Conservation and tourism. The*Carettacaretta*case in Crete.

Human Dimensions of Fish and Wildlife

Eirini – LampriniDaouti

Abstract

The loggerhead sea turtle is regarded as endangered (IUCN 2014) and distributed in a main oceanic ecosystems and in Mediterranean Sea. Crete is considered one of the most important nesting areas and included in a Special area of conservation of Natura 2000. However, a decrease in the population has been observed mainly due to construction and recreational activities related to tourism. In order to overcome these problems, a management plan have been proposed and implemented through the collaboration of state actors and NGOs. Though, the implementation remains at low levels. I discuss the wickedness of the problem through its ecological, instructional, and sociocultural dimensions and examine at which level adaptive management has already implemented. The report concludes that as a response to the existing problems specific technological, structural and cognitive fixes should be proposed in order to balance touristic development and conservation.

Introduction and presentation of the human dimensions issue

Most concerns related to wildlife populations and habitats usually have direct or indirect human dimensions considerations, either as a cause of, or a cure for problems (Dekker 2012). Effective and sustainable management must discover, understand, and apply insights about how humans value, want, affect or affected by wildlife. Implementation of these knowledge in every decision related to wildlife problem, must be the core of decision making. During these processes a variety of wicked problems emerge and disrupt the equilibrium between wild populations and the maintenance of the human activities. In the case of sea turtle management in Crete a number of problems arise due to the increasing touristic pressure.

The loggerhead sea turtle *Carettacaretta* is listed as a critically endangered species (IUCN 2014) with high value of existence. Is the only Mediterranean Sea turtle specie

that can be found and nests in Greece. Nesting beaches can be found in Zakynthos, Peloponnese and Crete. In Crete high densities reported in Chania, Rethymnon and Messara Bay.Crete is the third most important nesting area on a national level (Margaritoulis 1993; 1995) and nesting beaches are included in a Special area of conservation of Natura 2000 network and on the Habitat Directive as part of European nature and biodiversity policies (Archelon, 2012). Nevertheless, the population level decreased over the past decades at almost 50% at two of the most important nesting areas (Margaritoulis et al., 2009; Archelon 2012).Caretta - Caretta are strongly philopatric and always need to return to the same beach they were born to lay their eggs (Carreras 2007). Threats like environmental pollution, sea beds, speedboats and coastal degradation lead to lower nesting areas each year. A management program proposed in 1997 through the collaboration of NGOs and state actors in order to reduce problems and abig part was concluded in the Management plan of the ministry of environment (No 81352/1063/1-3-2000). Specific proposal was made to improve state of nesting beaches by discussing solutions to existing problems of light pollution, beach cleaning, sea beds and environmental awareness programs (Margaritoulis et al. 2009). Guidelines for future development of also made including construction criteria through national legislations.

The implementation of those measurements continue in low levels and crucial gaps remain in existing knowledge about population both from tourists and local community. Thus it is essential to investigate means by which balance the conservation needs of sea turtles with local need for sustainable touristic development. The present report taken into account the pressure on coastal areas and sea turtles due to touristic activities and values and attitudes of the stakeholders aims to investigate the social biological and institutional aspects of the issue and propose a more adaptive management plan.Focusing in encouraging the co-operation between local stakeholders and NGOs proposing fixes to improve the touristic product andincrease laws and regulation compliance.

Method(s) and analytical approach

Based on personal observations as a volunteer for one of the major stakeholder, the NGO Archelon (Sea turtle protection society of Greece), I will give a description of the issue and the stakeholdersinvolved and illustrate their interactions. In continuous,

a variety of information sources like personal experiences, project reports, laws and regulations will be described and supplement by the scientific literature.

The ongoing decrease on the sea turtle population, the lack of laws implementation as well as the exponentially increase of the touristic industry and by extension, the number of stakeholders involved lead to the characterization of the problem as wicked. I will investigate this hypothesis by investigating the turtle situation through the complexity of the wickedness by considering the diverse factors that affect and are affected by the wildlife management. This can be grouped into three major spheres of influence ecological, instructional, and sociocultural as described by Dekker (2012). Trying a more in depth description of the issue I will try to understand the stakeholders behaviors and intentions.

