A System Based Inquiry of Public Policy Issues for Snowmobile Tourism

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Abstract

A system dynamics structure is presented for a snowmobile destination, the Keweenaw Peninsula in Michigan's upper peninsula. The structure will simulate the inter-related effects of demand; trail capacity, infrastructure, and the quality of the snowmobiling experience. The purpose of the model will be to study the short and long-term effects of various policies on issues important to policy makers, such as fluctuation in demand, environmental degradation, and profitability of businesses. The proposed structure is explained and the plan for future work is described.

Keywords: Snowmobile, system dynamics, tourism destination, public policy

BACKGROUND

For some regions, tourism is the dominant industry, and for many others it is important to their economic well-being. The Keweenaw Peninsula, which juts out into Lake Superior from Michigan's Upper Peninsula, is such a region. Because of heavy snowfalls (averaging about 250 inches per year), snowmobile tourism on the Keweenaw Peninsula has become an important industry over the last twenty years. Snowmobiling is responsible for many economic benefits: 1) jobs and their impact on the region, 2) tax revenues derived from snowmobile-related businesses, and 3) the economic impact of snowmobilers' expenditures. However, snowmobiles can have a negative impact on the environment. Their emissions can affect air and water quality. Noise pollution disturbs local communities. Local chamber of commerce, government officials, and tourism promoters therefore wrestle with competing interests, a diversity of values and opinions. With this as a backdrop authors have undertaken a long-term undertaking in which systems thinking is to play a major role.

The management of tourism destinations is complex, partly because the destinations are made up of numerous, private enterprises (including motels, restaurants, attractions, and related businesses), which cater to tourists. Often business managers or public officials make decisions (e.g., should a business increase advertising expenditures or should

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government change regulations) based on recent experience or the extrapolation of trends. This can result in poor decisions because of the inter-related nature of the tourism industry.

Although modeling for public sector management and policy is fraught with problems, the system dynamics approach can improve the intuitive understanding of the issues and can illuminate the relationships among the various parts of the whole system. Therefore, in order to better understand the nature of snowmobile tourism in the Keweenaw Peninsula, an objective of the study is to create a framework for evaluating short and long-term effects of critical policies.

System Dynamics applications to environmental issues have appeared in the literature [Ford, 1999]. There are numerous modeling studies that deal with public policy issues [Richardson, 1996]. For example, Randers {1973) studied the long term delays between application of DDT on crops and the appearance of the chemical in fish. Boyce and Goldstone (1981) applied system dynamics to urban transportation planning. Ford and Bull [1989] developed a model for use by electric utilities so that conservation policies could be simulated under a wide variety of assumptions. A realistic portrayal of the region's complex utility system was depicted in the model. Wolstenholme [1993] constructed a qualitative system dynamics model to assist strategic debate in a health service problem in Great Briton where there were multiple interests. The model assisted decision makers evaluate the effects of well-meaning policies, which would have addressed symptoms, rather than the root cause of health care capacity problems.

In a review of the literature, there is very little written about snowmobile tourism, and what is written tends to be concerned with economic impact. In some ways, snowmobiling now is similar the regulations of automobiles after the turn of the century. There are no infrastructure standards. There are no specifications for trail layouts, design, maintenance, signage, speed limits, etc.

Building on the work of Jambekar and Brokaw (1989), which developed a generic system dynamics model for tourism and Brokaw and Jambekar (1999) this paper presents a preliminary conceptual framework to build a simulation model in support of system-based inquiry into for snowmobile tourism in Keweenaw. The next section briefly describes the genesis of the problem being studied. The section following that offers preliminary operational structures, will be improved and refined over time. The paper then concludes with some general observations and need for future work.

