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The blooming paradise: algae blooms, environmental change and tourism

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Abstract

Tourism has become an important sector for many rural areas in Sweden. For the island Öland tourism is an important economic niche and along with agriculture, the backbone of the local economy. Island tourism systems can however, be vulnerable to environmental change. Algae blooms have repeatedly affected Baltic Sea coastlines in recent years, and destination planners in Öland reported losses of 27 million Euros for the season in 2005 alone. This article investigates related impacts on tourist decisions within the camping sector, through interrelationships of algae blooms, weather conditions, supply of camping facilities and distance to attractions outside the camping area. It goes on to evaluate how important camping visitors state these different factors to be for their choice of destination. The method used in this article is a stated preference where the respondents are requested to evaluate a number of hypothetical alternatives. The results show that camping is an important niche within Swedish summer tourism. However, high reliance on sea, sun and sand as the primary tourism product might be challenged by weather extremes, precipitation and biotic change in the future. Proactive strategies and adaptation strategies are important steps to take in order to mitigate potential negative impacts for the future.

***Keywords*:** climate change, algae blooms, camping tourism.

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Introduction

Climate Change could be devastating for summer tourism destinations leading to tourism decline and economic losses due to less attractive and sometimes anticipated hazardous tourism environments. Especially island and costal tourism destinations have been pointed out as extra vulnerable to climate change due to their location and exposure to cyclones, storm events, precipitation extremes, biotic change (e.g. diffusion of severe algae events) and limited options in terms of economic development (Perperzak, 2003; Perry, 2005; UNWTO, 2008; Marjavaara, 2008). Many costal tourism destinations like Mauritius and Tobago is already claimed to be

affected by climate and environmental change (UNWTO, 2008). More frequent extreme storm and cyclone events damage coral reefs and lead to erosion. There is however, still an ongoing debate on the causal relationship between these events and climate change. Adaptation to climate change induced impacts have become an important field within tourism and planning studies. Tol (2005) argue that adaptation is local and complex, meaning that adaptation is done by different actors in the local context as a response to anticipated or real changes in the environment or local tourism setting. Adaptation could therefore have mitigating effects on the local conditions. Efforts to enhance the adaptive capacity of a destination make it less vulnerable to change. The tourism business in Kalmar County and especially on the island Öland state that repeated algae blooms, affecting coastlines around the Baltic Sea have led to impacts on the tourism business. For 2005 alone the business reports up to 27 million euro in economic losses due to algae blooms (Hasselström, 2008). The algae blooms in the Baltic are favoured by calm, warm weather with high water temperatures, just as tourism. These algae can, in certain compositions and levels be harmful to humans. The peak season for seaside tourism coincides with the blooming of algae (e.g. *nodularia spumigena*) in summer time. The predicted consequences from climate change indicate higher temperatures in northern Europe but also increasing events of strong winds and more precipitation (UNWTO, 2008; The Copenhagen Diagnosis, 2009; SMHI, 2009; Naturvårdsverket, 2009). Increased surface temperatures in the Baltic might lead to anoxic conditions and disturbance of the marine ecosystem (Romero, 2010). High water temperatures are also favourable for algae's and might cause spatial diffusion of algae occurrence (Becheri, 1991; Anderson, 1994; Andersson, et al. 1994; Hoagland, et al. 2000; Perpezak, 2003; Gilbert et al., 2005; Romero, 2010). According to Gilbert et al. (2005) Climate and Environmental Change (CEC) might lead to a future increase of severe algae blooms.

Research on the impacts from harmful algae blooms (HAB) shows potential economic backlashes for sectors like fishing and tourism among other industries (see e.g. Perry, 2005; Hoagland, et al. 2002). Human action are often blamed to be the reason to enhanced HAB-events and studies of algae blooms show that eutrophication as well as climate change are proved to be important factors (Peperzak, 2003; Sommer & Frenzel, 2005; Granéli, 2006; Romero, 2010). Marine ecosystems are vulnerable to changes or disturbance and a spatial diffusion of HAB-events are reported in marine water environments around the world (e.g. Hoagland et al., 2002; Masó et al., 2003; Basterretxea et al., 2005; Gilbert et al., 2005). There are studies indicating a future increase in HAB occurrence in certain areas due to climate change and anthropogenic pollution (Peperzak, 2003; Basterretxea et al., 2005; Gilbert et al,. 2005; Romero, 2010). Since both algaes and changing weather conditions might cause negative effects on tourism it is important for tourism destinations to be proactive in order to mitigate negative impacts (UNWTO, 2008).

