Canoes versus birds or canoeists versus canoeists? Combining interview survey and visitor monitoring to inform visitor management in the Mueritz National Park

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Abstract: Intensive use of canoeing trails in national parks can impact both wildlife and the satisfaction of paddlers. This paper focuses on paddlers' perception of congestion in the National Park Mueritz (Germany) and the effectiveness of different management options. Our theoretical discussion is based on the economics of congestion and the social science literature on carrying capacity of recreational resources. For the empirical application, we use interview survey and monitoring data. While our results suggest a high relevance of congestion on canoeists' satisfaction, the acceptance of a quota system does not exceed 30 percent. We employ a statistical analysis to describe the effect of different use levels on the quality of the paddling experience. We further use the travel cost method for a rough prediction of the effect of pricing strategies (entrance fee) on use levels.

Introduction[1]

This paper focuses on canoeists' perception of congestion in the Mueritz National Park (Germany) and the assessment and acceptance of management interventions to reduce numbers of paddlers. The management authority of the National Park is perceiving a growing conflict between the goals of the Park's management and the increasing number of paddlers on the lakes and waterways (cf. Nationalparkamt Mueritz, 2004). As a consequence, park managers are discussing strategies to reduce use levels in order to minimise negative effects on wildlife and habitats.

In economic terms, a reduction of the number of visitors in frequented protected areas can be justified if substantial congestion costs are to be expected. Usually, economists distinguish between two dimensions of congestion costs: reduction of the recreational benefit and negative environmental effects (cf. Hanley et al. 2003). While the latter relate to impacts of visitors on wildlife and habitats (canoes vs. birds dimension), costs of congestion of recreational resources costs refer to the visitors perception of crowding and resulting reductions of recreational benefit (canoeists vs. canoeists dimension). Even though both problem dimensions are highly relevant for the management of the canoeing routes in the National Park Mueritz, we concentrate on the recreational aspect in this paper.

The central focus of our project was therefore to establish, whether paddlers in the study area feel disturbed in consequence of the high number of other paddlers at all and to what extent this may prove to be an additional justification for a management intervention. The second purpose of our project was to support the design of management instruments by attempting an ex-ante assessment of their possible effects and acceptance. For the empirical analysis we use data from an on-site interview survey amongst paddlers and long term visitor monitoring of visitor flows.

Conceptualising and measuring costs of congestion of recreational resources

Evidence of the potential impacts of congestion on the demand for recreational resources and visitor satisfaction is of obvious importance to management. Because users differ in their preferences for resource use and aversion to congestion, evidence of how such congestion effects are borne differently by different user groups is crucial to help resource mangers to more efficiently manage their resources. Unfortunately, the empirical evidence on the potential impacts of congestion on visitor demand and satisfaction is mixed. This may be a sign of the difficulties associated with defining and measuring congestion. The most widespread approach is to derive encounter measures that either (a) describe the probability of encounters by using monitoring data of the number of visitors per location, date and time or (b) describe the number of encounters an individual remembers seeing during a trip. Crowding or con-

gestion is then defined as a negative evaluation of these encounter rates, and is therefore essentially an indicator of use levels.

Most researchers subscribe to an approach that predicts that disutility associated with crowding will increase until a visitors tolerance limit is reached. This disutility is termed cost of congestion to recreationists. However preferences for quiet and undisturbed enjoyment of nature are heterogeneous. In general crowding has different relevance for different activities and its effects are perceived with different intensity by different persons (McConnell 1988). Concerning canoeing, Boxall et al. (2003) show that canoeists experience of congestion not only varies amongst individuals but also varies for different parts of a trip. Whilst increasing encounters during paddling and camping were found to have a negative effect on satisfaction, encounters at the start and end point were found to have positive effects.