SNOWMOBILING AND THE REGION STUDIED- PROBLEM DESCRIPTION

Although the conceptual model in this paper could be applicable to other snowmobile regions, it was being developed for the Keweenaw Peninsula. Its development was the direct result of inquiries to the authors about how to better manage snowmobile tourism. One question was whether the local tourism association (the Upper Peninsula Travel and Recreation Association) should demarket snowmobiling to the nearby population centers, especially the Minneapolis/Saint Paul area. This question had its genesis in the strange, "El Niño," winter of 1997/98. Because of the mild winters in the upper Midwest, the

Keweenaw Peninsula was one of the few with appreciable amounts of snow. As a result, the region became congested with snowmobiles. Although some businesses were happy, this congestion caused increased perceived damage to the environment, made it difficult to properly maintain the snowmobile trails, and created a nuisance for people living close to the trails.

The question of whether or not the region should demarket snowmobiling to nearby population centers is problematic. If the region does not demarket when congestion is severe, this causes local problems including environmental degradation and might result in a negative tourism experience, which could subsequently adversely affect snowmobiling in the future. On the other hand, if the region is demarketed, this promotional effort may be too successful. Because of the inter-related nature of the problem, a system dynamics approach is a useful way of examining the short and long-term consequences of policy decisions. Figure 1 displays the hypothesized system structure, including the effect of "El Nino." The reinforcing loop in Figure 1 generated the dominant behavior and hence, the problem.

Early in this study, the authors noticed the lack of availability of data for most of the variables suggested in the model. The system-based inquiry into the problem may lead to the realization by local decision makers that money should be spent to regularly gather data. The model should provide a good framework for that data collection.

OPERATIONAL STRUCTURE OF SNOWMOBILE TOURISM

Figure 2 shows the inter-relationships of four sectors, which are included in the proposed system dynamics model. Policies can affect and be affected by these four sectors. Policy management involves developing and testing the effects of a combination of several public and private policies.

The remaining section briefly describes work-in-progress operational structures of the four sectors: Demand Management, Trail and Land Management, Infrastructure Management, and Quality of Experience.

