Sustainable tourism management and development of a Greek coastal municipality

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Abstract - A process is presented to facilitate the sustainable management and development of tourist destinations. Based on a specific reforming of the Limits of Acceptable Change planning system and combined with the Tourism Carrying Capacity concept into a common framework, specific steps are described to integrate environmental, social and economic information of a tourist destination into indicators, which are afterwards compared with reference conditions. The Leopold matrix is applied to identify and classify restrictions of development and provide the basis for negotiations between managers, stakeholders and local communities. Through a feedback process of continuous monitoring and adjustment, the aim is to focus developmental activities on restricting factors until all indicators upgrade to reference. A case study at a Greek coastal municipality (Ilida - western Greece) is applied to demonstrate the process. Activity zones are identified and 18 indicators are selected. Results suggest high potential for tourism development of the area. However, low scores are assigned to 8/18 indicators, reflecting restrictions, requiring priority under a sustainable development plan. The proposed process offers managers and stakeholders the ability to easily visualize/identify restrictions and assign developmental priorities within a step-by-step upgrading process, toward the sustainable management and development of tourist destinations.


1. Introduction

Tourism is a major source of income for a large number of developing and developed countries of the world. Over the past decades, recreational and leisure activities multiplied rapidly. With the numbers continuously growing since 2009, almost 1.13 billion travelers were recorded during 2014 and a total amount of 1.159 trillion US dollars was introduced into the global economy from tourism (UNWTO 2015). This rapid and often uncontrolled tourism growth has simultaneously and inevitably generated negative impacts on tourist destinations, emerging an urgency to place these activities in a sustainable framework.
This article describes a process to facilitate the sustainable management and development of tourist destinations, applied in a Greek coastal municipality (Ilida, western Greece). Starting from a short overview on the most widely used sustainable tourism frameworks and the criticism they have received, it advances to the presentation and application of the process, which is based on a specific reforming of the Limits of Acceptable Change (LAC - Stankey et al. 1985) planning system and combined with the Tourism Carrying Capacity (TCC - UNWTO 1999) concept into a common framework, with simultaneous use of the Leopold matrix (Leopold et al. 1971) as an advisory table to trigger negotiations between managers, stakeholders and the local communities. Finally, specific concerns on the practical application of sustainable tourism frameworks are discussed, concentrating on the gaps that this study can bridge by changing the focus of sustainable tourism research from finding a static or dynamic limit to a step-by-step upgrading of a tourist destination’s environmental, social and economic conditions toward sustainability.

2. Evolution of sustainable tourism frameworks

The concept of TCC (UNWTO 1999) was initially introduced to define a threshold beyond which a tourist destination may suffer from the adverse impacts of tourism (Middleton & Hawkins 1998). While theoretically useful to quantify a destination’s potential for tourism development, it has been proven practically unfeasible to calculate the TCC as a static limit (Getz 1983) and more dynamic approaches were suggested and applied. The LAC (Stankey et al. 1985) is such a flexible alternative to the TCC approach, widely recognized and utilized in sustainable tourism research and applications (Brown & Turner 1997; Ahn et al. 2002; Lawson et al. 2003; Roman et al. 2007; Salerno et al. 2013; Longyu et al. 2015). Rather than setting visitor numbers based on mathematical relationships, the LAC process underlines the contribution of stakeholders, decision-makers and the local communities to define “how much change is acceptable” (Krumpe & McCool 1997). Both frameworks however received much criticism on specific deficiencies when moving from theory to practice (McCool & Lime 2001; Farell & Marion 2002) and recently, tourism research advanced to more sophisticated processes and methodologies, such as the Visitor Impact Management (VIM) (Farrell and Marion 2002), the Visitor Experience and Resource Protection (VERP) (National Park Service 1997; Manning 2001) and the Protected Area Visitor Impact Management (PAVIM) (Farrell and Marion 2010), all referring to the tourism management of protected areas, but applicable at a wider spectrum of tourism management. These “advanced” methods however have been applied in a limited number of cases (e.g. Hof et al. 1994), while the TCC and LAC concepts are still widely used, despite the criticism received on the capability to provide accurate and defensible results (Williams 1994; Farrell and Marion, 2002) and a lot of research is still carried out using these frameworks and proposing specific reforming to incorporate them in the decision-making process (Kampeng et al. 2009; Zacarias et al. 2011; Lobo 2015).