The purpose of this study is to investigate to what extent different factors like weather conditions, algae blooms and supply of attractions and specialised campgrounds e.g. with an ecological or family profile, influence the willingness to visit or revisit a destination, in this case Öland. Could changes in supply of camp ground activities, service level and nearby attractions work as mitigation to tourism impacts caused by climate change?

A questionnaire has been distributed to camping tourists in Öland, in which respondents were asked to evaluate different scenarios related to camping tourism. The scenarios are based on a variety of weather and algae conditions, niche of camp ground and distance to attractions outside the camp ground of their stay. That means that the scenarios always presuppose camping but the style or image of the camp ground varies in each scenario.

Literature review

Camping or caravan tourism in Sweden has traditionally been closely attached to seaside or beach related tourism where at least the following three, *Sea*, *Sand* and *Sun* have been important (Löfgren, 1999). The summer season camping product very often presupposes calm

weather, sun and high temperatures. Camping tourism and especially in island destinations might therefore be vulnerable to impacts from climate change (UNWTO, 2008).

From the 1950's and forth, caravanning became a highly appreciated niche within camping tourism and during the 70's and 80's it became the symbol of the summer holiday for Scandinavian working class and middle class families (Nordström & Mårtensson, 1966; Löfgren, 1999; Johansson, 2002). Today, camping and caravanning stand for about 35% of the commercial nights spent in Sweden which makes it one of the most popular forms of tourism in Sweden (NUTEK/SCB, 2007). The seasonal length of camping has been extended as the technical developments of caravans make them suitable for use all year around. In response to increased competition and to avoid economic backlashes due to algae blooms, Tourism stakeholder on Öland have tried to develop new tourism seasons where the activities are separated from beach related tourism. The harvest festival is one example of this and many camp grounds participate in the harvest events (Foghagen & Johansson, 2004; Foghagen, 2010).

In many Swedish rural or peripheral summer tourism destinations, camping is the single largest form of tourism and in Kalmar County and the island Öland in south east Sweden the sector counts for more than 1 700 000 commercial overnight stays yearly which is 65% of all commercial guest nights (NUTEK/SCB, 2007; Tillväxtverket, 2008). Today many commercial camp grounds have become more integrated resorts with a supply of restaurants, activities, shops and events close to the accommodation zone (Mathieson & Wall, 2006; Foghagen, 2007; Stilling Blichfeldt, 2009). Commercial campgrounds for summer tourism are often located close to beaches; they could therefore easily be affected by climate and environmental change (CEC). Recent reports on CEC predict changes in sea water levels, disturbance regimes, increasing temperatures, precipitation extremes and biotic change, many of which could affect tourism (Gössling & Hall, 2006; UNWTO, 2008).

Camping tourism has developed towards higher service and amenity levels and many camp grounds include a variety of activities and a higher service supply for their customers today (O'Dell, 2005; Foghagen, 2007; Stilling Blichfeldt, 2009). Camping tourism in the Baltic Sea context is often closely connected to summer holidays in seaside destinations. Therefore the classic seaside motifs for travel are still significant to this form of tourism. That means that the quality of the Baltic Sea for sea bathing is often considered to be important and severe HAB-events or algae blooms, might be harmful to this form of tourism. To prevent or mitigate potential negative impacts from climate change or algae blooms especially, in small island destinations, the UNWTO (2008) suggest proactive rather than reactive adaption or responses to changes. Climate modelling and predictions of future climate display scenarios of increased temperatures, changed precipitation and wind and sea level rise (UNWTO, 2008:92). The level of awareness of potential changes on specific destinations has to be high. The process of risk management or development of adaptation strategies is an ongoing process. According to UNWTO (2008) steps of action has to be taken in both the supply and demand sides of tourism. Areas like communication and information, technical risk management, business development and public implementation are some of the fields of action discussed (UNWTO, 2008). Knowledge about potential impacts is needed in order to determine priority, type and need of action (Mason, 2003; Hall, 2008; UNWTO, 2008). Camping tourism is important for Öland and Kalmar County and the sector, based on sea, sand and sun tourism might be vulnerable to an increase of severe algae blooms induced by climate change. Baltic Sea has experienced extreme HAB-events repeated times the last 10 years causing media reports and reactions among tourism stakeholders, claiming economic losses due to algae blooms (Foghagen, 2007; Hasselström, 2008:369; Naturvårdsverket, 2009:33).