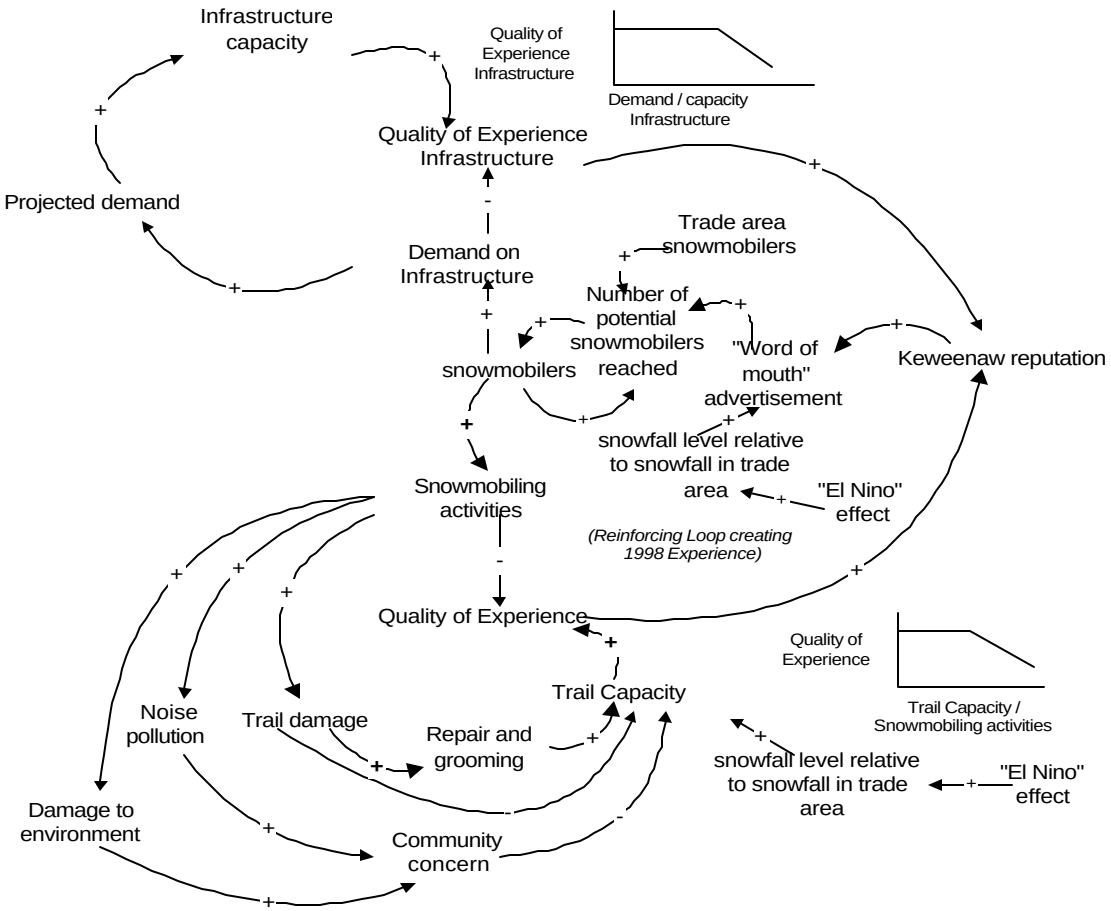

Figure 1: Hypothesis about Systems Structure based on 1998 Experience

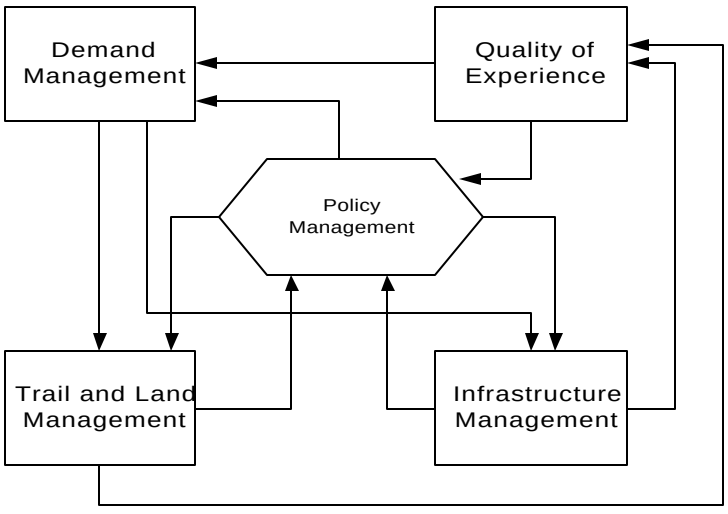

Figure 2: A System Diagram for Keweenaw Snomobiling Tourism

Demand Management: Figure 3 shows relevant stock and flow structures that capture the effect on demand of word of mouth communication due to Keweenaw's reputation and the effect of snow fall in the geographical areas that make up the trade area. Each geographical area would have to be modeled separately to capture the needed realism. The total number of snowmobilers is the output of this sector.

Land and Trail Management: Figure 4 below shows a very basic structure in which trail capacity over time can be increased with the addition of public or private lands. On a short-term basis capacity is decreased by intense snowmobiling activities and is restored through repair and grooming, possibly done by a local governing authority. The immediate restoration is normally easier if snow fall materializes after the damage has occurred.