Considering TCC, several authors suggested the integration of environmental, economic, perceptual, social and political aspects of a tourist destination (Papageorgiou & Brotherton 1999; Navarro-Jurado et al. 2012; Salerno et al. 2013) to define a limit, while similarly and rightfully, others indicate that TCC would be successfully incorporated in the decision-making process if both the intrinsic and cultural/perceived components were considered in the definition of a threshold, additionally proposing a concept of multiple carrying capacities to define this threshold (Saarinen 2006; Navarro Jurado et al. 2012; Salerno et al. 2013). Both the TCC and LAC methodologies are often now included in a DPSIR model (Drivers, Pressures, State, Impacts, Responses - EEA 2005), which enables the detailed description of the state of a tourist destination, the drivers, which lead to pressures and the environmental, social and/or economic impacts caused by such
pressures on the ecosystems and local communities of a tourist destination. Responses to mitigate these impacts are also included in the model to sustainably manage tourism activities (Castellani & Sala 2012).

Matrices have also been used in tourism research to relate one concept or variable to another, usually by comparing the two variables through an intersection produced by depicting the first in the x axis and the second in the y axis (Pearce 2012). The cells, which are formed through this intersection are then used to compare the two variables, either numerically, by assigning scores or descriptively. The Leopold matrix (Leopold et al. 1971) is such a matrix used in Environmental Impact Assessments (EIAs) as a tool to numerically weight and compare the probable environmental impacts of a project, serving “as a checklist or reminder” to relate environmental impacts with proposed projects/actions. While the descriptive comparison through matrices has been often used in tourism research (Dann et al. 1988; Harrington 2005; Pearce 1995), numerical comparisons have been rarely applied (Puczko and Ratz 2000).

3. Framework overview

3.1 The TCC concept
As mentioned earlier, TCC research has recently shifted from finding a static limit to developing dynamic thresholds including multiple carrying capacities (Salerno et al. 2013). A useful classification of the various TCC perceptions has been presented by Saarinen (2006). When TCC is based on resources, it can be calculated as a measurable limit from the original conditions based on the intensity of the impact. From the developers’ perspective, limits are dynamic and calculated through modelling approaches such as the Tourism Life Cycle model (Butler 2011), taking into account that a tourist destination is constantly adapting to new situations. The community-based TCC is perceived as a negotiated limit between managers, stakeholders and the local communities (Hughes 1995). Stepping forward, advanced modelling frameworks have been developed to properly evaluate these multiple carrying capacities (e.g. Salerno et al. 2010).

3.2 The LAC framework
The LAC framework includes nine methodological steps (Stankey et al. 1985) to search for relationships between current and desired or acceptable conditions, relying on management judgment for implementing strategies when a problem is identified (Ahn et al. 2002). These steps include (i) the identification of an area’s concerns and issues, (ii) the classification of the area into specific classes, (iii) the selection of indicators of resource and social conditions, (iv) the identification of existing environmental and social conditions, (v) specifying standards for the indicators, (vi) the identification of alternative opportunity class allocations, (vii) the identification of differences between existing conditions and defined standards and management actions necessary, (viii) the evaluation and selection of a preferred alternative and (ix) the implementation of actions and monitoring of conditions.

3.3 The Leopold matrix
The Leopold matrix has been initially applied to evaluate environmental impacts of a project (Leopold et al. 1971). The y axis of the matrix represents the various project activities, while the actions, planned to be applied for each activity are placed in the x axis. A slash is placed at each cell of the matrix; the “evaluator” assigns a number at the upper-left corner depicting the magnitude of the possible impact (1-lowest and 10-greatest magnitude) and a number at the lower-right corner depicting the importance (1-lowest and 10-greatest importance), the latter derived by multi-disciplinary expert judgment from the team working on the EIA. Discussion is focused on the cells, which present the greatest magnitude and importance.
4. Methods

4.1 Definitions

This study considers as managers, all local and regional public authorities contributing in decision-making processes on the various environmental, economic and social aspects of an area. For the Municipality of Ilida these include the authorities of the municipality, the Prefecture of Ilia and the authorities of the Region of Western Greece. Tourism stakeholders include all groups and individuals involved, interested in, or affected positively or negatively by tourism (Aas et al. 2005) and will be also affected by a new tourism management plan. For the Municipality of Ilida, these stakeholders include companies and individuals actively involved in tourism business (hotel owners, tour operators) or in business sectors, which benefit from tourism (e.g. restaurants, coffee shops, patisseries, stores). By “local communities”, this study considers all individuals or groups of people, which may not directly benefit from tourism but may be interested to participate in tourism planning and management as it may affect their every-day living or provoke changes in an area, which may not be acceptable by these communities.