Before identifying potential solutions, I will examine if adaptive management has already successful implemented in this situation and discuss the possible limitations that face based on 9 pathologies proposed by Allen and Gunderson(2011). Based on those limitations I will identify potential solutions for the management based on the oppurtunities and drivers of change. Supplemented technological, cognitive and structural fixes will be proposed in order to support my management approach.

As a conclusion, I will emphasize on the primal aspects of the project including the major quantitative and qualitative goals of the management that need immediate action and the complications that require further research and development.

In-depth description of the problem

Going on step further into the human dimensions of the project I will try to illustrate the complexity of the wickedness of the problem by considering the diverse factors that affect and are affected by the wildlife management. This can be grouped into three major spheres of influenceecological, instructional, and sociocultural as described by Dekker (2012). I will give a description of the management through ecological and instructional sphere illustrating data, laws and policies and focus on the sociocultural elements of the issue including stakeholders (figure1), values, attitudes political and economic considerations related to the management.

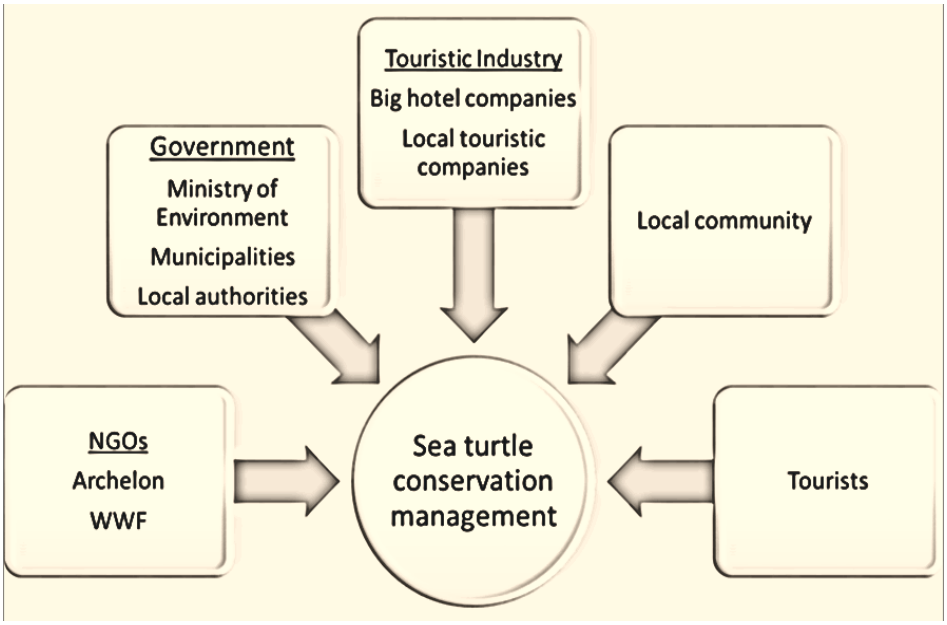

Figure 1 .Stakeholders in *Carettacaretta* conservation management in Crete.

Though the ecological sphere, the population exhibits huge decrease in two of the three major nesting areas. Specifically, in Rethymno 387 nests/year was recorded between 1990- 1999 while the next decade from 2000- 2011 the population exhibit a 42% decrease with 224 nests/year. In Chania a 45% decrease from 110 nests/ year from 1992- 2002 to 60 nests/year from 2002 -2011. In Messara the population represents stable nesting activity the past two decades. Major projects and interventions in the spawning areas resulting in the reduction and disrupting naturals dynamics concerning the reconstruction of the beach and decrease through the years the size of the available nesting areas (Sunolakis 2008). Additional occupation of the beach from sea beds and umbrellas increase the consequences of the problem. In summary in reproduction areas 9503 sea beds are recorded of an area of 20,44 km which 321 are stored during night. On the other hand, in the area that does not indicate any population fluctuations or decrease, from 574 almost half are stored during night (Archelon 2012). The reduction is strongly affected by high hatchling mortality due to light disorientation and collisions with passing vehicles. The extended use of technical lighting on the beach especially during night hours, directs hatchlings at the back part of the beach and the main roads. Nests are also affected by vibrations from the crossing of heavy cleaning vehicles and festivities near spawning areas.