The study area

Öland is the second largest island in Sweden and located in Kalmar County in Southeast Sweden (Figure 1). Borgholm in Öland is a traditional seaside resort and tourism is a

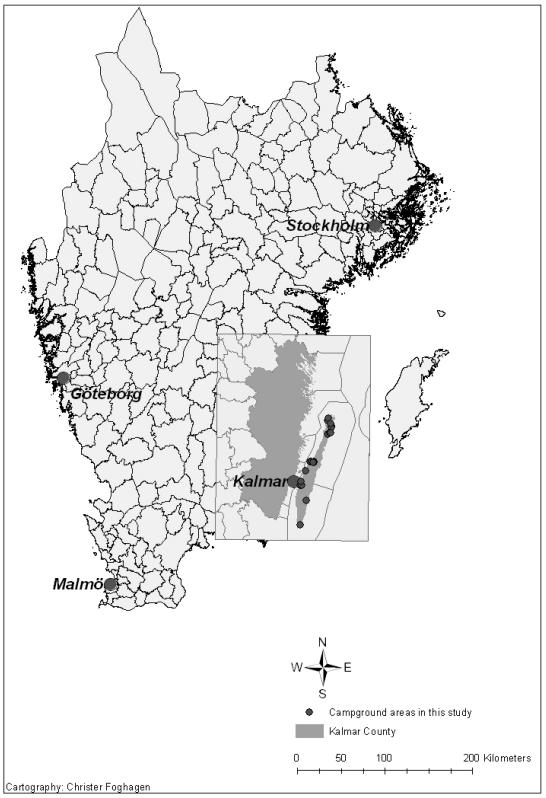

Figure 1. *Location of the campgrounds and study area on Öland. The highlighted area within the frame is Kalmar county and the grey dots*

traditional niche in the economy of the island. The local economy have in recent years become even more dependent in tourism due to general restructuring and decline in some other sectors in the island. The peripheral parts of the island, especially the northern part, display similar consequences from restructuring and reduction as other rural and peripheral areas in Scandinavia. Changes in agriculture and reduction of the public sector recent decades resulted in a diminishing labor market, rural decline and outmigration from these areas (Saarinen 2003; Lundmark 2006). As argued by Lundmark (2006) many rural areas turn to tourism and service sectors in scenarios like this, Öland is no exception. There is though a vital difference in Öland compared too many other rural areas namely that tourism already before these latest phases of reduction and restructuring held a strong and important position in the local economy. However as a small island destination with a strong tourism dependency, Öland is potentially vulnerable to impacts from climate and environmental change.

A previous study compared statistics on nights spent in campsites in Öland and Kalmar County with presence of algae blooms, there are indications of tourist backlashes that might be, at least partially, caused by algae blooms (Figure 2). Other important factors might affect tourism e.g. frequency of media reports, financial or weather conditions and due to limited access to sufficient data these factors are not included in this study (Foghagen, 2010).