Principally two different approaches to measuring the disutility or costs associated with crowding are found in the recreation literature. The more widespread are social-psychological measures, which measure individual preferences in terms of stated satisfaction or acceptability. The economic approach attempts to assess disutility in terms of revealed or stated willingness to pay measures. This approach is based on a utility theoretical framework, which assumes that an individual will be willing to pay higher access costs (travel further, pay higher entry fee) in exchange for reduced numbers of encounters if the change in congestion level is greater or equal to the lost income. Otherwise the individual will choose to keep the income and live with the actual congestion levels. This relationship can be used to estimate utility levels of recreation associated with different levels of congestion. Consumer surplus measures, which can be derived from this type of analysis can then be used to estimate welfare implications.

A central issue in the measurement of the disutility associated with crowding is that the congestion measurements that are relevant for the recreationist may not be equivalent to those that are developed by the outside observer for monitoring or analytical purposes. Jakus and Shaw (1997) suggest to differentiate between measures based on actually observed crowding and measures based on the expectation and on-site perception of congestion by respondents. They further differentiate between ex ante and ex post measures of congestion. For our purposes it is important to note, that ex-post assessment of congestion costs are conditional on ex ante expectations, because self selecting decisions such as choice of site or date of trip are made on basis of ex-ante expectations.

Building on these ideas, Eugenio-Martin and Thiene (2003) develop a rather simple concept of expected congestion to predict probability of visitation in a multi – site choice model. They use a dichotomous variable (1–0), which denotes whether an individual states that congestion reduces significantly the enjoyability of any site or not. They define expected congestion of an individual for a site as the estimated absolute use intensity multiplied by the dichotomous variable. As a result expected congestion is set to zero for those visitors who do not care about the level of congestion.

We adapt this concept for our own single-site study of the Upper Havel Trail. We assume heterogeneity of visitors sensitivity to congestion (Figure 1). Because of the increasing popularity and high use levels we assume that ex-ante expectations of high levels of congestion are relevant and a self selection of visitors is to be expected. Congestion sensitive visitors may substitute potential visits during expected high visitation periods, for example weekends or public holidays for less crowded areas or less crowded periods. As a result we conceptualise on-site rate of total visitors who perceive a congestion problem to be:

$$\frac{IPC}{N_{sd}} = \frac{(N_{sd} * IS_{isd} * PC_{sN}) + (N_{sd} * INS_{isd} * PC_{sN})}{N_{sd}}$$

where *IPC* is the number of individuals who perceive congestion at total visitation level *N* on site s and day d. IS is the proportion of visitors who are principally sensitive to congestion, *INS* is the proportion of visitors who principally do not care very much about the level of congestion. *PC* is the rate of individuals who perceive congestion costs at visitation level *N* of site *s*. For *INS* the perceived congestion *(PC)* is zero. If we assume that the proportion of *IS* and *INS* is constant over the year, the maximum rate of persons who perceive congestion can rise to *N * IS*, which should be less than 100%. Therefore we expect that the percentage of visitors who perceive congestion as a problem to increase with higher use levels, but not linear (Figure 1). The specific intercept and maximum percentages in relation to the observed use levels are an empirical issue, which we intended to investigate for the Mueritz National Park.

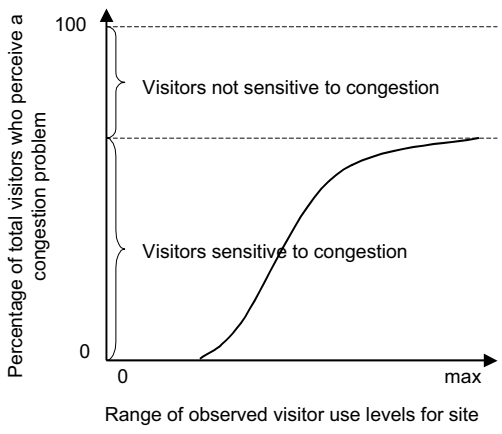

Figure 1. Conceptual model for on-site perceived congestion in relation to use levels.

Even though the relevance of costs associated with the congestion of recreational resources is largely uncontested there is an ongoing debate in economics and park planning on how to conceptualise and define acceptable levels of crowding. For practical purposes, these acceptable levels of crowding are most often framed in terms of carrying capacity. From a perspective of economic theory, the concept of carrying capacity is closely related to the concept of optimal congestion levels. From a welfare economic point of view and for a start not taking environmental costs into account, recreation site management should attempt to chose strategies which maximise recreation benefits for a given regional, national or other population, subject to both an income constraint of the population and the availability and accessibility of sites.