4.2 Process overview

The process described and applied is based primarily on the LAC concept, appropriately reformed to overcome the deficiencies discussed previously and combined with TCC into a common framework. The “reforming” includes (i) a reduction of the methodological steps from 9 to 6 (ii) the incorporation of a “dynamic” TCC when applicable and (iii) the use of the Leopold matrix to visualize collected information and enable comparisons-negotiations to facilitate strategic actions toward the sustainable tourism development of a destination. While the rationale of both the TCC and LAC concepts is focused on setting standards (limits or desirable conditions respectively), the currently proposed framework is focused on a step-by-step upgrading of a tourist destination’s environmental, social and economic conditions until all conditions reach a sustainable level (limit), either negotiated as sustainable between managers, stakeholders and local communities (mainly regarding the economic and social conditions) or estimated numerically (regarding the environmental conditions).

Regarding the specific case study, TCC calculation, when applicable, was a resource-based TCC (Saarinen 2006); however, in a more extensive application of the methodology, a modelling framework could be applied to achieve a more accurate and defensible TCC evaluation (e.g. Salerno et al. 2010).

Based on the LAC concept discussed previously, the process proposed is summarized in six steps (Figure 1):

**Step 1:** Definition of activity zones inside the tourist destination and of potential interactions between the zones under investigation

**Step 2:** Selection of indicators for each activity zone to describe the status of the economic, environmental and social conditions of an area

**Step 3:** Establishment of reference conditions (standards) for each indicator

**Step 4:** Scoring of each indicator according to the degree of deviation from the reference state (standards) and comparison by utilizing the Leopold matrix.

**Step 5:** Initiation of decision-making actions and procedures by upgrading those indicators (reflecting conditions), which received the lowest scores (and as a consequence comprise restricting factors for sustainable tourism development).
Step 6: Monitoring of progress, adjustment of procedures and further upgrading of all indicators-conditions with low scores until all scores reach high values, reflecting the sustainable upgrading of the tourist destination.

4.3 Process description

STEP 1 - DEFINITION OF ACTIVITY ZONES: While tourist destinations usually have specific hot spots (places concentrating the major tourism flow), a destination may also include wide areas of various types of economic activities, which can benefit from a tourist hot spot. A coastal zone, for example, may absorb the major tourist flow but an adjacent urban or rural zone may also be affected and benefit from the raised activity at the coastal zone. With specific management, tourism activities may be prompted to “flow” from one zone to the other, providing benefits to the wider area of the tourist destination. At this step, managers, stakeholders and local communities should arrange appropriate discussions to identify the various activities inside the area.

STEP 2 - SELECTION OF INDICATORS: Various sets of sustainability indicators have been developed (e.g. CIDA 2012; European Commission 2013). Indicator selection can be summarized in two main approaches according to Rajaonson and Tanguay (2012): (i) the scientific approach focused on integrating a large set of indicators to maximize precision (Miller 2001; Tasser et al. 2008; Hickey & Innes 2008) and (ii) the approach favored by decision-makers, in which data are condensed to synthetic indicators intended to support political decisions and are simplified for public dissemination (Gahin et al. 2003; Reed et al. 2006). The aim of this step is to select a representative group of indicators, which will effectively depict the various economic, environmental and social conditions of the tourist destination, ideally combining the two abovementioned approaches as several authors recently suggested (Bell & Morse 2008; Holman, 2009; Rametsteiner et al., 2009).

