

MARINE TURTLES: The Role of Flagship Species in Interactions Between People and the Sea

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ABSTRACT Quite apart from their utilitarian role as sources of food and materials, marine turtles have served as symbols, utilized for millennia by diverse societies and cultures. In recent years these reptiles have been given important roles by various social groups around the world. With the growth of conservation biology and the institutionalisation of environmental concerns, marine turtles have been employed, both explicitly and implicitly, as flagship species for conservation. In addition, these reptiles have also served as symbols -- flagships -- in other social contexts: a fact that has routinely been neglected, or denied, by conservationists. There is considerable confusion in the general concept of flagship species, and in addition to the general need to clarify this notion, there is a more specific need to understand the diverse social contexts in which marine turtles have played roles as icons for different social groups. Few natural or social scientists have studied either the social responses and/or the relations of different societies to these animals; and most information about marine turtles as flagship species is descriptive, or founded on untested assumptions and speculation. The papers in this Special Issue of *MAST* present diverse information that establishes a broad-based empirical foundation from which a rich array of working hypotheses can be generated. These presentations also provoke and foster much-needed interdisciplinary approaches. Meaningful resolution of environmental issues, particularly the conservation of biological diversity, can only be attained with the full and effective integration of the 'natural' and 'social' sciences, and flagship species can play a unique role in this effort.

Introduction

Marine turtles have been more than just sources of meat, oil, and shell. For millennia, societies from around the world have interacted with these marine reptiles in many other, less utilitarian ways; the motives and social values of these relationships are complex to understand and analyse. Although there is an enormous and diverse body of literature on the biology, conservation, and economic importance of marine turtles (Bjorndal 1995; Frazier 2002a; FAO 2004a; Godley and Broderick 2004; Spotila 2004; Tröeng and Drews 2004), there is very little on the other reasons and ways humans interact with these remarkable animals: this, despite the oft-cited fact that these reptiles serve as common, and powerful symbols. While the human-turtle relationship has obvious significance to specialists in marine turtle issues -- whether they be conservationists, fishers, scholars, or traders -- it also has profound implications for understanding how humans interact with and manage the seas, and the environment on a broader scale.

This paper summarises some of non-consumptive ways that people have interacted with marine turtles, showing that human-turtle relations are long-standing, diverse, and strong. It shows how this is especially relevant to setting priorities for biological conservation, namely, through the use of flagship species. The basic terms and concepts are explained in some detail, because so far their use has been limited largely to writings in biology and ecology, despite the fact that the flagship concept deals with issues central to the social sciences. The papers in this Special Issue are then introduced, pointing out key points in each of them; and a few generalities are presented, suggesting future topics of investigation.

Marine Turtles as Symbols

The portrayal, and celebration, of marine turtles is remarkable for its antiquity and diversity. Perhaps the oldest examples derive from the Middle East and the Arabian Peninsula, where cylindrical seals, stamps for decorating food preparations, reliefs on palace walls, and other cultural artefacts clearly depicting marine turtles are several millennia old. Terracotta miniatures, brass artefacts, and paintings from South and Southeast Asia, as well as paintings and statues from ancient Greece, also plainly portray marine turtles, and many of these depictions date back millennia. While turtle portrayals from Latin America, and Caribbean and Pacific Islands are not as ancient, the diversity of representations is nonetheless remarkable, appearing in ceramics, carved bone, stone, and many other media (see reviews in Frazier 2003a, 2004a).

Today representations of marine turtles appear in myriad situations and places, deriving from a variety of underlying motivations (Campbell 2003:323 ff.). Some of the most obvious examples are idols in religious contexts, such as on the Penghuy Islands, Taiwan (Balazs, Cheng, and Wang 2000; 2002). Marine turtles have been depicted on more than 1,000 postal stamps from 172 nations, including land-locked states such as Central African Republic, Lesotho, Mongolia, Uganda, and Uzbekistan. Three territories include these reptiles in their respective coats of arms: British Indian Ocean Territory, the Cayman Islands, and the Solomon Islands (Linsley and Balazs 2004). Marine turtles also have been portrayed on phone cards from nearly fifty states and territories (Linsley 2004). Some twenty-six countries have included depictions of these animals on their coins, and fifteen territories show these reptiles on their paper money. Marine turtles were displayed on the earliest known coins, from Aegina, Greece (Lopez 1996; 2004; Lorch 1999). In the case of Brazil, a marine turtle was selected for the two Reais note after winning a national popularity contest (Marcovaldi, Patiri, and Thomé 2005).

In addition to material representations, and quite apart from historic and academic descriptions (Frazier 2003a, 2004a), marine turtles appear in literary works of diverse types in many parts of the world (Molina 1981; McNamee and Urrea 1996). Consumer products, as common as chocolate bars (ESCC 2005), are promoted with marine turtle logos. Tourism programmes, and the tourist industry in general, make ample use of marine turtle images; for example, the logo of the Tourist Development Corporation of Malaysia is a caricature of a marine turtle, as is the logo of Cayman Airways. Tourist destinations from Borneo to Trinidad use marine turtles prominently in their advertising brochures and signs, as has been described in detail for

the Mediterranean (Cosijn 1995; Godley and Broderick 1996; Schofield, Katselidis, and Hoff 2001).