Methodology

The *Stated choice or preference method* (SP) is a tool which provides opportunities to measure attitudes towards hypothetical events and scenarios. The method provides opportunities to study whether variations of

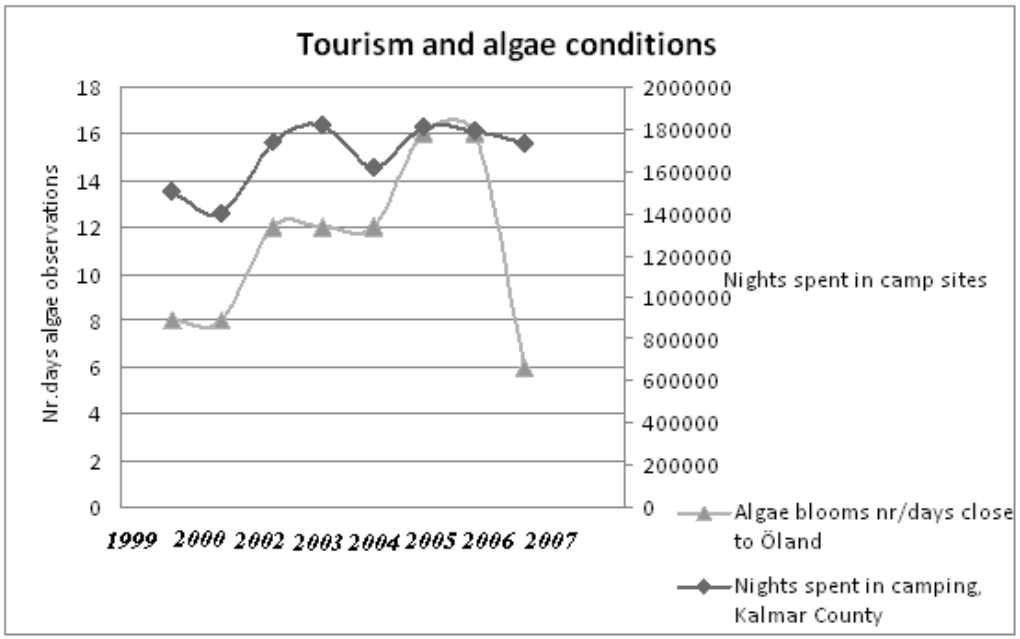

Figure 2. *Nights spent in campsites in Kalmar County (1999-2007) and days of algae blooms. Note*: The light grey line represents number of days with algae blooms close to Kalmar county and Öland while the dark line represent number of nights spent in commercial campgrounds in Kalmar county. Source: Composed by data from SMHI and SCB

different variables into different combinations influence the decisions making or evaluations made by respondents (Louviere et al., 2000). In this study stated preferences is used to measure how camp ground visitors evaluate various hypothetical scenarios. A number of alternative scenarios comprising different situations and attributes are presented. These attributes exist on a number of levels and the respondents are asked to rank these alternatives according to classified scales.

One weak point in a stated preference study is that you never know if the respondents really would act in the way they say, if the scenarios became a real situation. It is hard to imagine a scenario in its full extent and therefore it is important to clarify that the results of this study only display how the respondents evaluate the scenarios and how they choose between given hypothetical scenarios at a certain time, given the facts available at that time. The respondents might also give the answers that they think the interviewer wants to have.

The strength of this method is although that it provides information about attitudes to alternatives and scenarios at a point where these scenarios have not yet, if ever, became a reality. The scenarios should therefore be realistic and plausible (Louviere et al., 2000; Pettersson, 2001; Westin, 2004). The questionnaires provide data from a limited time period and the conditions and level of satisfactory at the time of responding to the questionnaire might reflect or influence answers. Therefore data from algae blooms in the Baltic Sea as well as data for the number of nights spent different forms of commercial accommodation and camp grounds in Kalmar county give valuable information about changes in over broader time horizons.

Sampling

There are 2520 stated preferences in the data. Each respondent had 9 scenarios to evaluate and the data include evaluations from 292 responding visitors. Most respondents were over 35 years old (88%). The largest segment was respondents born 1960-1974 (38%). The

division of gender in the study is relatively equal, 55% female and 45% male respondents, and 69% had primary school or high school education. Of the 292 respondents only 8% state that this is their first visit to Öland. When reflecting over their main reasons to visit Öland, respondents state that nature, landscape, sun, beach and environment have a strong influence on their decisions. 22% of the responding visitors have their permanent place of residence within 250 km from Öland.