STEP 3 - ESTABLISHMENT OF REFERENCE CONDITIONS: Setting reference conditions may be a difficult task. This is often attributed to lack of available data to quantify the environmental, social and economic impacts of tourism, or to the complexity of the system, which results in high uncertainty of the estimation. As mentioned earlier, various methods have been developed to evaluate TCC either as a calculated limit or a negotiated threshold. In this step, TCC calculation is necessary only to provide a dynamic and flexible limit for negotiations during applying “magnitude” and “importance” scores at the Leopold matrix. Dynamic, as the tourist destination is adapting to a positive upgrade of a specific condition and flexible, as managers, stakeholders and local communities may change their perception on TCC as the destination is upgraded.

STEP 4 - SCORING OF INDICATORS AND COMPARISON: In this step, based on the scoring procedure of the Leopold matrix, “magnitude” and “importance” scores are assigned at each indicator. Magnitude depicts the possibility of each indicator (condition) for development, evaluated as deviation between the current situation and the calculated or negotiated reference conditions. To conform with the Leopold matrix scoring procedure, the percentages derived from these calculations are converted into a 1 to 10 scale where 1 indicates 100% deviation (condition needing attention) and 10 indicates no deviation (sustainable condition). Importance scores are assigned ideally after negotiating between the various actors of the tourism destination as described previously, reflecting the managers’ and stakeholders’ interest on the specific indicator/condition and giving thus priority to indicators with low magnitude and high importance.

STEP 5 - UPGRADEING OF LOW-SCORED INDICATORS: For example, a status of ‘2’ assigned at an indicator of surface water quality suggests that water quality is highly degraded. Considering that possible increase in tourism activities would pose more impacts on the surface waters of the tourist destination, the improvement of surface water quality should be a priority. Nevertheless, the importance of the indicator allows managers
and stakeholders to decide on assigning priorities, as a more “important” indicator-condition may be upgraded first.

**Figure 1.** The steps of the process (modified from the LAC planning process - Stankey et al. 1985). ENV: Environmental; EC: Economic; SO: Social; Grey shaded quadrants indicate that the next process cycles initiate from step 3 and end at step 6.

STEP 6 - MONITORING AND ADJUSTMENT: The decision-making process is a dynamic process of continuous evaluation and adjustment. Reference conditions are established, scores are assigned and indicators are upgraded. The results of each upgrade/improvement on “real life” (according to how managers, stakeholders and local communities perceive and evaluate each change) are monitored, and feedback is provided. Then, reference conditions may change (as many of these references may be negotiated and not always scientifically calculated), indicators are further upgraded and monitoring continues until all indicators reach their reference. The aim of the proposed process is to, by repeating the cycle described in Figure 1 (from step 3 to step 6), improve all indicators to ideally “10”. After reaching reference, specific monitoring will be required to provide the necessary feedback for possible adjustments.
5. Results

The Municipality of Ilida (western Peloponnese - Greece) was selected for the pilot application of the proposed methodological framework. Amalias is the capital city of the municipality, which is primarily an agricultural municipality with 32,219 inhabitants, covering an area of 401.9km² (Figure 2). The economy of the municipality mostly depends on the primary sector. During the last decades, efforts have been made for tourism development, given that this area is characterized by an extended, developed, sandy coastline, ideal for swimming, also including the archeological site of ancient Ilida. Moreover, various interesting sites of natural beauty are located nearby, while the great archeological site of Ancient Olympia is only 20 km far. The pilot application of the proposed methodology is based on already existing information on the various environmental, social and economic conditions of the municipality, which was assembled and properly processed to fulfill the requirements of the methodological framework applied. Most of the information regarding the municipality was derived from Greek documents on tourism data (ELSTAT - www.statistics.gr) and relevant tourism websites of the area. The pilot application is thoroughly described below, on a step-by-step procedure:

STEP 1 - DEFINITION OF ACTIVITY ZONES: Two major tourist destinations (activity zones) can be defined in the municipality: (i) the coastal area, with two primary beaches (Kourouta and Palouki) and (ii) the mountainous area with the town of ancient Ilida and the artificial lake of Pineios river, combining interesting natural and cultural sites.

STEP 2 - SELECTION OF INDICATORS: Eighteen indicators (four environmental, six economic and eight social) were selected to appropriately represent the economic, environmental and social conditions of the municipality (Table 1). Environmental indicators are related to the protection of natural and cultural heritage and indicate the quality status of coastal waters, wastewater treatment facilities and the population covered by the current water supply system. Economic indicators are related to employment and profits from the current tourism activities. Social indicators are mainly related to the rates of local awareness and satisfaction.

