Participatory Modeling of Recreation and Tourism in the Northern Forest

Principal Investigator: Lisa Chase
University of Vermont Extension, Lisa.Chase@uvm.edu
11 University Way #4, Brattleboro, VT 05301
Collaborator: Roelof M.J. Boumans, Gund Institute for Ecological Economics, University of Vermont
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Using a participatory process, we developed a dynamic computer model illustrating complex relationships associated with recreation and tourism in communities of the Northern Forest. Evaluation of the model and modeling process revealed that, while the model holds potential as a decision-making tool, the process has already had positive impacts on community capacity including fostering dialogue, gaining new perspectives, and helping to build consensus.

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Project Summary

Rationale:
Recreation and tourism in the Northern Forest have a long history of contributing to the economy, influencing the culture of local communities, and impacting the natural environment. Although many rural communities are quick to embrace tourism for its perceived economic benefits, concerns exist regarding negative social and environmental impacts and inequitable distribution of economic benefits. An improved understanding of the opportunities and threats associated with rural tourism can help communities design tourism plans that are consistent with their goals and visions for the future.

Methods:
1.We conducted participatory modeling workshops in six communities in the Northern Forest, with two sites in New Hampshire, two in Vermont, and two in New York. Follow-up workshops were held in selected communities.
2.With guidance from experienced facilitators and modelers, workshop participants created computer models that describe recreation and tourism issues in their communities.
3.We combined components of the six community models to create a general model that can serve as a base model for Northern Forest communities. We tested the general model in one community.
4.We evaluated the model for its utility as a decision-making aid, and we evaluated the modeling processes for their impacts on building community capacity.

Findings and Outcomes:
Evaluation results indicate that the model has potential to help communities make informed decisions about tourism development, however the base model requires additional inputs and the user-friendly interface needs to be further refined. Although the model itself needs to be further developed, the modeling process has already had positive impacts including strengthening relationships, promoting systems thinking, and helping to build consensus. One of the most interesting results was a shift in thinking regarding “quality of life.” When workshop discussions began, participants were focused on how to increase tourism. As the workshops progressed, community members shifted their focus to implications and trade-offs of this development, and discussed how different options would be best for their communities’ overall welfare. This shift in thinking led to a model representing quality of life, as defined by community members.

Implications for the Northern Forest Region:
A STELLA computer model with a user-friendly interface and step-by-step manual is now available for communities in the Northern Forest to examine tourism and recreation issues. While future research is needed to evaluate the effectiveness of the model for decision-making, the process has been shown to be useful for fostering dialogue, gaining new perspectives, and building consensus.

Background and Justification

- The rural economic landscape is changing. The loss of many manufacturing plants and the growth of industrial agriculture have severely limited small communities' options for economic development. Many communities have come to rely on tourism as a way to diversify revenue in resource-dependent economies (Sinclair, 1998; Wilson et al., 2001).
- Many cultural attractions are supported by tourism and even created for tourists, yet tourism can diminish the small-town charm and sense of place appealing to residents and tourists alike (Krannich & Petrzelka, 2003).
- Traditional economic thought would indicate that simple growth in the recreation and tourism industries would benefit everyone. However, it has often been argued that biophysical and psychological limits to growth exist.
- An improved understanding of the opportunities and challenges associated with recreation and tourism can help communities design plans that are consistent with their goals and visions for the future. Daly and Farley (2004) explain: "Three critical questions guide economic inquiry, and there is a clear order in which they should be asked:
    1. What ends do we desire?
    2. What limited, or scarce, resources do we need to attain these ends?
    3. What ends get priority, and to what extent should we allocate resources to them?"
- Many attempts have been made to answer these questions and to identify significant components of economic systems and their impacts on well-being, but how do community members themselves perceive these ideas?