The scenarios and questionnaire

This study focuses on three attributes. The first one is environmental conditions. The second one is supply of attractions and the third one is economy and distance. The purpose with the first attribute is to measure and evaluate how camping visitors in Öland value changes of environmental conditions and how they estimate different situations when they make holiday decisions. The environmental situations displayed in the questionnaire are extreme and exclude the scenario of sunny, warm weather with low levels of algae blooms. The reason to use extreme situations is to offer attributes that are clearly separated from each other. But also to force respondents to reflect upon their evaluation of attributes and thereby it is possible to use a scale rating to analyze the expressed degrees of preference on each factor (Louviere et al., 2000). Also that it is more likely that severe algae blooms appear if the weather and water temperatures are warm.

The second attribute measured is the *integrated campsite resort*. This means the supply of *in house* attractions and service in the camping resort. This contains attractions both directly related to weather situations such as sun, heat and calm winds e.g. beach activities. In Öland this has, for a long time, been related to caravan camping tourism. But it also contains attractions and services such as museums, art galleries, indoor activities that are not dependent on certain weather but often favored by rainy days. Also activities and services such as *kinder garden* or day care for children and sports, golf and surfing, nature based activities like bird watching and fishing, and by cultural events and theme parks.

The last attribute to be considered is distance. Öland is an island with a permanent link to the mainland through the bridge between Kalmar and Färjestaden. There are also ferry connections, between northern Öland and the mainland city of Oskarshamn and one between northern Öland and the island Gotland. Both visits to mainland attractions and attractions in Öland often presuppose travel by car and therefore distance might be an important factor to evaluate. How do these camping visitors value distance to different activities and attractions outside the campsite resort or accommodation area?

By combining these different types of attributes and providing different scenarios the respondent can compare those and decide how to act in different situations. This provides potential opportunities to study preferences and attitudes to algae blooms, weather, rural tourism, distance and tourism attractions. In this study there are three levels on each attribute which give 27 possible scenarios (Figure 3).

The questionnaire used in this study contains, first of all, the attributes described above, but also a number of background variables such as sex, age, level of education, length of stay in Öland, repeated visits, income and motives to visit Öland. These background variables for example *the motives to visit Öland* or *distance from their permanent residence* might help to explain the importance of different activities and importance of local places during their holiday.

As stated above in total 27 scenarios are composed. But each respondent only evaluates nine of these scenarios. According to Söderlund (2005) the quality and reliability could be affected if respondents have to evaluate large numbers of variables and scenarios. All questionnaires have been distributed to visitors in the same frequency. That way all combinations have coverage over the whole period of research and the possible number of evaluations of different combinations is equal. Each combination of attributes was followed by two questions. In the first one, respondents had to evaluate the attractiveness of the combination of attributes. The second

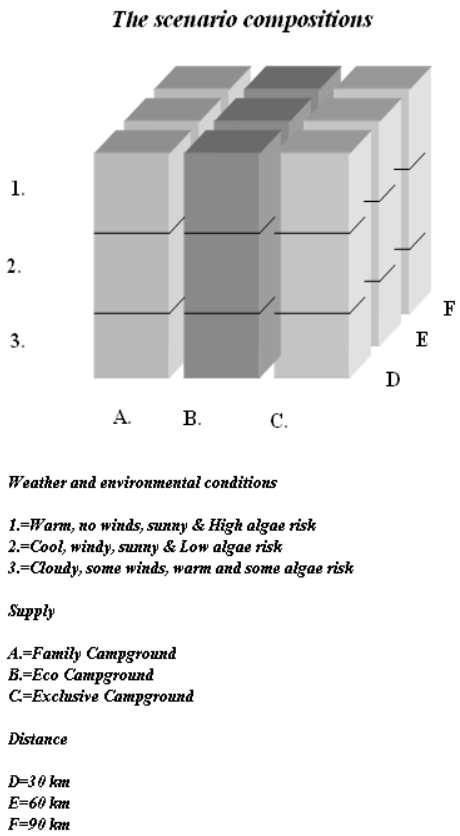

Figure 3. *Composition of the scenarios used in the questionnaire*

one included an evaluation of how likely it is that they would purchase a trip to Öland if the given combination was the most likely conditions during their holiday. The scaling of evaluations in each combination of alternatives went from 1-5 where 1 stood for very good and very likely to purchase while 5 was very bad and very unlikely to purchase. By combining these different attributes it is possible to determine to what extent changes in the attributes influence the tourist evaluation. The following set of attributes might influence the tourist choices and by combining different attributes it might be possible to determine the factors which could have an impact on tourist choices. There were three attributes concerning weather and environmental conditions, three concerning distance to attractions and three different sets of camping supply. In total nine different attributes combined into 27 scenarios (Figure 3) and each scenario have been evaluated by about 100 responding visitors. All scenarios are introduced in the questionnaires starting with instructions about how the scenarios are composed and how to fill in the evaluations.