Although it is generally extremely difficult to deduct optimal levels of congestion empirically, these theoretical concepts have important ramifications for assessing recreation and park management options in practice.

Because users differ in their preferences for resource use and aversion to congestion, it is important to have empirical indications of use levels from where on congestion costs become relevant and how these congestion effects are borne differently by different user groups. Both theoretical and empirical findings indicate that ignoring heterogeneous preferences is likely to lead to incorrect conclusions about optimal use levels. Michael and Reiling (1997) show that failure to account for heterogeneous preferences would overestimate congestion costs. Freemann and Havemann (1977) were the first to show that an explicit accounting of how these congestion costs are distributed across users is necessary for an optimal rationing and pricing policy. McConnell (1988) shows that, if the demand for a recreational good is income elastic, rationing via price among heterogeneous users will increase the demand for some groups, even if overall demand may be decreased. The effect is to make the users more homogenous, favouring higher income groups. These theoretical result supports mangers reluctance to use price rationing in favour of setting quotas due to equity considerations. If on the other hand managers accord a high priority to development of the regional tourism economy, possible price effects which in tendency deter low budget tourism may be acceptable. McConnell (1998) contrast this result with the effects of increasing the efficiency with which a site can provide recreational benefits by increasing capacity or optimising design of the trail, which results in reductions in congestion while not decreasing demand by any one group. Knowledge of the specific points in a paddling experience, where congestion is most costly can be crucial to the design of the trip routes, resting places and portaging sites.

Study Area: Mueritz National Park

The Mueritz National Park is part of the Mecklenburg Lakes Region, which is characterised by a multitude of lakes and waterways. The Lakes Region is only some 130 km from Berlin, which makes it a popular destination for weekend and holiday trips. For German standards the forest and lakes landscape – although not a pristine wilderness – offers a certain degree of solitude.

Two paddling trails, which are both part of the larger waterways system originate within the National Park territory. The more important one of these is the Upper Havel paddling trail, which is approximately 23 km long. Paddlers may begin paddling at both ends and halfway, where there are camping sites and boat rentals. Boat rentals along the paddling route have a total capacity of around 300 canoes. Additional boat rentals in the vicinity have an additional capacity of some hundred canoes. Most paddlers require two days for the trail within the national park, even though they may continue on south for many further days. Likewise paddlers arriving from south may end their paddling trip here. There are two portaging sites within the national park. The southern entry and exit point is a lock with a portaging site.

There is a long tradition of watersports, especially canoeing, in this region, which has become increasingly popular in the years following German reunification. The long term trend of boat movements through the lock at the southern entry show that activity levels on the paddling route have more than doubled in the last ten years (Nationalparkamt Mueritz 2004).

The paddling trail passes through several lakes and lowland fens which are important breeding bird habitats. The management authority of the national park has already implemented several management measures to reduce negative effects of water-based recreation on local wildlife and habitats. While non-

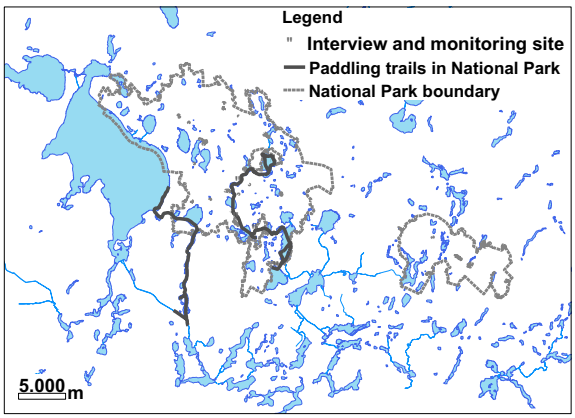

Figure 2. Map of the Mueritz National Park and the Upper Havel Paddling Trail.

commercial paddling is principally allowed (up to groups of 8 boats), motor boating and surfing are not. Resting and camping sites have been deliberately limited by the National Park Authority for conservation reasons. Resting and camping outside the official resting, portaging or camping sites is strictly forbidden. Wild resting places are barricaded with dead wood. Some sensitive stretches of the Havel and individual lakes have already been totally closed to paddling. Apart from two shorter portaging sites, paddlers can however still experience a non-stop paddling route between the most northern Kaebelick Lake and the southern exit point.