Background and Justification - continued

- Keogh (1990) emphasizes the importance of participation in tourism planning and decision-making evaluating many tourism impact and resident attitude studies. He explains that the public often perceives the negative impacts of tourism development as being greater than the positive economic gains, potentially resulting in negative feelings of the residents towards tourists and tourism.
- One method for involving the public in planning processes is participatory modeling. Participatory computer modeling is a “process for involving stakeholders in the conceptualization, specification, and synthesis of their knowledge and information into dynamic computer-based simulation models” (van den Belt, 2004). These models are developed to represent a particular situation in the participants’ lives, thus providing a space for community members to come together, discuss the issue at hand, and possibly come to a joint, deeper understanding.
- While perhaps not typically seen as a method for evaluating economic well-being, computer modeling has often contributed to problem solving by providing decision-making support in complex systems.
- Dynamic model programming software allows for the quantification of components so that alternative scenarios can be simulated (Costanza & Ruth, 1998). For example, the complex system of relationships associated with tourism in a particular community can be mapped out and quantified. Then variables can be changed to examine the effects. Simulations can be created that estimate how an increase in the number of tourists will impact different businesses, traffic patterns, land prices and other variables that can be incorporated into the model—or not—as a community sees fit.

Background and Justification - continued

- The goal of this research is to develop a dynamic computer model illustrating all components and factors of the economics of recreation and tourism industries as perceived by community stakeholders through a participatory process.
- A user-friendly interface allows communities to utilize the model and evaluate the broad range of benefits and challenges associated with recreation and tourism development, as well as provide them with a decision-making and consensus-building tool. Specific objectives of this research include:

  Develop a general model encompassing six site-specific models created at participatory modeling workshops;

  Tailor the general model to one community through the incorporation of data specific to that community;

  Evaluate the usefulness of the general model as a decision making tool and also the modeling process as a method for consensus building and informing community decisions.

Costanza, R. & Ruth, M. (1998). Using dynamic modeling to scope environmental problems and build consensus. *Environmental Management, 22*(2), 183-195.

Daly, H.E. & Farley, J. (2004). *Ecological economics: Principles and applications.* Washington: Island Press.

Keogh, B. (1990). Public participation in community tourism planning. *Annals of Tourism Research, 17*, 449-465.

Krannich, R.S. & Petrzelka, P. (2003). Tourism and natural amenity development. In D.L. Brown and L.E. Swanson (Eds.), *Challenges for rural America in the twenty-first century*. University Park, PA: Pennsylvania State University Press.

Sinclair, M.T. 1998. Tourism and Economic Development: A Survey. *The Journal of Development Studies, 34*(5), 1-51.

van den Belt, M. (2004). *Mediated modeling: A system dynamics approach to environmental consensus building.* Washington: Island Press.

Wilson, S., Fesenmaier, D.R., Fesenmeir, J., & van Es, J.C. (2001). Factors for success in rural tourism development. *Journal of Travel Research, 40*, 132-138.

Methods

- To develop and assess computer models of recreation and tourism through participatory workshops, six communities were chosen as test sites using a snowball sampling method with an important factor being level of interest regarding the project.
  1. Saranac Lake, New York
  2. Wilmington, New York
  3. Northeast Kingdom, Vermont
  4. Franklin and Grand Isle Counties, Vermont
  5. Colebrook, New Hampshire
  6. Carroll, New Hampshire
- Once the communities and participants were selected, a full day workshop was held in each community. In each workshop, the goal was to develop a scoping model, or visual diagram, representing the tourism and recreation industries unique to each community.
- Workshop participants were asked to discuss all aspects of recreation and tourism, and similar to an integrated assessment model, the goal here was to develop an illustration of the whole system representing a general agreement on how it functioned.
- A modeler, using STELLA software (available at http://www.iseesystems.com/) projected on a large screen for all participants to see, worked with community participants to lay out the structure of the model by taking the components identified and using the conversations to create links and ties between the variables. Participants collaboratively defined relationships and connections.

Methods – continued

- From September 2005 to December 2005, this project was incorporated into a Service-Learning class at the University of Vermont. After all of the workshops were complete, the six models were brought into the classroom where the students worked with the faculty and communities to more thoroughly develop the models by defining variables, equating relationships, and inputting data.
- Second workshops were held in Wilmington, NY and Franklin and Grand Isle Counties, VT to inform the development of a general model.
- Community participants were shown the models and the modeler explained the developments that had been made. Participants discussed the changes, whether or not they felt the model reflected their community, and components that they felt were still missing from the model. Students took notes recording these comments to help in further development of the models.
- A third workshop was held in Grand Isle, VT after a user-friendly interface and general model were developed.
- After the six initial workshops, 70 evaluations were collected. In this evaluation, participants were asked what they valued most about the workshop and how useful the model would be for decision-making.
- Questionnaires also were collected from participants after the second and third workshops in Wilmington and Franklin-Grand Isle Counties. Again, participants were asked to comment on what they found most valuable about the workshop and the usefulness of the model for decision-making.