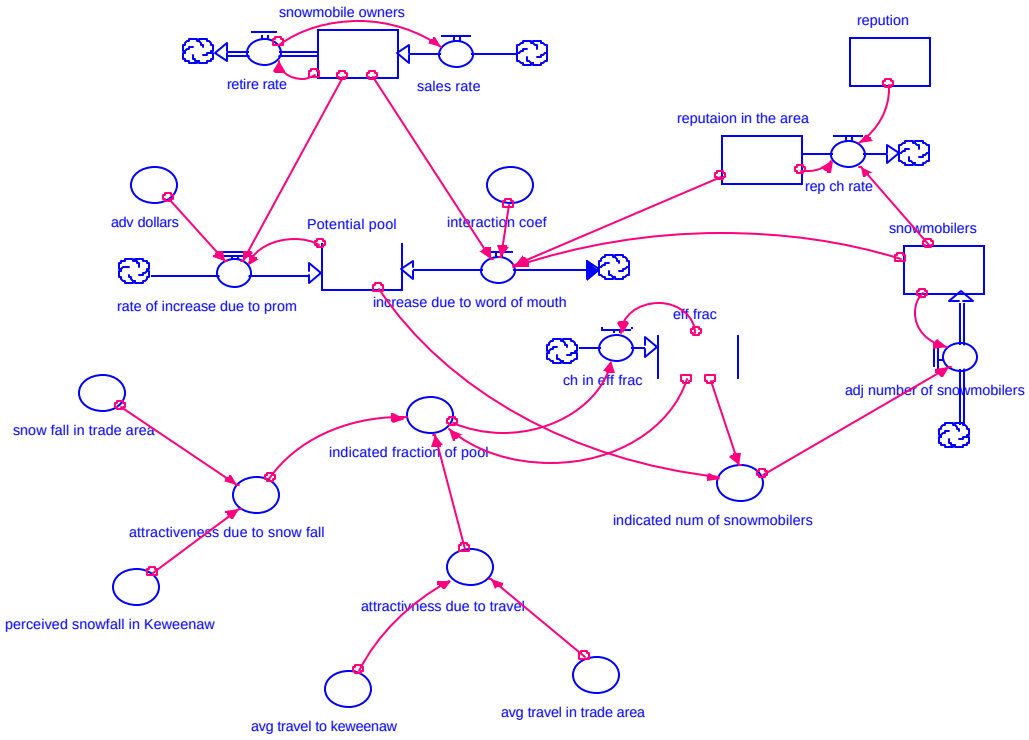

Figure 3: Demand Management

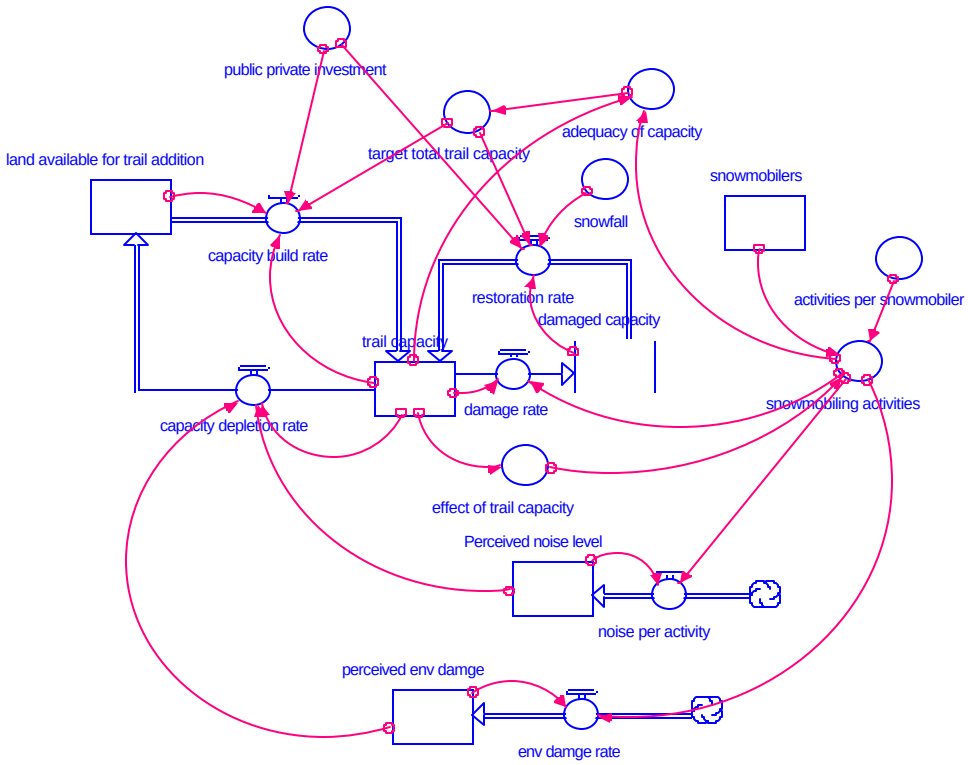

Figure 4: Land and Trail Management

Capacity depletion may occur if the some of the private trail owners choose to do so by closing out certain trails from any further use. Community concerns caused by noise pollution and environmental damage may result in restrictions on use of public lands for snowmobile activities. Currently, the Keweenaw Peninsula has plenty of public and private land still available. Additional land may be designated for snowmobiling recreational purpose, which would require additional public or private investment.

Infrastructure Management: In 1998, local businesses such as hotels, motels and eateries thrived on increased business caused by