Visitor survey and monitoring data

Interview survey

Face to face interviews with paddlers passing four portaging / resting[2] sites were carried out on six weekends between May and August 2003. Interview dates were chosen to sample a range of expected visitation levels. The sample of a total of 285 interviews was drawn by randomly selecting interview partners at their arrival at the portaging site. We used a rather short questionnaire, each interview lasted on average between 8–10 minutes, because paddlers hardly accept interviews of substantially longer duration during their trip. The survey contained questions about the paddlers' current paddling trip (group size, starting and endpoint, starting time, length of paddling trip in days, nights camping during the trip, advanced planning for trip in weeks), general paddling experience (boat ownership, number of paddling trips per year, number of paddling trips in Mueritz National Park per year, membership in paddling association etc.), socio-economic variables (household size, household income, employment, age, sex, home district) and a set of questions related to perceived congestion (see below for details), the general acceptance (yes – no) of a quota system with booking on a "first come, first served"- basis and the willingness to pay a user fee in this context for the administration of this system and the maintenance of the facilities along the paddling trail at current levels (principal willingness and amount in €).

In the following, some important characteristics of paddlers and their trail use patterns are summarized. Median group size is four persons in two boats, who take a three day paddling trip with two nights spent at a camping site on the way. 58% of the visitors rent their boat on site. 39% of the visitors are day trippers who travel back and forth on one day. It is apparent that the paddling route attracts visitors from all of Germany. The average distance from the home district is 273 km. However canoeists from Berlin (30.5%), which is 130 km away, predominate. 40% of respondents decide to take the trip rather spontaneously, that is less than 2 weeks in advance, whilst 60% make their decision well in advance. Only 7% of the paddlers are a member of a canoe association. Median number of canoe trips taken per year is two, one of which is in the Mueritz Lakes Region. Two-thirds of the respondents have visited the paddling trail before. 44% of the respondents take only one canoe trip per year.

Measure of physical and perceived congestion

We attempted to assess perception of congestion levels during paddling and resting / portaging as a function of boat activity levels on the interview date by eliciting responses to following statements:

A. In my opinion, there are too many boats/people on the paddling trail today.
B. In my opinion, there are too many boats/people at resting / portaging sites today.

A four point Likert scale (fully agree=4 ; agree=3; do not agree=2; do not agree at all=1) was used. The two items (A. and B.) were evaluated both independently and as combined scale with a range from 0-6, with 6 denoting the most negative perception of crowding. The formation of this combined perception of congestion scale was found to be statistically valid.[3]

Because we are interested in explaining perception of congestion, the proper specification of measures of physical congestion is important. Boat counts were carried out for each of the interview days. Three physical measures of congestion were calculated from the data: boat activity level (number of boats passing count station on interview data), absolute number of boat encounters preceding interview (averages number of boats per hour on interview date cumulated for the hours between starting and interview time) and average boat activity levels during portaging preceding interview (averages number of boats per hour on interview date multiplied by the number of portaging points passed preceding the interview). In order to account for the fact that respondents were interviewed during and not at the end of their trip, we included the hours a respondent was paddling preceding the interview and the total length of the trip in days as additional variables in our statistical analysis.

Boat counts and correction coefficient

Regular counts of the number of boats passing the portaging site at Granzin are carried out by the National Park administration beginning from the year 2000. These boat counts describe relative activity levels at the counting points. Whilst these may be adequate for characterising relative congestion levels, for assessing management options related to regulating boat numbers it is necessary to estimate absolute numbers of boats. The interview survey was used to elucidate use patterns of boaters passing the interview stations. This data was used to calculate a simple correction coefficient for estimating the number of boats associated with observed activity levels at the monitoring point[4].