Looking the problem from the institutional prospective, as already mentioned all of the spawning areas are included Natura 2000 network (GR 4330004,GR 4340003, GR4340006,GR 4310004 and GR4310012) and on the Habitat Directive (92/43/EEC) as part of European nature and biodiversity policies (Margaritoulis 2009). The management plan is also included as law by the ministry of environment (No 81352/1063/1-3-2000). Regulations highlight that after the sun down the sunbeds must be stored in order not to be an obstacle for the sea turtles and the government circulation prohibit the installation of headlamps on the beach and proposes measurements for the correct use of the lighting (FEK 792/29-4-2). Additionally, environmental regulations strictly forbid the crossing of the beach from heavy vehicles from May 1st until October 31 the period of laying and spawning of the eggs (Archelon 2012)

In most of the cases there is non -compliance and weakness to implement existing legal framework. .Local authorities even though there are trying to cooperate they are very flexible with the hotel owners when do not follow the rules. The touristic businessmen in order to make the beach pleasant for tourists, force the cleaning authorities to compress and clean the beach regularly. Conservation organizations pressure for the collecting the garbage manually but lack of workforce make vehiclesthe only solution. Unauthorized festivities inside or outside the spawning areas are a major conflict area between NGO and municipalities, which are reporting the violations to the local media and trying to prevent them. In most occasions are followed by lawsuits (Archelon 2012). NGOs prevents local touristic business to get a blue flag from Greek company of protection of the nature which indicates high quality of the ecosystem and beaches. Based on laws NGO are also blocking financial investments of locals in tourist industry.

Focusing on the sociocultural aspects of the issue and the human dimensions it is important to mention that on Crete sustainable tourism has a strong economic signification, to the point that becomes virtually synonymous with continuous profit-making (Psarikidou 2008). For locals the end of profitable tourism would automatically mean the end of the location’s future and strong affects their behaviors and attitudes towards the management of the sea turtles. Uninterrupted development and promotion of the touristic product is the essential element for the financial viability of the location. Political local actors and the touristic industry have a huge

stake in sustaining the touristic profits concentrating in the attraction as much tourism as possible for the next season. This view goes against the idea of sustainability, which is based on a wider view of the future. For example, when the economic expectations are interrupted by the NGOs actions, the reactions can be unpredictable, since the areas next to the sea turtles nesting areas are privately owned.

This value towards short- term financial benefits outweighsany kind of values of natural environment, biodiversity and sustainability and affects the implementation of management plans for the sustainability and increase of the sea turtle population. The only way to reverse this value towards a beneficial co-existence is if turtles are used as a leisure ability and add earnings to the stakeholders pockets.

A parameter that affects more the problem is the inability of the Greek state to implement the restricting for the land owners existing laws. NGOs react to the acquisition of the land adjacent to the nesting areas and increase the reactions from the local community. The role of NGOs sometimes extends beyond conservation operating as insider exerting influence on government police or as an outside pressure activating public opinion (Psarikidou 2008). Though their attempts to implement some protective measures they encourage more sustainable forms of tourism which eventually are used to support their conservation strategy.

A promising example and an indication of change is given by Grecotel hotel companies who saw sea turtle of Crete as an important source to improve touristic image of the areas, helping to maintain a high quality vacations.Crecotel and the NGO Archelon, developed a co-operation program that supports the protection of the sea turtles, since three of its hotels are adjacent to the most important nesting areas for Carettacaretta and contributes to hotels profitability(Valergal and Panagopoulou 2006). They collaborate in the implementation of measures aiming to improve nests conditions and hatchling access to the sea and organize activities aiming to raise awareness. Moreover Archelon activities are supported through sponsoring and donations. They realize that in the future they will be among the first groups that will be affected by the decline in environmental quality.