Results

The respondents were asked to estimate how attractive a scenario or combined set of attributes were (weather and climate, supply and distance) and the likelihood on a Likert-type scale with a range of five alternatives, where 1 represents highly attractive or very attractive and 5 represents very unattractive. The same type of scale was used to measure the respondent's willingness or likelihood to purchase the given combination of attributes.

The most preferable attributes from the scenarios are sunny but cool weather and low risk of algae blooms combined with family campsites including high level of services like

Table 1. The mean values from evaluated attributes

Average results for each level of choice	Mean	Std. Deviation
Cool, sunny and low algae risk	**2.80**	1.183
Warm, sunny, high algae risk	2.94	1.157
Warm, cloudy, some algae risk	3.53	1.050
Family camp	**2.87**	1.170
Ecological camp	3.22	1.121
Exclusive camp	3.24	1.180
30 km distance	**2.86**	1.150
60 km distance	3.07	1.140
90 km distance	3.36	1.154

Note: The values shown indicate attribute impact on tourist choice. A high value indicates negative impacts on tourist decisions (1 = very likely – 5 = very unlikely). The most preferable combination is marked by bold figures.

Table 2. The mean values from evaluated scenarios

The five most preferable scenarios	N	Mean	Std. Deviation
Cool, sunny and low algae risk with Family camp and 60 km distance.	96	2.31	1.098
Cool, sunny and low algae risk with Ecological camp and 30 km distance.	95	2.58	1.068
Warm, sunny, high algae risk with Family camp and 60 km distance.	101	2.48	1.054
Warm, sunny, high algae risk with Family camp and 30 km distance.	94	**2.22**	1.079
Cool, sunny and low algae risk with Family camp and 30 km distance.	91	2.44	1.013

Note: The values shown indicate scenario impact on tourist choice. A high value indicates negative impacts on tourist decisions (1 = very likely – 5 = very unlikely). The most preferable combination is marked by bold figures.

Table 3. The mean values from evaluated scenarios

The five least preferable scenarios	N	Mean	Std. Deviation
Warm, Cloudy, some algae risk with Ecological camp and 90 km distance	90	3.67	1.028
Warm, Cloudy, some algae risk with Exclusive camp and 60 km distance	89	3.57	1.065
Warm, Cloudy, some algae risk with Family camp and 90 km distance	90	3.76	0.964
Warm, Cloudy, some algae risk with Ecological camp and 60 km distance	90	3.69	0.979
Warm, Cloudy, some algae risk with Exclusive camp and 90 km distance	94	**3.78**	1.128

Note: The values shown indicate scenario impact on tourist choice. A high value indicates negative impacts on tourist decisions (1 = very likely – 5 = very unlikely). The most preferable combination is marked by bold figures.

children day care and activities for families and external attractions related to families with children within a distance of 30 km (return trip) (Table 1). The least attractive scenario is cloudy or rainy weather with warm temperatures and some risk of algae blooms, combined with exclusive campsites and a distance of maximum 90 km (return trip) to related attractions (Table 3). The six most preferable scenarios are shown in Table 2 and the six least preferable in Table 3.

The difference between the most and least preferable alternatives' within the distance and weather categories indicates that clouds, rain, algae blooms and longer distances might have a negative impact on the tourist choice of destination (Table 1). The alternatives with sunny weather have a higher priority than cloudy weather. Although the temperature are described as higher in the alternative with clouds than in the alternative with sunny but cool weather tourists prefer sun. The sunny alternatives differs in temperature and risk of algae blooms. The cool and low algae risk alternative is preferred.In the supply of campsite category the family campsite distinguish itself as the most preferable while eco camp and exclusive camp are least preferable. There is a negligent difference between eco-camp and exclusive camp where eco-camp seems slightly more favorable than an exclusive (luxurious) campsite.