Methods - continued

Participatory Modeling Workshops

First Workshops:

Northeast Kingdom, VT
Oct 14, 2004
Saranac Lake, NY
Oct 21, 2004
Colebrook, NH
Jan 19, 2005
Carroll, NH
May 17, 2005
Wilmington, NY
Jun 7, 2005
Franklin County, VT
Oct 25 , 2005

Second Workshops:

Wilmington, NY
Oct 13, 2005
Franklin County, VT
Dec 6, 2005

Third Workshop:

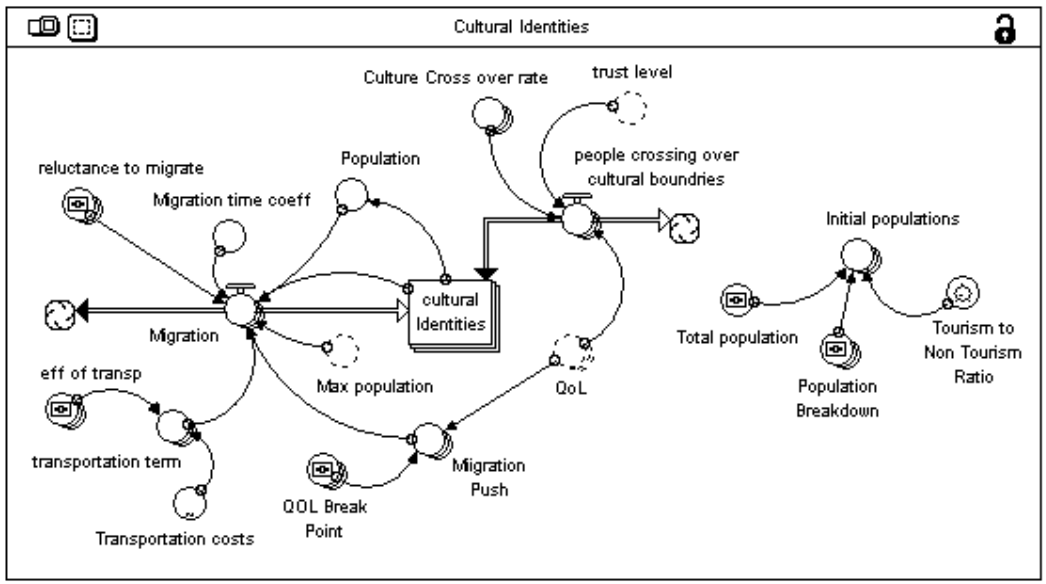
Franklin County, VT
May 15, 2007

Workshop in the Northeast Kingdom of Vermont

Results and Project Outcomes

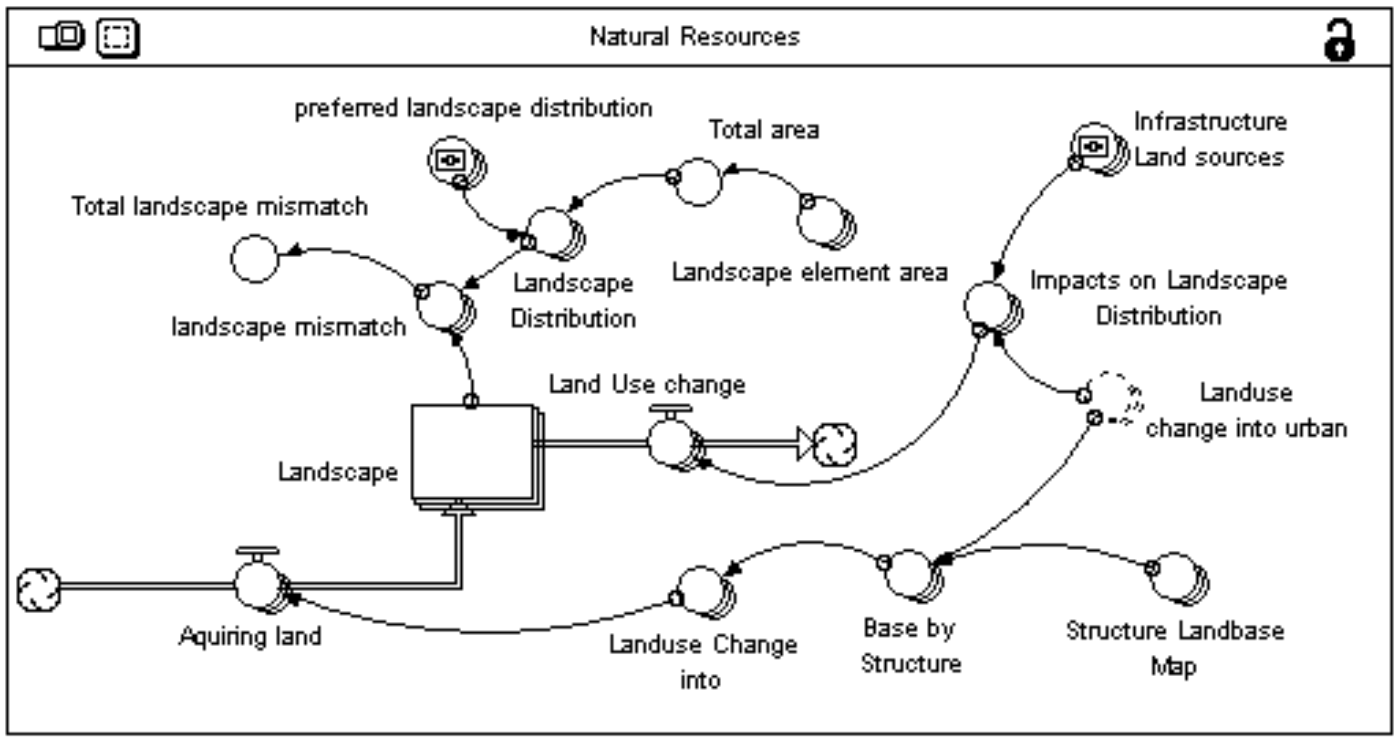
Model Description:

- The general model was developed containing six main sectors: Cultural Identities; Built Capital; Natural Resources; Services; Social Cohesion; and Quality of Life. Although the initial focus of the workshop brainstorming was recreation and tourism, participants began discussing the fact that development in these areas really impacted the overall well-being of their community. Therefore, the model became centered around Quality of Life, with the recreation and tourism industries just one of the many impacting variables, factored in the Service sector.
- The model illustration below defines how residents move into and out of the community, which resident groups they join or leave, and how or if residents will shift from one group to another.



Results and Project outcomes – continued

- Natural Resources were discussed in all of the communities, and this typically became a conversation of their landscapes. Because many of these communities are small, rural towns, they saw the landscape distribution as an important factor and draw for tourists. Therefore, a Preferred Landscape Distribution was created which compares what the user defines as ideal with the distribution that is actually present in their community. This sector incorporates this idea as well as determines how the landscape will change given any changes in the Built Capital sector.