Figure 2. The Municipality of Ilida. The capital city (Amalias), the two major beaches (Kourouta and Palouki) and the town of Ancient Ilida are depicted.
from the current tourism activities, also monitoring the reaction of local communities to potential tourism development.

**STEPS 3 & 4: ESTABLISHMENT OF REFERENCE CONDITIONS, SCORING OF INDICATORS & COMPARISON** - A resource-based TCC was mainly used to establish reference conditions. However, as specific indicators require a “developer’s perspective” or a community-based TCC (negotiated thresholds regarding mainly social indicators), small-scale meetings were organized between the scientific team and local managers to derive such limits. The “magnitude” scores were initially estimated by an expert researcher and further negotiated, while “importance” was also a negotiated score. Obviously, it would be better to involve managers, stakeholders and the local community during such negotiations, however this could be feasible in case of an extensive application where all actors will participate.

For each indicator, reference conditions and the relevant scoring are described below:

**ENV1 - Protection of natural/cultural heritage:** The archaeological site of ancient Ilida, a wildlife refuge and a coastal forest are the main sites of natural/cultural interest in the municipality. All sites are legally protected. The protection of the archaeological site of Ilida is supervised by the Hellenic Ministry of Culture, Education and Religious Affairs, while the wildlife refuge is supervised and protected by the Ministry of Reconstruction of Production, Environment and Energy. However, in a local level there is no specific public authority to watch over these areas and prevent possible violations. Therefore, a score of 2/10 is assigned for both zones.

**Table 1.** Selected sustainability indicators reflecting the environmental, economic and social conditions of the Municipality of Ilida

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| **Environmental (ENV)** | 1. Protection of natural/cultural heritage  
2. Water supply capacity  
3. Coastal/Inland water quality  
4. Wastewater treatment |
| **Economic (EC)**     | 1. Nr of tourists per year  
2. Annual Nr of tourists / km coastline  
3. Access - road network  
4. Local enterprises/foreign enterprises  
5. Occupancy rate of accommodation facilities  
6. Contribution of tourism to local economy |
| **Social (SO)**        | 1. Annual Nr of tourists / local people  
2. Sustainable development plan  
3. Tourism management plan  
4. Local awareness of sustainability  
5. Employment in tourist enterprises  
6. Local/foreign workers in tourism business  
7. Tourist satisfaction  
8. Local satisfaction from current tourism activities |

**ENV2 - Water supply capacity:** While water for irrigation is derived from the artificial lake of Pineios river, drinking water is supplied from nearby springs and groundwater pumping. Lack of drinking water has often been reported especially during the summer season. The construction and operation of a water refinery to provide clean drinking water to 100,000 people from the lake of Pineios is ongoing. However, the refinery is
not currently in operation. While this indicator could score at 8/10 if the refinery was operating, as the carrying capacity would be 100,000 inhabitants (with current population 32,219 inhabitants) when the refinery is operating, a score of 5/10 is assigned to both zones, considering the water supply restrictions mentioned before.

ENV3 - Coastal/Inland water quality: The physicochemical quality of the artificial lake of Pineios river is excellent. The beach of Kourouta has been awarded a blue flag, indicative of the high quality of the bathing water and the facilities to support tourism activities. The beach of Palouki, although without a blue flag as it has less supporting facilities, also has clean water, suitable for swimming. As a result, the score of this index could be 10/10.

ENV4 - Wastewater treatment: A wastewater treatment plant is operating. However, it is not yet connected to all villages of the municipality. Considering that a rise in tourism activities will generate more wastewater and until all settlements are connected to the treatment plant, a score of 6/10 is assigned for the coastal zone and 7/10 for the natural/cultural zone.