snowmobiling. Some of the business owners normally shut down for the winter and only open up for the summer tourist season. Many of them decided to stay open during the winter of 1998. Effects like this are explained in Figure 5.

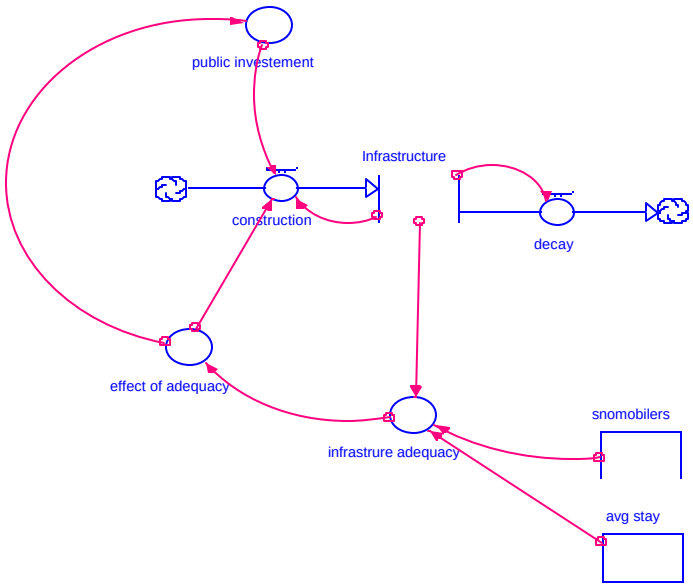

Figure 5: Infrastructure Management

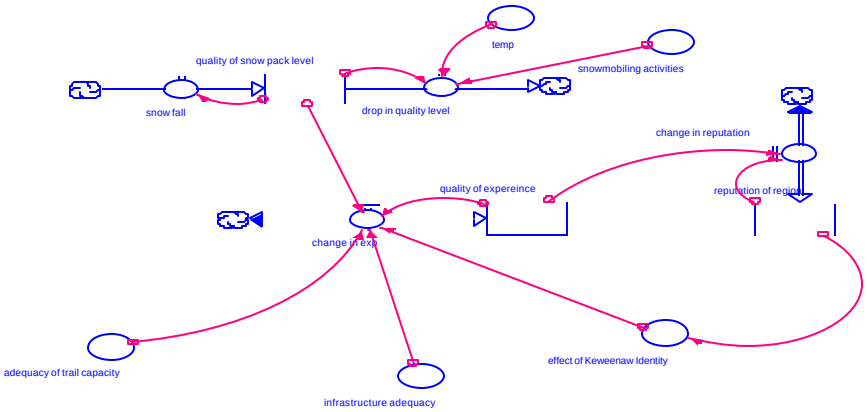

Figure 6: Quality of Experience

Quality of Experience: An important influence on demand is the quality of the experience that snowmobilers have. This is captured in Figure 6. Four factors influence the quality of experience: quality of snow pack level, adequacy of trail capacity, infrastructure adequacy and the effect of identity or reputation of the Keweenaw Peninsula. The quality of experience in turn affects the reputation of Keweenaw.

