACE enhanced adaptive management Pump stations	Florida
Regional Workshops	Assessment of impacts and vulnerabilities	Simulated climate change adaptation planning—Sky Island Alliance
Resiliency**		
Oceans Act	Advisory Committee Ocean Management Plan	Sites for wind energy development
Communication infrastructure*	Web-based database case studies Alpine Stewardship Programs—sharing data	Cake ex (?)
Accountability****		Las Cienagas National Conservation Area
Education****	High School/Middle School Higher Ed Workshops Eco Programs for Underserved Youth	Climate Change Backpacks Antioch University New England Internships Earth Advocates—Green Leaders for the Environment
Identify and generate down-scaled climate change information*	USFWS Landscape Conservation Cooperatives	LCC Climate Change Implementation Plans
Conserving green infrastructure*	Working with utilities for climate change adaptation Implement floating-boundary preserve structure Convene private-public conservation partnerships NGOs and Forest Service working together Identify collective action strategies and key decision makers Interactive incorporation of climate change plans	Florida Governor's Climate Change Task Force Lake Sunapee Watershed Climate Adaptation Plan New York-New England Family Forest Outreach Initiative Hampton Road Regional Green Infrastructure Plan
Develop local climate action plan***	Early stakeholder involvement in setting strategies* Diverse stakeholder involvement	Cambridge Climate Emergency Congress Neighbors Meeting Neighbors: Cool Monadnock
Leadership***		Post-Katrina reconstruction
Reassess legal framework**	Change statutes to allow action	Magnuson-Stevens Act
Carbon emissions reduction**	Home carbon footprint feedback loop	Metro-Boston communities

*Each asterisk equals one colored dot. Each colored dot represents one 'vote' by a participant on which of all of items on the Mind Map tree are the most important or should be the highest priorities.

Appendix C

Characteristics of Effective Adaptive Governance

For purposes of the discussion at the Rendezvous, governance was defined as the structures and rules for making decisions. Participants noted that good governance is characterized by accountability, fairness, leadership, transparency, partnerships, and clear and frequent communication. During the concluding panel, it was observed that adaptive governance, which is required for collaborative adaptive management, features these same attributes, with the following additional characteristics:

- ❖ Ability to change management actions, as well as underlying assumptions and objectives, in response to new information
- ❖ Ability to incorporate new participants and to engage stakeholders in stages/topics in which they are interested
- ❖ Mechanisms to reward innovation, collaboration, and adaptation

Other observations about governance in general and adaptive governance specifically that were made during the Rendezvous included:

- Good adaptive governance structures and processes need to be put in place up front so that when new scientific, technical, or experientially-based information becomes available, decision makers have the ability to use it and adjust if needed. In this sense, Charles Curtin referred to adaptive governance as one of "the pre-conditions for success" in collaborative adaptive management.
- Enabling adaptive governance often involves revising decision-making processes, although major structural overhauls are not always necessary. Sometimes infusing good governance practices into existing management structures is sufficient, as was done when incorporating collaborative processes into the U.S. Department of the Interior NEPA decision-making process.
- When designing governance structures, think about how decisions at one scale affect other scales and whether governance structures need to be linked, as well as how the framework should be tailored to local conditions and cultures.
- Match the scale of governance to the scale of the resource and resource use. For some resource management challenges, the overarching decision-making frameworks are nationally based, such as for federal management of public lands. In other cases, such as New England forest management, decisions are made at multiple scales and a larger number of parties are directly engaged in governance because land is owned by private and not-for-profit entities in addition to the public sector. Even within this context, different governance structures are more effective under different circumstances. Specifically, in sparsely populated northern New England, regional conservation plans are easier to implement, whereas in densely populated southern coastal New England, a community-by-community approach is more effective.
- Developing a larger inclusive vision of a natural resource use or ecological challenge is often necessary for adaptive governance to be effective.
- All of this involves building partnerships of individuals, organizations, and agencies committed to a larger vision that incorporates their own priorities but inevitably is tied to a larger positive benefit for the linked social-ecological system.

- Taking the time to build trust through continual communication, consistent follow through, and smaller successes is key to creating and manifesting the collective vision.

- Governance needs to be considered at every step of collaborative adaptive management, especially in the development and evaluation of scientific monitoring. As Steven Courtney reminded us, sustained dialog between science-competent managers, management-savvy scientists, and the resource users dependent on the decisions is critical to achieving desired outcomes.