EC1 & EC2 - Nr tourists per year and annual Nr of tourists/km coastline: For this indicator, TCC was derived by comparing the Municipality of Ilida with the Greek territory (negotiated as an initial dynamic limit) and with the Municipality of Skiathos Island, which is considered to have reached its TCC and was a similar municipality with data availability. Figure 3 shows the observed and reference data for these indicators. Greece reached 20,000,000 tourists during 2014 with 15,000 km of coastline, reflecting 1333 tourists per km of coastline. The island of Skiathos reached 119,069 tourists during 2013 with 44 km of coastline, corresponding to 2706 tourists per km of coastline. The Municipality of Ilida, with 8,300 tourists and almost 10 km of coastline, is far below the previous levels as the number of tourists per km of coastline is 830, revealing a high potential for tourism development. A score of 8/10 is assigned for the coastal zone. Considering that tourism is mainly focused on the coastal zone and is significantly reduced in the natural/cultural zone, a score of 10/10 is assigned for the latter.

Figure 3. Evolution of hotel rooms vs overnight stays for the period between 1995 - 2005 (left) and the annual number of tourists per km of coastline (right). TCC is defined at 2706 tourists from the island of Skiathos.
EC3 - Access/Road network: A national road ensures quick access to the coastal zone. In contrast, the road network of the natural/cultural zone is narrow, with more curves, reducing accessibility to the zone. A score of 8/10 is assigned for the coastal zone and 5/10 for the natural/cultural zone.

EC4 - Local enterprises/foreign enterprises: Three out of four hotels belong to local inhabitants and 2 out of 3 camping sites. This results in a 71% of enterprises belonging to local people. Most enterprises are inside the coastal zone and a small number is located near the artificial lake or the town of ancient Ilida. A score of 7 is assigned for the coastal zone and 1 for the natural/cultural zone.

EC5 - Occupancy rate of accommodation facilities: With the carrying capacity set at 100%, hotels often reach 70% occupancy, while the camping sites may reach 90% or even 100% during summer. The natural/cultural zone however is less occupied, below 50%. A score of 7/10 is assigned for the coastal zone and 4/10 for the natural/cultural zone. These scores reveal the necessity for further development of accommodation facilities, under a tourism development plan.

EC6 - Contribution of tourism to local economy: Profits from tourism activities indicate a small contribution on the GDP of the area of only 7.58%. This is the 1/4 of the relevant contribution of the primary sector on the area’s economy. Considering that, managers have great expectations for the local economy from a potential tourism development. A score of 3 is assigned for the coastal zone and 2 for the natural/cultural zone.

SO1 - Nr of tourists per local people: While for Greece this number is 20,000,000 tourists per 10,900,000 people, which means 1.84 tourists/local people and in the island of Skiatos 119,069/6,160 = 19.3 tourists/local people, in the Municipality of Ilida it is only 8,300/32,090 = 0.26 (Figure 4). Setting the TCC at 19.3, a score of 10 is assigned to reflect the zero restrictions regarding this indicator.

![Figure 4](image.png)

**Figure 4.** Graphical representation of the number of tourists per local people. It is obvious that the municipality is far below the TCC and even below the intermediate limit of 1.84.

SO2 & SO3 - Sustainable development plan and tourism management plan: There are few studies relative to the developmental opportunities of the area around the Pineios artificial lake and even fewer for the sustainable tourism development of the coastal zone. Currently there is no “official” sustainable development plan or a tourism management plan. A score of 2 is assigned for the coastal zone and 3 for the natural/cultural zone.
SO4 - Local awareness of sustainability: Although younger people are aware of the sustainability concept and may have adapted their every-day habits towards this concept, the larger portion of the population needs much education on such issues. Although they welcome any kind of development which will upgrade the local economy, they may stand against possible restrictions to non-sustainable practices. A score of 4 is assigned for both zones to reflect this situation.

SO5 - Employment in tourist enterprises: Data from the Hellenic Statistical Authority (ELSTAT) show that only 4% of the local people are employed in tourism business. This reveals a large capacity for development. A score of 9 is assigned.

SO6 - Local / foreign workers in tourism business: All workers are local people. This may be a good start for development of the local economy in a possible upgrade of tourism activities. A score of 10 is assigned.

SO7 - Tourist satisfaction: All hotels and camping sites of the municipality score above 7 in tourism sites, reflecting a general satisfaction of tourists from the offered facilities. A score of 8 is assigned to both zones.

SO8 - Local satisfaction from tourism activities: Local people are mainly employed in the primary sector. However, they get very satisfied when tourism activities reach higher levels each year and this reveals a general will to upgrade tourism in the area. A score of 9 is assigned for both zones. Targeted studies with specific questionnaires will enable more defensible conclusions and score adjustments may be required.