Future Research Work

The snowmobile tourism appeared to have leveled off during last two seasons and the problems obvious during 1997/98 seasons have largely disappeared from the consciousness of many stakeholders. The need to answer the questions raised before is still there, but the sense of urgency to do so is not. Hence, modeling has become interesting but more of an academic exercise at this time and hence, currently we are

looking at the distribution of various snowmobilers types from a targeted region as shown in Figure 7.

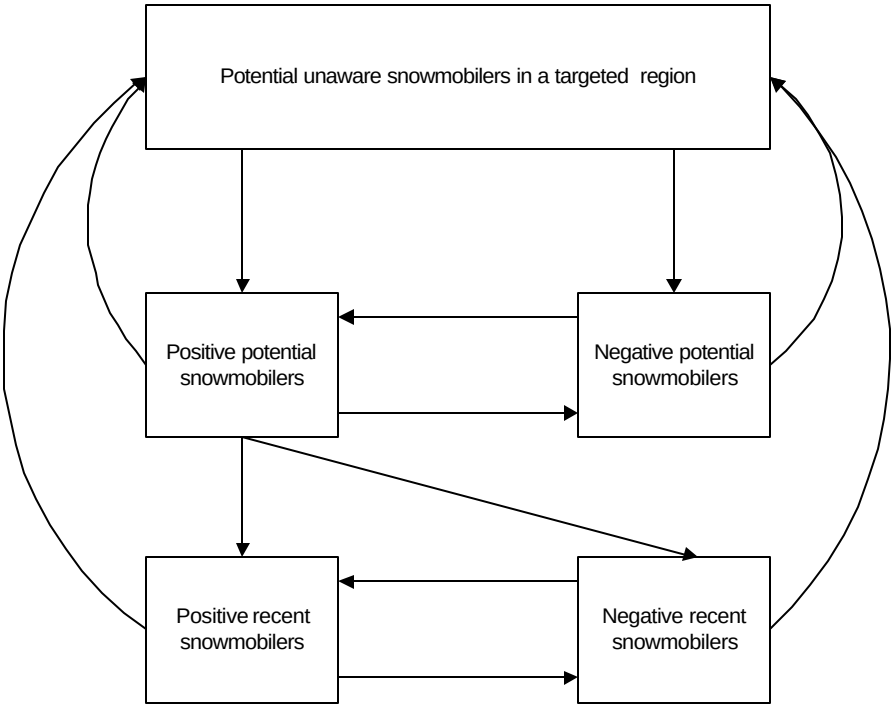

Figure 7: Distribution of Snowmobilers in a Targeted Region

The conceptual model is currently being converted into to computer based simulation model. The first objective is to create a model with face validity and to test if the model is capable of creating the 1998 experience and then to test it for consistency. As the model building process proceeds, data availability will influence adjustments to the model and plans for data collection. Once this is done, the model can be used to investigate questions that would be difficult or impossible to probe in other ways. For example, what is the long-term effect on snowmobile activity in the region if the region is demarketed one year because of heavy snowmobile traffic caused by light snowfalls in nearby major metropolitan areas? Is it a better policy to have steady promotional expenditures or should expenditures vary? If licensing requirements are changed, what are the long and short terms effects? Is strong public support of snowmobile and tourist infrastructure really needed? What level of support is best from a public policy perspective? What is the role of this support? For example, is seed fund needed, but continuous funding not necessary? How do changes in land management policy affect snowmobile activity and environmental degradation over the short and long term? What are the roles snowmobile manufacturers? Can technological solution be one solution?

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