Data analysis and results

Utilisation levels

Figure 3 illustrates the results of long term monitoring of activity levels at Granzin and our corrected estimate of total number of boats on the paddling trail for the years 2000 to 2003. Peak activity levels are during public holidays in early summer. Generally high, but not peak levels are found throughout the summer holiday month. Absolute numbers of boats on the 23 km paddling trail are estimated to be 550 boats at a maximum. This is equivalent to an average density of 24 canoes per km paddling trail per day. Since approximately 40% of the canoeists paddle both up and downstream on the same day, absolute activity levels along the trail are ca. 20% higher.

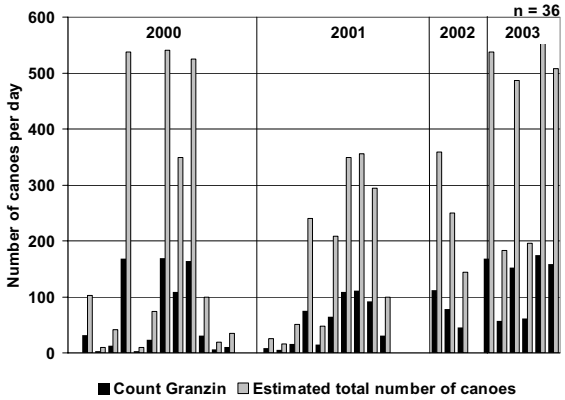

Figure 3. Range of observed activity levels and estimated total number of canoes on the Upper Havel Trail.

Levels and determinants of perceived congestion

We find that negative perception of congestion by visitors at current use levels on the paddling trail is not negligible. The percentage of respondents per interview date, who agreed and strongly agreed to the statement, that there are too many boats on the trail ranges from 30–70%. We tested various possible explanatory variables in a linear regression model to predict perceived congestion as measured with the combined perceived congestion scale. Explanatory variables were excluded stepwise if not significant at the 95% level. In particular, we tested three measures of physical congestion. These were included both as linear and quadratic terms in order to account for possible non-linear effects. Of the three measures, the general boat activity level showed to have the best explanatory effect. We find that the linear term is positive and significant whilst the quadratic term is negative and also significant. This suggests that the probability that a person perceives effects of congestion negatively, rises with higher boat activity levels but not proportionally. Implications of this finding are discussed in more detail below. We further find that variables included to correct for the fact that some respondents were interviewed at the beginning of their trip while others towards the end, have a positive and significant coefficient. These are the duration of paddling preceding the interview and total length of paddling trip in days. This suggests that the longer a person has been on the trail both in terms of time paddling on the interview day and in terms of total days spent on the trail and has thus been able to experience activity levels in tendency increase negative perception of congestion. Another explanatory aspect might be that the more paddling days respondents spend in the Lakes Region, the more likely is that they ascribe importance to quite paddling during their holidays. Negative perception of congestion also increases with size of travelling group. A possible explanation is that larger groups have to wait longer at portaging sites for all boats to pass. Somewhat surprising, negative and significant coefficients were found for membership in a canoe association. A possible explanation could be strategic bias, because restrictions due to crowding are a hotly debated issue in canoe associations. Furthermore, a self-selection of congestion insensitive members might be relevant because the canoe associations advises members not to paddle the trail on extended weekends in spring. Finally, respondents with their own canoe were found to be more congestion sensitive than paddlers who rented their canoe. This is in accordance with our expectation of a higher preference for an undisturbed nature experiences by people who are willing to buy their own canoe.

In a second step, we use our sample of 285 visitors to calculate the predicted level of negative perception associated with congestion on the combined scale over a range of boat activity levels for every respondent. The results, reported as percentage of total sample for which a strong negative perception of congestion is predicted (upper third of the combined scale) are shown in Figure 4[5]. It can be seen that substantial negative perception of congestion commences at activity levels of ca. 50 canoes and continues to rises up to a level of 100 canoes a day, where after negative perceived congestion levels remain constant. We interpret these results to show the empirical distribution of heterogeneous aversion to congestion of visitors to the trail. Our results could possibly be improved if more detailed questions as to the principal sensitivity to congestion, expected congestion and its relevance for choice of trip date would have been included. If a larger sample for maximum use levels were available, differences self selection between dates could be better accommodated for. A larger sample would also enable a separate analysis for different user groups.