All indicators are integrated into the Leopold’s matrix and classified in five status classes according to their scores for better visualization and comparison (Table 2). It is evident that for both the coastal and the natural/cultural zones, eight indicators presented a status lower than ‘sustainable’. For the coastal zone, water supply and occupancy rate were the main restricting factors, in combination with the lack of a sustainable tourism development plan. For the natural/cultural zone, water supply and the lack of sustainable tourism development plan, in combination with almost no tourist enterprises in the area were restricting factors of development.

STEPS 5 & 6: UPGRADING OF LOW-SCORED INDICATORS, MONITORING & ADJUSTMENT: These steps of the process require political will to organize and implement a sustainable development plan, based on the scientific background offered from steps 1-4. During step 5, managers, stakeholders and local communities should focus their priorities on indicators with “negotiated” low magnitude and high importance. Considering that each indicator reflects a specific condition, a step-by-step upgrading of these indicators will increase the destination’s capacity for tourism growth. Along with the developmental activities that will take place in “real life”, monitoring is required to locate possible errors and adjust indicators appropriately to reflect the new conditions, which will be established after each upgrade.
Table 2. Comparison of indicators through the Leopold matrix for the coastal and natural/cultural zone. Restricting factors for development are expressed as low-scored indicators and highlighted with specific colors (Magnitude - upper left corner / Importance - bottom right corner).

<table>
<thead>
<tr>
<th>COMPARISON OF INDICATORS</th>
<th>Coastal zone</th>
<th>Natural/Cultural zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV1 Protection of natural/cultural heritage</td>
<td>2 (Red) 10</td>
<td>2 (Red) 10</td>
</tr>
<tr>
<td>ENV2 Water supply capacity</td>
<td>5 (Yellow) 8</td>
<td>5 (Yellow) 8</td>
</tr>
<tr>
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<td>10 (Red) 10</td>
</tr>
<tr>
<td>ENV4 Wastewater treatment</td>
<td>6 (Yellow) 10</td>
<td>7 (Orange)</td>
</tr>
<tr>
<td>EC1 Nr of tourists per year</td>
<td>8 (Red) 10</td>
<td>10 (Red) 10</td>
</tr>
<tr>
<td>EC2 Nr of tourists / km coastline</td>
<td>8 (Red) 8</td>
<td>10 (Red) 8</td>
</tr>
<tr>
<td>EC3 Access - road network</td>
<td>8 (Red) 10</td>
<td>5 (Orange) 10</td>
</tr>
<tr>
<td>EC4 Local enterprises/foreign enterprises</td>
<td>7 (Orange) 7</td>
<td>1 (Green) 7</td>
</tr>
<tr>
<td>EC5 Occupancy rate of accommodation facilities</td>
<td>4 (Red) 7</td>
<td>7 (Orange)</td>
</tr>
<tr>
<td>EC6 Contribution of tourism to local economy</td>
<td>3 (Orange) 9</td>
<td>2 (Green) 9</td>
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<td>10 (Red) 9</td>
</tr>
<tr>
<td>SO7 Tourist satisfaction</td>
<td>8 (Red) 10</td>
<td>8 (Red) 10</td>
</tr>
<tr>
<td>SO8 Local satisfaction from current tourism activities</td>
<td>9 (Red) 10</td>
<td>9 (Red) 10</td>
</tr>
</tbody>
</table>

1,2 (Red): Restricting factor (higher deviation from reference)
3,4 (Orange): High deviation
5,6 (Yellow): Moderate deviation
7,8: Slight deviation
9,10: Sustainable indicator (no deviation)

6. Discussion

Ideally, sustainable tourism development would require an objective and quantitative procedure to eliminate subjectivity in defining reference conditions in an effort to manage tourist destinations in the most rational manner. Practically though, defining a threshold over which alteration due to tourism activities becomes unacceptable has been proven to be rather visionary and much relevant criticism has been made on explicitly
quantitative concepts, such as the TCC (Graefe & Kuss 1990; McCool & Lime 2001). Such threshold theoretically exists, however it would be very time- and money- consuming to integrate the high amount of environmental and economic data necessary for an accurate estimation. Moreover, the social factor is a priori a factor of subjectivity, as different stakeholders, managers and local people have different perceptions on “what is unacceptable” (Ioannides & Billing 2005; Navarro-Jurado et al. 2012; Salerno et al. 2013). Several authors (Lindberg et al. 1997; McCool & Lime 2001), rightfully suggested a shift from “how many is too many” to “how much change is acceptable” (Castellani & Sala 2010) and this shift is currently included in the LAC planning process.