The evaluation of the scenarios and their attributes where followed by a rating of the likelihood to visit Öland if the displayed scenario where likely to appear during their vacation. The pattern is that responding visitors tend to be more likely to travel to Öland cases where they did a positive evaluation of the scenario. However there are some differences between the evaluation of the scenarios and the likelihood to buy.

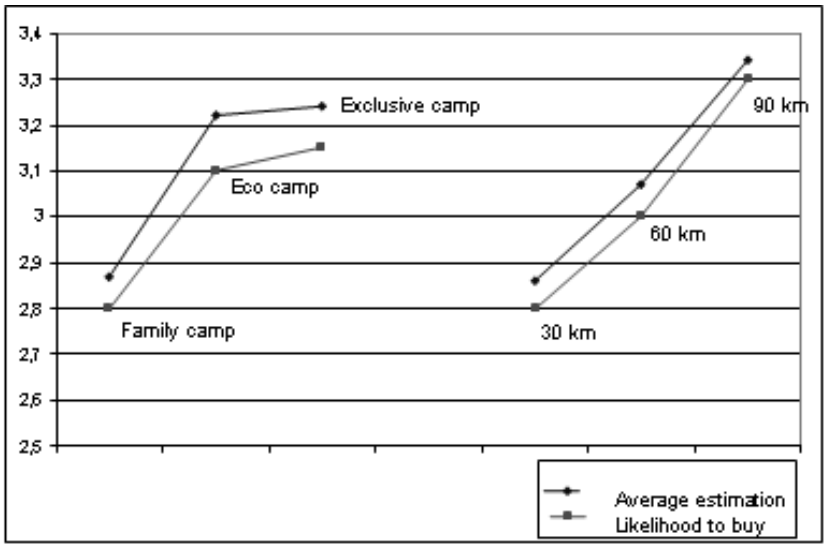

Figure 4. *The influence from, and difference between, evaluations and likelihood to buy (or make reservations) for a holiday trip to Öland*
Note: Both estimation values and likelihood to buy is measured on a five point scale where the number 1 in the estimation represents very good and number 5 represents very bad and for the likelihood to buy number 1 represents that it is very likely and number 5 represents very unlikely to buy.

Table 4. Regression model

Dependent variable: *Tourists stated likelihood to buy the scenario alternatives*	**Unstandardized Coefficients**			
	B	**Std. Error**	**t**	**Sig.**
(Constant)	9.586	2.934	3.267	0.001
Gender (0=female and 1=male)	-0.010	0.036	-0.266	0.790
Year of birth	-0.003	0.001	-2.128	0.033
Income (in thousands of Swedish kronor)	0.000	0.000	2.729	0.006
Length of stay in the destination (number of weeks)	0.001	0.005	0.228	0.820
Warm, sunny and high algae risk	-0.513	0.040	-12.723	0.000
Cool, sunny and low algae risk	-0.553	0.040	-13.769	0.000
Family oriented campground	-0.501	0.040	-12.497	0.000
Eco oriented campground	-0.096	0.040	-2.397	0.017
60 km	0.178	0.040	4.422	0.000
90 km	0.600	0.040	14.966	0.000

The evaluations tend to be more negative towards the scenarios than the willingness to buy a vacation in Öland (Figure 4). A majority of the responding visitors have visited Öland many times and experienced different types of weather and supply of attractions and they are quite loyal to their choice of destination and that might explain the high likelihood to buy even if the given scenario is not the most preferable.

The variables in this study have been analysed through a linear regression model (Table 4). The dependent variable is the stated likelihood to buy a trip to Öland with the conditions of a given scenario.