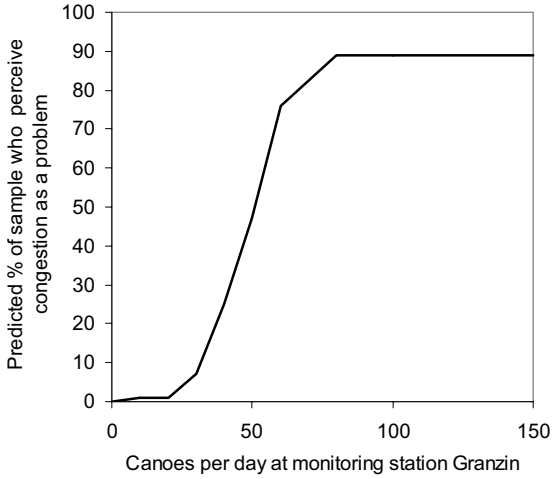

Figure 4. Percentage of sample who perceive congestion as a problem for the different levels of canoe activity at the monitoring point in Granzin as predicted with statistical model.

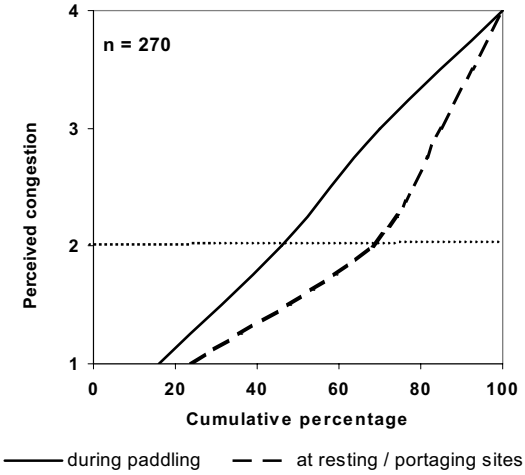

Figure 5. Comparison of perceived congestion during paddling and resting / portaging: fully agree (4) – do not agree at all (1) that there are too many boats.

Improving the efficiency of trail use

Possible management option to deal with congestion problems is to increase the efficiency with which a site can provide recreational benefits by increasing capacity or optimising design of the trail, which results in reductions in congestion while not decreasing demand by any one group. Knowledge of the specific points in a paddling experience, where congestion is most costly can be crucial to the design of the trip routes, resting places and portaging sites.

We tested whether the negative perception of crowding can be traced back to crowding at the resting sites or portaging sites. Resting sites have been deliberately limited by the National Park Authority for conservation reasons. Figure 5 shows the cumulative percentage of responses to the statements on the perception of crowding at the resting/portaging sites and during paddling. Whilst only 45% of the total sample did not perceive a problem with number of canoes encountered during paddling, 70% did not perceive a problem with overcrowded resting/ portaging sites. This suggests that limitation of resting sites is not the main issue, and that consequently increasing the capacity by reopening some of the sites would not substantially reduce perceived congestion. Likewise we can not infer that congestion at the portaging sites, which constitute a bottleneck, is the main determinant for perceived congestion. These specific results have to be treated with caution, because we did not specifically ask respondents how often and long they had been resting or how many portaging sites they had passed prior to the interview.

As an further result of our survey, we find that a potentially effective, easy to control management option to reduce activity levels which is not as restrictive as the introduction of a quota would be the restriction of the paddling direction. We found that 40% of the visitors are day trippers who start and stop at the same point. By restricting travel direction to downstream, activity levels could be reduced by 20% without reducing numbers of visitors.