Results and Project Outcomes - continued

Evaluation of the Model

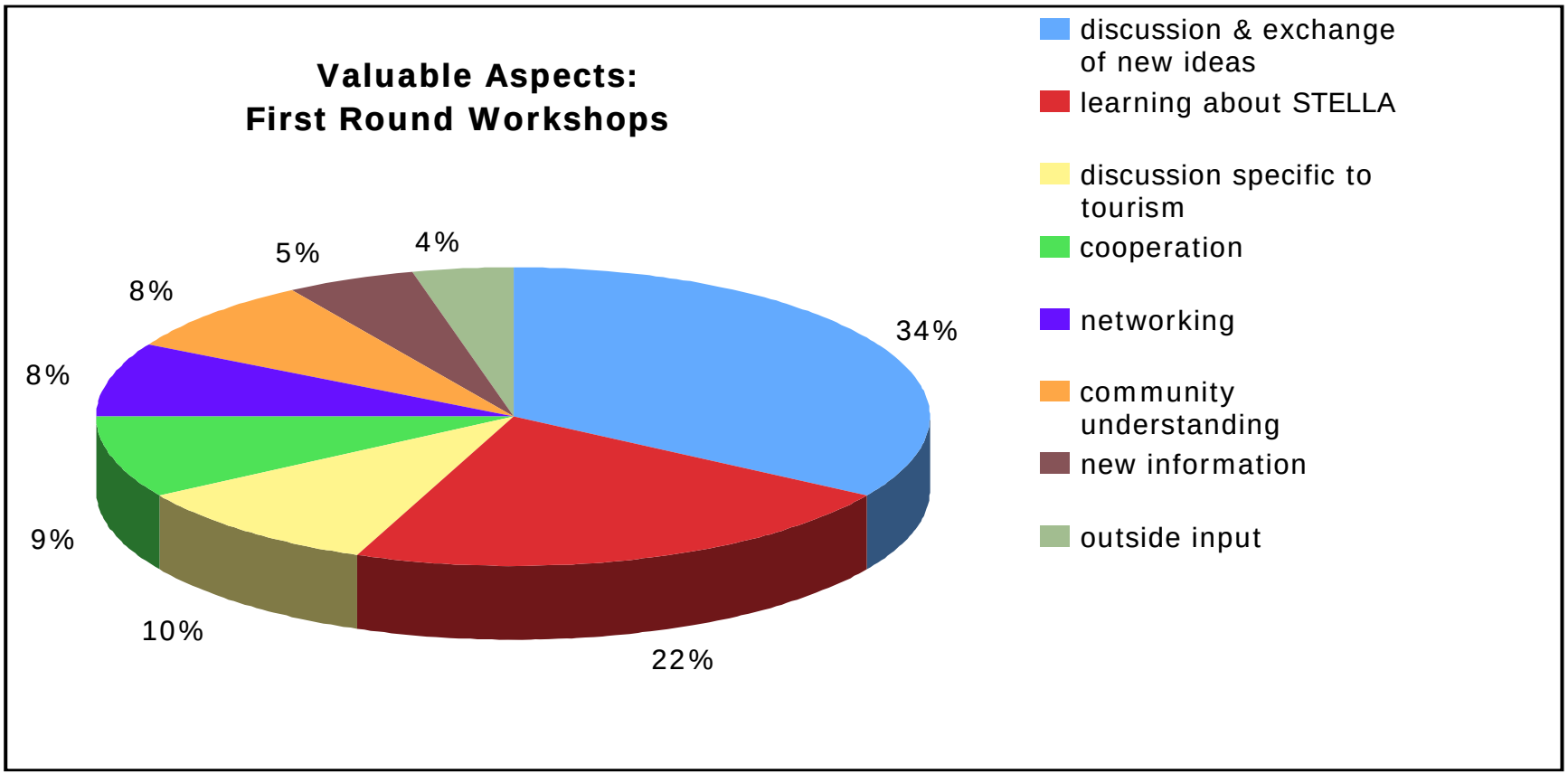
- The models represented an overall, general agreement on how the recreation and tourism industries functioned in their communities. These were all encompassing, multidisciplinary models addressing and including variables completely unique and defined by community participants.
- A comparison of findings revealed interesting changes in the participants' perceptions of their likelihood of using the STELLA model in the future. After the first round of workshops, Franklin-Grand Isle Counties' participants not only had a higher mean than the overall mean from all six counties, but they also had a higher percentage of respondents indicating a 5, or a "highly probable" likelihood of using the model in the future. In addition to this, Franklin-Grand Isle Counties' first workshop had no participants indicating a response lower than 3, while about 23% of the respondents overall indicated a value less than 3 after the first workshop.
- Comparing Franklin-Grand Isle Counties' responses after the first workshop with those obtained in Grand Isle after the second and third workshops revealed an initial increase in the perceived usefulness of the model after the second workshop, followed by a decrease after the third workshop. Perhaps more significant than the fluctuating mean value was that the percentage of respondents that indicated a value of 5, or "highly probable" of using the model in the future dropped from 25% after the first workshop to 20% after the second workshop to 0% after the final workshop.
- These results are potentially indicative of the difficulty encountered when attempting to utilize the model. This was the first time participants were actually asked to run the model themselves, and participants were keenly aware of the assumptions behind the model and challenges finding accurate data inputs. Perhaps initial optimism regarding the model was slightly diminished due to a better understanding of the complexity of modeling and data inputs.
- Further work developing the user-friendly interface and collecting data is necessary to run scenarios in which community members have complete confidence.