According to Jones et al. (2011)tourists attractive motive for visiting Crete is environmental quality and that is a basic value affecting their behaviors towards conservation. Turtles can act as an indicator of the healthy environment and fulfil the

demands of tourists for a clean natural ecosystem and also interested in sea turtles in general. In contrast, as Jones et al. (2011)study revealed, very few are aware of the Natura 2000 sites and the impacts of tourism in the area. In most of the cases, state is consider as the basic actor responsible for environmental protection and most of tourists expressed the importance of environmental protection and *Carettacaretta* specifically.Visitors link the environmental management with state actions, a conclusion which can be clarified taking into consideration that the Greek state is the main management actor for all environmental policies although there have been a few attempts recently to try to promote more participatory management frameworks (Dimitrakopoulos et al.2010)

Smaller local businesses employing big part of the local community do not adopt similar practices due to the need of quick profits and lack of appropriate resources to follow the market demands seem almost unwilling to encourage and support management efforts. Conservation does not make sense to the extent that generate future profit. This value is a major source of conflict between the basic stakeholders leading to disastrous effects on the environment in different ways.

The need for public consensus and dialogue is essential for a shift to a more focused and less anthropocentric approach by policy-makers and tourism actors and other stakeholders in a multilevel governance society.

Potential solutions from a human dimensions perspective

In the previous chapter I described the problems, stakeholder values and attitude though ecological, institutional and sociocultural aspects towards the management of the Sea turtles. The realization that the destruction of nature and its creatures is harmful for touristic industry has a key influence upon directing the management and policies. Adaptive management as described by Dekker (2012) involves learning as part of management process through increasing the knowledge and thereby reducing uncertainty. Allen and Gunderson (2011) also accepted this form of management but noticed that adaptive management is not a panacea for wicked problems and described 9 pathologies which can disrupt implementation of adaptive management. Table 1 evaluate in which range the pathologies apply in the *Carettacaretta* case.

Table 1. Evaluation of the nine pathologies of adaptive management in *Carettacaretta* management process.

Pathology	**Evaluation**
Lack of stakeholders engagement	☑Difficult to involve the majority of the locals in the conservation
Experiments are difficult	Conservation efforts follow the same process over the past decades.
Surprises are suppressed,	Environmental and social surprises are not often occur due to the environmental stability of the ecosystem.
Prescriptions are followed	☑Prescriptions are followed by the NGOs but touristic companies seem unwilling in some cases tothe implementation the laws
Action procrastination: learning and discussing remain the only ingredients	Learning and discussing are the only ingredients that are not taken into consideration in most of the cases.
Learning is not used to modify policy and management	A few stakeholders learn through the learning and modify the policies e.g. Grecotel embrace the sea turtle conservation and modified hotels policies accordingly
Avoiding hard truths: decision makers are risk averse	This pathology does not occur for the NGOs but mostly for the local authorities which avoid to implement the environmental laws under the fear of social responses.
The process lack leadership and direction	☑The basic leader in the conservation efforts seems to be the NGO but state must actively participate in order the

	project be successful and gain acceptance
Focus on planning and not action	Actions are most common when problems occur with lack on central planning

For the 9 pathologies only 3 seems to fit the problem and therefore adaptive management can be applicable. Following the scheme proposed by Allen and Gunderson (2011), uncertainty is high and risk concerns only stakeholders acceptance of for implementing measurements. However, through a co management approach the risk can be decreased with benefits for both species and touristic companies. Large companies have already felt the pressure for supporting conservation efforts and showing signs of responding to co management requirements. This can also be a driver of change for smaller companies and touristic operators which after the crisis eruption their profits are directly threatened. This is also affected by the gradual change in consumers' demands on cleaner and healthier environment. Increase of*Carettacaretta*population is an indicator for the quality of the ecosystem and that drive all the stakeholders to follow the implementation of a adaptive management scheme. Hoteliers and local community can support the plan if the realize that environmental responsible community is also the basis for a more sustainable economic future.

According to Allen and Gunderson (2011) adaptive management can be productive when basic conditions are fulfilled and intended to incorporate adaptive management principles, as appropriate, into policies, plans, guidance, agreements, and other instruments for the management of species.

- **The decision making is structured** in order to overcome management paralysis and identify and evaluate alternative management options by engaging local community, hotel companies, NGO experts and local authorities in a more proactive manner
- **Bridge the organizations** for participatory adaptive management in order to enhance and facilitate adaptive co management and governance which are essential to managing flexible social- economical systems. Engaging

stakeholder and providing outreach to keep the public informed. Improve communication and collaboration, intermediate level entities may serve to facilitate cross-scale linkages.