People in rural coastal communities around the world, often former turtle hunters, have been motivated to convene workshops and other sorts of meetings to discuss the plight of marine turtles, and agree upon collective actions to help to save them, sometimes with remarkable dedication to meticulous detail (which ironically may be of little biological or ecological significance in and of itself). These grassroots initiatives have occurred in places where the socio-economic status of the participants is anything, but affluent, such as in Pemba and Zanzibar, Tanzania (Slade, Khatib, and Yussuf 1997; Khatib 1998), and many Caribbean islands (Godley *et al.* 2004), not to mention dozens of other coastal areas around the world (Frazier 2003b).

As would be expected, images of marine turtles figure prominently on books and articles about these animals and turtles in general, in virtually uncountable numbers and forms. They are on the covers of books (Bjorndal 1995; Spotila 2004), monographs and special issues of academic journals (Frazier 2002a; Gelpke 2004), newsletters (Godley and Broderick 2004), and special reports (Khatib 1998) that deal specifically with these animals. More remarkably, these reptiles appear with prominence in several well-received academic textbooks that deal with a diverse variety of issues, far beyond marine turtles. For example, they adorn the cover of the third edition of *Essentials of Conservation Biology* (Primack 2002), a volume that has been translated into Chinese, German, Hungarian, and Spanish. A marine turtle is on the cover of so-academic a tome as *Applied Population Ecology: Principles and Computer Exercises Using RAMAS* EcoLab* (Akçakaya, Burgman, and Ginzburg 1999). The popular press has also made repeated use of images of marine turtles; for example, the front page of a national newspaper in France announcing a meeting of UNESCO on biodiversity, portrayed two baby turtles (Libération 2005). There is great public interest in, and support for, oddities involving these reptiles, no matter how ecologically insignificant -- such as a complicated airplane flight of twenty hatchlings in a private jet, accompanied by two biologists and a special agent of the US Fish and Wildlife Service, from Columbus, Ohio, to Juno Beach, Florida, for subsequent release (Miller 2001).

Each year specialists in various parts of the world organise meetings specifically to discuss the status of marine turtles and their habitats, with a frequency that could keep one in turtle meetings yearlong (Frazier 2003b). The educational and intellectual attractions of these ocean wanderers are not limited to inhabitants of the coast. A leading author on marine turtle issues works out of Iowa City, Iowa (Davidson, 2001); and the Henry Doorly Zoo, Omaha, Nebraska, is developing an exhibit on these marine reptiles (Cook *in litt.* 15 Feb. 2005). Both of these cities are located in the centre of the North American continent, thousands of kilometres from the sea. High school students' organisations in landlocked Missoula, Montana (Osborn 2004; EPI 2005), as well as New Hampshire (nearly landlocked) (Rolph *et al.* 2005) have developed a variety of exchange programmes and other activities focused on marine turtles.

Intergovernmental organizations pay heed to these marine reptiles. In 2004 the 'Newsroom' home page for the website of the Food and Agriculture Organization of the United Nations (FAO), which announces what issues the FAO has been recently involved with, showed, along with its institutional logo, the logo of the UN,

and the logo of the World Food summit, a photo of a swimming hawksbill turtle (*Eretmochelys imbricata*) (FAO 2004b). But FAO's involvement with these marine reptiles goes far beyond the attractive photos and press releases; the organisation has convened expert panels and working groups to address the much-lamented problems of incidental mortality of marine turtles from modern fishing activities (FAO 2004a), producing documents that have enormous importance in the development of international policy, particularly issues that impact multilateral relations, marine fisheries, and world commerce. This is not to mention intensely debated proposals for marine turtle exploitation put before the Convention on International Trade in Endangered Species of Wild Species of Fauna and Flora (CITES) or the much studied 'shrimp-turtle' case, deliberated at the all-powerful World Trade Organisation (WTO) (Frazier and Bache 2002; Bache 2005; Bache and Frazier in press).

Diplomatic delegations from scores of countries meet *expressly* to discuss the conditions of marine turtles, ways to conserve them, and even to negotiate international instruments such as treaties and memoranda of understanding -- documents *specifically* focused on marine turtles. The Inter-American Convention for the Protection and Conservation of Sea Turtles is a 'stand-alone' treaty, so far with eleven contracting Parties. The Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa, with nineteen signatory states, and the Memorandum of Understanding on the Conservation and Management of Marine Turtles and Their Habitats of the Indian Ocean and South-East Asia, with twenty-one signatory states, are agreements under the United Nations Convention on the Conservation of Migratory Species of Wild Animals, known also as the 'Bonn Convention' or 'CMS' (see Frazier 2002a).