Results and Project Outcomes - contined

Evaluation of the Modeling Process

- In the evaluation following the first round of workshops, participants were asked to comment on what they found most valuable about the workshop. A clustering of general comment types revealed eight different categories into which the open-ended comments were grouped. These categories, in order of comment frequency, are: 1) discussion and exchange of new ideas; 2) learning about STELLA and the potential for modeling; 3) discussion specific to tourism; 4) cooperation and interaction; 5) networking and meeting new people; 6) better understanding of community and its issues; 7) new information; and 8) outside input from the university. Discussion and exchange of new ideas was the most frequently provided comment type, making up 34% of all comments to this question. Second most frequent with 22% was the cluster of comments pertaining to learning about STELLA and modeling.
- Participants were asked this same question regarding the most valuable aspects of the workshop after the second workshop for Franklin and Grand Isle Counties. The comments responded were: 1) Networking and reconnecting with UVM representative and community members; 2) Further development of understanding the capabilities of a model; 3) Coming to an understanding of how STELLA really applies; 4) The discussion about what went into the model and how it might be used; and 5) To see how the information we gave at the last meeting impacted the model. Clustering here revealed that 4 of the 5 comments (80%) pertained to learning about the STELLA model and the potential for modeling. The last comment valued networking and reconnecting with community members.

Results and Project Outcomes - continued



Results and Project Outcomes - continued

- Similar to the question asked in the evaluations after the first and second round of workshops, in the evaluation following the third workshop in Grand Isle County, participants were asked, “What did you find most valuable about the workshop today? If you participated in previous workshops, does this differ from what you found most valuable about the overall participatory modeling process? Please comment.” The six comments received regarding what the participants found most valuable about the third workshop were: 1) another step closer to understanding; 2) a step in the right direction; 3) group discussions about the participatory modeling process itself; 4) understanding of where other community members are coming from; 5) a vision of how the model could work; and 6) the model demonstration and how it helped to understand the complexity of the process.
- Clustering here revealed the most frequent comment type to be gaining a better understanding of the community and the complexity of issues with 50% of the comments falling into this group. The second most responded comment group was learning about the STELLA model and the potential for modeling with 2 of the 6 comments. The last comment valued the discussion of the overall modeling process.
- According to the data from the written evaluations, participants in this process indicated that the process has fostered dialogue, helped them to gain new perspectives and helped to build consensus and inform decision-making.

Results and Project Outcomes - continued

Workshop in Wilmington, New York

Implications and Applications in the Northern Forest Region

- While participants' evaluations indicated a positive response regarding their intentions to use the STELLA model in the future, this would require much more work on the model in terms of data collection and calibration, as well as more assistance in facilitating the use of it. This is certainly not an unrealistic goal, and with continued community interest and further research and modeling time, this STELLA model holds potential as a decision making tool.

- The participatory modeling process has already had positive results. Personal observations, and even the form which the model ended up taking, suggest a deeper understanding of the impacts of recreation and tourism among participants. What started out as a brainstorming activity to generate all aspects and components of recreation and tourism quickly became a discussion of quality of life. This idea was reflected in the shape of the model, which became centered around quality of life, with the economy, and tourism and recreation industries being just one small part of a much bigger picture. Enabling community members to come to this conclusion and realization jointly shows the power of this participatory process as a method for understanding the impacts of recreation and tourism.

- Not only did the participants gain a deeper understanding of the impacts of recreation and tourism development, but the environment in which they did this enhanced community vitality. As recognized by respondents in the evaluations, this process set the stage for participants to come together, share ideas, discuss their community, and jointly come to a deeper understanding. Perhaps extending the length of the research to follow up with the community members may be the only way to conclusively determine if this participatory modeling process has helped to inform decision-making, but based on the participants' responses to the written evaluations, they seem to feel as though the information obtained will be useful.

Implications and Applications – continued

- One of the most interesting, and perhaps unexpected, contributions of this project stemmed from the shift in thinking on the part of the participants. Citing Meadows (1996), Costanza (2000) lists five general principles of a successful envisioning process, one of which being, “In order to effectively envision, it is necessary to focus on what one really wants, not what one will settle for.” While we did not set out to accomplish a formal envisioning process, our modeling exercise was similar in its effort to help participants think deeper about the goals of their community. When discussions began, participants focused on how to increase tourism. The initial goal of participants seemed to be to evaluate development options to determine how to further the industry. As the workshop progressed, community members seemed to shift their focus to implications and trade-offs of this development, and began discussing what options would be best for them. In essence, they began answering the first question of economics and defining their desirable ends.