This model display how the willingness to travel to Öland is affected by the different attributes but also by age, gender and number of previous visits in Öland. The regression model show significant values for the attribute variables as well as the income and year of birth. Sex does not show significant values nor does the length of stay. Three attributes were excluded, namely: *30 km distance*, *cloudy, warm and some algae risk* and *exclusive oriented campground*, these did not have any significant values. Altogether the proposed regression model explains about 25% of the variations in the material. Other factors that might have contributed to a greater explanatory value could have been more detailed information on e.g. general travel behavior, motives, previous experiences of algae seasons and distance to the destination that have not been collected in the survey.

It is important to notice that the attribute *cool, sunny and low algae risk* have the highest positive influence and *90 km distance* have the highest negative impact. *Family oriented campground* is the most favorable among the supply alternatives. In algae risk and weather it is hard to know if weather or algae have the highest impact but, as shown in Table 1, the least attractive option is cloudy weather even if the temperature is high. Tourists prefer sunny weather and if sun is granted the risk of algae blooms seem to have some significance (Table 1).

Discussion

Mitigation of climate change induced impacts is according to IPCC (2007) a proactive anthropogenic intervention to reduce green house gases. Tol (2005) argue that adaptation is local and complex, meaning that adaptation is done by different actors in the local context as a response to anticipated or real changes in the environment or local tourism setting. Adaptation could therefore have mitigating effects on the local conditions. Efforts to enhance the adaptive capacity of a destination make it less vulnerable to change. As described by Hanefors and Mossberg (2007), visitor expectations and information based on previous experiences are important in customer decision making. The level of flexibility and ability to meet visitor expectations in a destination system is an important sign of the adaptive capacity.

The results of the study show that a majority of the responding visitors had visited the destination before and that might have influenced the expectations and anticipations on the destination and algae blooms. It is not possible to state that algae blooms are the only cause to the displayed tourism changes but as discussed by Iso-Ahola (1987), risk factors like environmental conditions e.g. algae blooms might have a negative effect on the choice of destination. Although the results show that respondent reactions towards scenarios with high risk of algae blooms indicate that they are more cautious about purchasing a trip to Öland then in scenarios with low risk of algae blooms even if the weather is colder and windier. The total number of overnight stays in the county of Kalmar shows a noticeable increase over the period even if fluctuations occur. Years with severe algae blooms might have contributed to a decrease the following year or years but the total number of nights spent in commercial accommodation remain over the first year in the time selection (1997) which had the lowest number of nights spent. As it seems, a summer with high level of algaes blooms does however not need to be devastating as long as the weather conditions are favorable (i.e. sunny) and the supply of alternative attractions and swimming opportunities is satisfying.

Conclusion

The reliance on Sea, Sun and Sand as the primary tourism attraction might be contested by impacts from climate and environmental change in the future. Changes in precipitation, water quality as well as biotic change are plausible and challenging effects that have to be considered. The results of the study show that weather and environmental conditions, such as algae blooms, might affect the willingness to visit a destination where the risk to face such conditions are high. As in all forms of crisis management actions has to be taken either to prepare for plausible events or to mitigate the adverse effects of occurring events (UNWTO, 2008). Proactive, responsive and adaptive actions presuppose knowledge about tourist demand and tourist behavior responses to these changes. Even if this study only

includes evaluations from tourists during one season, it indicates that algae blooms could affect the camping tourism in Öland. It also indicates a need for longitudinal studies to follow up these results and to raise the awareness of potential impacts and important actions to take in order to minimize negative impacts in the future.

As a response to increased competition from other destinations and anticipated decline in tourist arrivals due to algae blooms, summer destinations have to take steps to develop adaptation strategies to environmental change. To develop new seasons can be a successful means to mitigate the negative effects of potential environmental impacts. As long as the summer season is the primary or only season the destinations will continue to be vulnerable to changes in terms of decreasing demand and environmental change during this season. Therefore efforts to mitigate tourism impacts from algae blooms and changing tourism demand, has to be made.

Since the study indicates that algae blooms and changes in weather conditions (especially if the number of sunny days is low) might have negative impacts to camping tourism, it has to be taken seriously from a destination perspective. Strategies to mitigate potential negative impacts need to be developed and actions taken to adapt to these potential changes. Camping tourism have got very little attention in academic research despite its popularity and importance as a tourism niche. Further research is needed in order to see the potential role of camping tourism in future tourism development for island destinations.

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