In accordance with Salerno et al. (2013), TCC is viewed as a systematic, strategic policy tool within a planning process rather than a unique number that is intrinsic and unable to be modified. Through this perception, the limits defined under the proposed process should not be conceived as static numbers but utilized to trigger negotiations focused on upgrading the indicators-conditions which are “closer” to the threshold. Since most thresholds are negotiated, they should also be utilized with much flexibility, considering that TCC may increase through specific actions (OECD 2002) and initial restrictions to growth might be mitigated through investments and regulatory measures (Coccossis & Mexa 2004). Within this conceptual framework, the proposed process shifts the planning and management targets from defining thresholds (while considers them necessary for negotiations) to a step-by-step upgrading of the current conditions. Thresholds, either static or dynamic, although considered throughout the process, they are flexible and may increase. The key concept of this process is that the upgrading of each indicator-condition should be applied gradually, with appropriate monitoring of possible changes posed on other conditions to adjust thresholds and possibly refine reference.

By using the Leopold matrix, the proposed process attempts to establish the missing link between science and policy making. This link is not “clearly” provided by both the TCC and LAC concepts, while considered necessary to trigger negotiations, support political decisions and simplify the scientific information for public dissemination, as mentioned earlier. Using the Leopold’s matrix as an advisory table managers will be able to focus tourism development on specific conditions and assign priorities to the process of development.

Regarding the specific case study, a high potential for tourism development was reflected through the indicator scores for the municipality. This potential is indicated by the very low annual number of tourists and the annual number of tourists per km coastline. However, prior to any actions to attract tourists, measures must be received to upgrade specific conditions (indicated by the magnitude of each indicator):

(i) 1,2 (Red) - A sustainable tourism development plan needs to be implemented; the natural and cultural heritage of the area should be protected from possible violations in a local level.
(ii) 3,4 (Orange) - New hotels and camping sites should be constructed, while actions towards sensitizing and educating the local communities should be implemented.
(iii) After upgrading and receiving feedback from (i) and (ii), the water supply system should be improved by operating the refinery of Pineios lake and wastewater treatment should be upgraded by connecting all settlements to the wastewater treatment plant (yellow cells of table 2).
(iv) When all low-scored indicators are upgraded to a score of 7 or 8, specific actions will be necessary to reach sustainability. The road network should then be upgraded and new tourist enterprises may then be constructed, as simultaneously tourist flow will be ascending. The Municipality of Ilida will become sustainable when all indicators have reached the sustainable status.
7. Conclusion

While sustainable tourism is difficult to define, it can be addressed through methods, which combine static or dynamic thresholds, such as the TCC, with more flexible frameworks, such as the LAC process. Despite the criticism received (McCool & Lime 2001; Farell & Marion 2002) they have been widely used and are currently much improved from their initial concepts (Ioannides & Billing 2005; Navarro-Jurado et al. 2012; Salerno et al. 2013). This study showed the potential of these methods to be fully operational when integrated in a common framework, with specific reforming to assign flexibility regarding thresholds and acceptable changes. Thus, a solid scientific basis can be provided to initiate discussions-negotiations between managers, stakeholders and the local communities of a tourist destination. Furthermore, by using the Leopold matrix as an advisory table, the scientific information that these methods integrate can be simplified enough to establish a link to support decision making and public dissemination.

The key conclusion of the current study is that rather than strictly defining thresholds or acceptable changes, sustainable planning and management should focus on the various conditions of a tourist destination and proceed to a gradual upgrade of each condition that restricts development with simultaneous monitoring and adjustment. Limits (either expressed as TCC or acceptable changes) are required to trigger the appropriate procedures to “remove” the obstacles that pose the limits and through a long-term process of continuous negotiations and adjustments, to implement a sustainable management and development plan of tourist destinations.

References