- Participants went so far as to fully answer this question by developing a representation of Quality of Life. Once participants began talking about what they really wanted, they inevitably began defining their Quality of Life, and all of the different components that impacted it.

Costanza, R. (2000). Visions of alternative (unpredictable) futures and their use in policy analysis. *Conservation Ecology 4*(1). [online] URL: http://www.consecol.org/vol4/iss1/art5/

Future Directions

- Evaluation results indicate that the model has potential to help communities make informed decisions about tourism development, however the base model requires additional inputs and the user-friendly interface needs to be further refined. Communities would like to see the model further developed and applied to their situations. We are encouraged by their strong interest, and we will continue to work with communities as long as interest continues and resources are available to support further model development and incorporation into community planning.

- Future research is needed to evaluate the effectiveness of the model for decision-making, although the process has already been shown to be useful for fostering dialogue, gaining new perspectives, and building consensus.

- The definition of Quality of Life was an unexpected outcome of this research, potentially opening the door for future research. Can community members, through a participatory modeling process, answer the primary questions of economics and develop a definition of Quality of Life? This research seems to indicate that answering the first question, or defining desirable ends, is certainly a potential outcome, but how far can this be taken? Could the model and modeling process help to evaluate scarcity of resources and the allocation of these? This research indicates that the answers to these economic questions and related questions about the definition of Quality of Life are already known by community members and academic research on these topics could be informed by community participants.

- Better data are needed to run model scenarios, especially in relation to impacts of different types of recreation on the economy and the environment.

List of Products

Publications

- Chase, L.C., S. Morse, R. Boumans. In progress. Participatory Modeling Tools for Tourism Planning. Tourism Analysis.
- Chase, L.C., R. Boumans, S. Morse. In press. Participatory Modeling of Recreation and Tourism. The 18th Annual Northeastern Recreation Research Symposium, Bolton Landing, New York, April 10, 2006.
- Boumans, R. and L.C. Chase. 2006. Participatory Modeling as a Tool for Planning and Consensus-Building. Proceedings of the Conference on What Works! Rural Entrepreneurship and Community Development in the Northeast, Burlington, Vermont, September 28-30, 2005.

Presentations and Posters

- Morse, S., L.C. Chase and R. Boumans. Measuring Tourism and Recreation Impacts through Participatory Modeling. Selected presentation. 2006 National Extension Tourism Conference, Burlington, Vermont, September 10-13, 2006.
- Chase, L.C., R. Boumans, and S. Morse. Participatory Modeling of Recreation and Tourism. Selected presentation, The 18th Annual Northeastern Recreation Research Symposium, Bolton Landing, New York, April 10, 2006.
- Ceroni, M., R. Boumans, and L.C. Chase. Assessing and Modeling Genuine Well-being in Rural Communities of the Northern Forest. Selected presentation, Third International Conference on Community Indicators, Burlington, Vermont, December 1-3, 2005.
- Boumans, R. and L.C. Chase. Participatory Modeling as a Tool for Planning and Consensus-Building. Selected presentation, What Works! Rural Entrepreneurship and Community Development in the Northeast, Burlington, Vermont, September 28-30, 2005.
- Boumans, R. and L.C. Chase. Tourism, Local Communities, and Participatory Modeling. Selected presentation, US Society for Ecological Economics Conference, Tacoma, Washington, July 20-23, 2005.

List of Products - continued

Presentations and Posters-continued

- Chase, L.C. The Vermont Tourism Data Center's Northern Forest Research. Selected poster, The Northern Forest Leadership Exchange, Plymouth, New Hampshire, May 24-25, 2005.
- Chase, L.C. and R. Boumans. Participatory Modeling of Tourism and Recreation in the Northern Forest. Invited presentation, Northern Forest Community Leadership Exchange and Northeastern States Research Cooperative, Burlington, Vermont, November 13-14, 2003.

Thesis

- Stephanie Morse. Enrolled in UVM's Rubenstein School of Environment and Natural Resources August 2005. M.S. to be received October 2007. Thesis title: Participatory Modeling of Recreation and Tourism.

Service-Learning Course

- NR 378 Integrating Analyses of Natural Resource Issues: Tourism in the Northern Forest, Fall 2005, Service-learning course co-taught by Roelof Boumans and Lisa Chase.

Website

- http://www.uvm.edu/tourismresearch/partmodel.htm