Acceptance of a quota system and willingness-to-pay for user fee

An effective strategy to reduce peak activity levels is the introduction of a quota system. We asked respondents for general acceptance of such an instrument for the Mueritz National Park. We proposed a reduction of peak levels by 30 percent with a pre-booking system and allocation of quotas according on a “first come, first serve” basis. Its was explained that the implementation of the system would reduce the probability of being able to go on popular weekends. However, provided that canoeists book early enough, they could enjoy a less congested paddling trial. Herewith, we attempted to make clear the trade-off between the reduced probability of obtaining a quota and the increased enjoyment of the paddling route. In total 29 % of the respondents were willing to accept the introduction of a quota system. We use a logistic regression to determine factors influencing acceptance. As expected, we find that negative perception of congestion has a positive effect on acceptance. In other words, congestion sensitive paddlers are more likely to accept the implementation of a quota system. We also find that first time visitors, who constitute 33% of the visitors are more likely to accept a quota system. This is interesting, as it suggests that a quota system would not deter the recruitment of new visitors for the tourism destination. Large groups and frequent paddlers are more likely not to accept a quota system, which can be attributed to the stronger expected impact on their use patterns. Interestingly,

we also find that a dummy for the public holiday extended weekend days in our sample has a negative effect on acceptance. This is where crowding is most relevant. We interpret this to be the result of a self selection effect. We assume that visitors on this date expect high use levels, may also find these too high, but prefer to continue to have a free choice of when to go.

Respondents were further asked how high their willingness to pay for a user fee to be collected in association with the pre-booking system would be. This fee was explained to be used both for the maintenance of the facilities at current levels and the administration of the pre-booking system. Average willingness to pay was found to be 2.30 € per person, including those reluctant to pay with a WTP of 0 €6.

Setting user fee levels and compensating losses to boat rentals via increased rental prices

The travel cost method was employed to assess the effects of different user fee levels in the context of the introduction of a quota system. We analysed two possible mechanisms for setting user fee prices levels. In the first case, we where interested in assessing potential demand effects of setting differential user fees for peak season weekends and off season/weekdays. In the second case, we were interested in a quota system, in which a certain proportion or all of the quota is allocated to boat rentals, who may thus be put into a position to compensate for a reduction in boat capacity through charging higher rental prices.

We did not ask respondents directly for effects of changes entry prices on visitation rate. Therefore, we used the travel cost model to estimate relative changes in visitation rates that would result from increases in user or boat rental fees. This is based on an interpretation of the travel cost function as a proxy for estimating price elasticity of demand. For this purpose we employ a zonal travel cost model. The zonal TCM demand equation specifies trips per capita from a given zone of origin to a particular site as the dependant variable. Observed visitation rates are assumed to reflect the desired level of consumption given the travel cost facing the recreationist. Annual visitation rates per 1000 population in our sample were predicted by travel costs for the mean distance from home (14 zones ranging from 8 to 760 km) to the paddling trail. Travel costs were calculated on the plausible assumption that respondents travel to the area by car. Travel costs were assumed to be 0.10 € per km with an average of two persons per car. We employ a linear regression to estimate a zonal travel cost model following Beal (1995). A double log specification was chosen because model validity and predicted visitors showed best results[7]. All of the estimated coefficients are significant at the 0.05 level and the coefficient on travel cost is of the expected sign.

In a second stage we determine relative changes in visitation levels, by stepwise adding increased entry fess to the travel costs and calculating new visitation rates with the travel cost model. Relative changes of visitation for an increases in entry or user fee from 0 to 50 € per person and trip are presented in Figure 6[8]. It can be inferred, that price elasticity of demand is highest in the range of fee levels from 0–10 € and that a user fee in the range of 20 € per person and trip would lead to an expected reduction of visitation levels by 50 %.

What does this imply for management? When setting user fees an incentive to redistribute visitor flows between peak season weekends and low season weekends may be useful. We estimate that demand may be sensitive already at low levels of user fees between 0 and 10 € per person and day. Whilst relative high user fees at peak times may be useful for a higher cost recovery level, these may lead to additional reduction in low periods, where use levels may be very low. Differential pricing for high and low periods could provide a way to increase acceptance and effect a temporal redistribution of visitor demand.