- **Adaptive governance**through sharing management power and responsibilities, and promotes a collaborative, participatory process. Dependents on adaptive co-management andleadership with vision
- **Enabling laws**and evolve them into the social- ecological aspects of the system in order theenvironmental governance of the species to be successful.

Those solutions can be reached through three types of fixes proposed by Heberlein (2012) for navigating the environmental attitudes. The fixes can be technological, cognitive and structural.

Technologal fixes can be focus in better monitor systems to the beaches and build up a communication channel through internet where stakeholders can organize meeting and open discussions regarding the current issues. Establish a common area for organizing festivities and other recreational activities away from nesting areas in order to reduce harmful for the species interactions and conflicts (lawsuits) from NGOs to hotel managers and local authorities.

Although structural fixes are already implemented through laws and regulations (Directives and Nature 2000) new fixes must focus on establish a high quality inspection procedures and prosecute offenders when they are not comply with the law. Offender must deal with high economic penalties and those many can be used to raise awareness or support any attempt of conservation or eco-tourism. Success can come when roles are well defined between local authorities though a clear hierarchy system. NGOs must act in the area not as inspectors of the law but share responsibilitiesfor the conservation of the species. As Jones proposes an accommodation tax can also implement taking into consideration visitors' perceptions and level of trust. Average Willingness to Pay (WTP) estimated as 1.13 € from the daily accommodation tax. In that way, the necessary funds could be collected in order to create the appropriate infrastructures, while financing eco-touristic activities
However, in order for the accommodation tax to become an effective policy accepted by visitors, it is essential that the level of trust toward the institutions responsible

increases, referring both to local NGOs, local authorities and the government. This may be achieved by an increase in the information flow and several cognitive fixes.

Cognitive fixes are most important and challenging in Carettacaretta case. Educating the public as Heberlein (2012) mentions cannot be a cure for changing people behaviors. Communication must be enhanced between stakeholders through monthly meetings before the begging of the touristic season in order to co-manage and organize activities that can be profitable for both parties. Specifically, focus and advisory groups should be created and conducted with the participation of all local stakeholders, in order to examine the potential benefits and obstacles of the two proposed policy instruments from stakeholders' perspectives and the means by which these can be overcome. Such actions will increase the levels of social and institutional trust while a higher level of awareness will significantly facilitate the effectiveness of the environmental management of the coastal area.

Education must focus on informing local touristic operators that a modified and environmental friendly touristic product can be also profitable attracting larger number of more sophisticated a higher budget- minded tourists. Fewer sea beds and umbrellas does not mean lower income but shift to a higher quality product and remain in high competitive market. Protection of the conservation will strengthen the ecological profile of Greece worldwide and have benefits on the promotion of the touristic product

Through formal networks such as the Greek Tourism Organization and the Greek Ministry of Environment information campaigns, seminars and conferences must raise the awareness among the touristic community, which are Jones (2011) survey revealed lacks information about sea turtle conservation.

Conclusions and further research

In conclusion, the management of the sea turtle conservation on Crete beaches has a strong human dimension constituents and show many characteristics of a wicked problem. Management involves many stakeholders who have different values and attitudes, leading to conflicts. Laws and policies are found wick to implementand touristic pressure affects the outcome of most of the efforts. Examples of productive

collaboration between Hotel and NGO is a bright example of sustainable but the greatest challenge remains to build a strong support base and among locals and small touristic companies and conservation organizations. Emphasis should be given upon the intrinsic value of species and ecosystems, as equals to humans. Touristic activities should not harm the functioning of the ecosystem but social carrying capacities of the area must be taken into account ad develop accordingly alternative tourists forms and management approaches. It crucial to reach a high degree of social consensus among the stakeholders through the co management approach where locals, representatives of the touristic companies and authorities being contact with each other and politicians support any attempt of a more environmental activity. Informations should not just educate the stakeholders but through them manage to reach participation and collaboration.

National and international awareness must be raise for the issue affecting both locals but also tourists expectations and prospective on the issue. At a legal level directives and national interests must synchronized and implement balancing the stakeholders interests and focusing in sustainability. Only through the choosing the appropriate fixes for the problem and focusing on the human dimension of the issue we can have a more genuine change in human behavior and the management efforts of the endangered species and their habitats.

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