If the second option, to allocate quota to boat rentals, is realised, we find that the potential to increase boat prices is generally not very high, because demand is relatively price elastic. If a quota is allocated which for example requires a reduction of maximum boats put up for rental from 300 to 150 and assuming a rental price of 25 € per day, an additional ca. 25 € on the remaining canoes per day would have to be charged in order to compensate the loss. We find that demand is sensitive to this level of price change, but that total demand would still be high enough for it to seem realistic to assume such prices could be taken, provided that the predominant share of the quota is allocated to boat rentals and chances to substitute for a private boat is thus low.

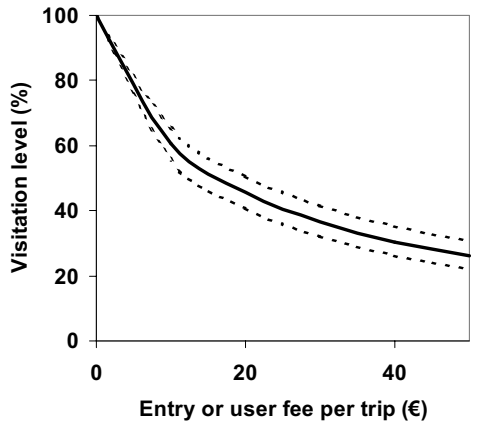

Figure 6. Changes in estimated visitation levels (mean and +/- standard error) for increases in per trip entry prices using the travel cost function (mean trip length of three days).

Summary

Our key result is that a majority of the canoeists in the Mueritz National Park do perceive congestion as a problem. The negative perception of crowding seems to be attributable to the frequency of boat encounters on the lakes and waterways and not to congestion at the resting and queuing at portaging sites. A more detailed analysis of the determinants of perceived congestion (is it the number of boats encountered during paddling, their direction, boats at the portaging sites, at the rest places, during camping?) could allow for more finely tuned management and generate greater net recreational benefits.

We calibrate the resulting statistical model of perception of congestion to the activity levels at the long term visitor monitoring point, so that it can be used to evaluate long term trend data. For visitor management purposes, the interpretation of visitor flow monitoring data can be substantially improved through a systematic combination with interview survey data to elucitate actual visitor use patterns that are the basis for observed activity levels. This is especially the case if monitoring of activity levels is to be used to discuss quotas in terms of absolute visitor numbers.

The simple fact that the majority of canoeists has proven to be congestion sensitive can be interpreted as an argument to reduce the allowed number of boats but an unambiguous and clear standard for the determination of acceptable use levels is still lacking. It is hardly possible to draw concrete conclusions regarding an optimal level of paddlers within the National Park, for which a rigorous economic welfare assessment would be necessary. Here, we clearly see much room for improvement and future research.

Secondly, we analysed several aspects relating to the implementation of a quota system. The implementation of quotas as a visitor management instrument is not very common in Germany because most National Parks are pursuing a "free access" policy since the exclusion of citizens from "their landscape" is a hot political issue. Never the less, quota systems for canoeists have already been implemented (e.g. Ems, Rur, Upper Donau) or are under consideration in several canoe areas in Germany. We find that canoeists' acceptance of a quota system is rather low. In contrast to the low acceptance of quotas, respondents have turned out to be more willing to pay for a user fee and the maintenance of the facilities on the current level.

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[2] Granzin, Babke, Blankenfoerde, Zwenzow

[3] Cronbach's Alpha is 0,7021.

[4] CANOES = COUNT * $C_{\text{NOT COUNTED}}$ * $C_{\text{DOUBLE COUNTED}}$, where CANOES = total number of boats on the trail on a day, COUNT = number of boats counted at Granzin from 9.00 AM to 18.00 PM, $C_{\text{NOT COUNTED}}$ is a coefficient to correct for canoes not observable at the counting station (estimated value = 3,2) $C_{\text{DOUBLE COUNTED}}$ is a coefficient to correct for double counting due to bi-directional day trips (estimated value = 0,8)

[5] The activity levels are those observed at the monitoring station Granzin.

[6] For comparison: user fees for the Ruhr in the context of a quota system is ca. 3 € per person and day.

[7] Log (Per Capita Visitation Rate) = a + b *Log (Travel Cost) + c* (City)

[8] Taking average trip duration into account the per person and day prices would be ca. 50 % lower then per trip prices.