Annual expenditures on turtle conservation are estimated to be at least 20 million US dollars worldwide (Tröeng and Drews, 2004). Major environmental organisations, such as the World Wide Fund for Nature, or World Wildlife Fund (WWF), have declared that all seven species of marine turtle are 'flagship species' for mobilizing public support (WWF 2005a, 2005b). This then places these marine reptiles in the same category with the giant panda, tigers, whales, great apes, and rhinoceros -- all regarded as highly attractive, or charismatic, animals on which public campaigns can be focused. Since the WWF is one of the largest, most powerful environmental non-governmental organisations (ENGO) in the world, the implications of their utilisation of marine turtles as campaign species is enormous. There is even a 'World Sea Turtle Day', on 16 June, 'the birthday of Dr. Archie Carr, the father of modern sea turtle conservation' (Salzberg 2005)!

Hence, in many societies around the world, at multiple cultural, economic, political, and social levels, marine turtles occupy special places. They are symbols for numerous and varied social activities. Remarkably, numerous examples of special importance bestowed on marine turtles relate to their classification as nationally and internationally endangered, threatened, and/or vulnerable. Hence, many societies, organisations, and governments around the world have determined that special actions are required for the conservation of marine turtles and their habitats (Frazier 2002b). To understand the roles played by marine turtles it is essential to understand the broader context in which the flagship concept was developed in biological conservation.

Species of Special Conservation Concern

For decades naturalists, field biologists, and conservationists have expressed consternation about the degree to which numerous species of plants and animals have been negatively affected by modernisation and other human activities; these include Charles Elton, founder of modern ecology (Elton 1958:143 ff.) and Frank Fraser Darling, pioneer in field studies (Darling 1947). After the UN Conference on Environment and Development ('Rio Summit') in 1992, terms like 'conservation' and 'biodiversity' took on international importance (Groombridge 1992; Heywood 1995), becoming highly fashionable so that people from all walks of life seasoned their conversations with 'conservation' as it became a commodity as much as a philosophy (Chapin 2004; Frazier 2004b).

Setting Priorities

Whether based on serious, carefully designed initiatives to promote the conservation of biological resources, or the desire to present a politically correct image, it is necessary to set priorities. With innumerable tasks and challenges for biological conservation, but limited trained personnel, funds, and other resources, conservationists face constant questions of where attention and action need to be focused. Should species popular with the public be assigned priority, or should organisms with other qualities be given most support? In addressing this question, Myers (1983:98) concluded that 'we need to devise an analytic methodology that supplies us with an evaluatory ranking of priority among species', and he proposed setting priorities based on more than just risk of extinction. The selection process he suggested included consideration of six classes of attributes: biological, ecological, genetic, economic values, cultural and aesthetic valuation, and 'exceptional-value ecosystems'. He explicitly emphasised the basic need for information and research from the social sciences to facilitate this ranking (pp. 118-119).

Normally, however, priorities for conservation, as defined by specialists from the natural sciences, are founded principally (if not exclusively) on arguments of biological and ecological importance (Spellerberg 1991:13; 1992:81, 101 ff., 134; Simberloff 1998). Within these restrictive criteria, eminent authorities in natural sciences have debated in learned journals about how to determine priorities for conservation. For example, some have argued that the 'little things' (invertebrates) run the world (Wilson 1987; see also Franklin 1993), while others contest that it is the 'big things' (large carnivorous mammals) that are important (Terborgh 1988). Related debates include positions extolling the importance of mechanisms for preserving selected species (Myers 1983; Noss 1991:232; Tracy and Brussard 1994; Wilcove 1994), countered with arguments that the focus on single species is ineffective and even passé (Franklin 1993; 1994; Simberloff 1998).

These arguments about which animals are most important are not simply the amusing pastimes of scholars. The debates are at the centre of a fundamental, and ongoing, enquiry about humanity's place in the world. Through iterative social processes they guide the ways that academic departments and institutions develop, transform, and respond to pressures from both peers and society in general. This in turn affects the development and projection of research priorities, not to mention the pursuit of resources and prestige, as well as social credibility and justification.

These events in academia affect, as through a positive feedback loop, general policies, and the ways that societies deal with regulations, legislation, the establishment of scientific and environmental priorities and directions, as well as countless other issues before different societies -- both within and without the realm of scientific endeavour (Nader 1996). In sum, the implications of seemingly esoteric debates about the relative importance of an ant mite or an agouti, a tardigrade¹ or a puma, are substantive and affect many parts of society.

Some authors have concluded that '[a]ssigning priorities to endangered species protection may be ethically hard and biologically problematic, but reasonable criteria exist for identifying creatures of special significance' (Kellert 1996:183). However, while some people may consider certain criteria 'reasonable', others may not: it is this process of setting priorities -- particularly for marine and coastal issues -- that is at the base of this Special Issue.

Terms for Prioritising Species.

A variety of categories and terms have been used to refer to organisms to which special attention is applied for describing ecological processes, setting policy in management practices, and promoting activities and campaigns for biological conservation. The list is long, including vocabulary such as: competitor, dominant, economically important, endangered, endemic, exotic, exploited, flagship, focal, index, indicator, indigenous, invasive, keystone, management indicator species (MIS), native, protected, pest, plague, predator, prey, priority, rare, spokesperson, star, surrogate, target, threatened, vulnerable, and so on. These different terms refer to ideas such as ecological role, economic value, geographic provenance, legal status, and level of risk. Collective terms that have been offered to group and organise these terms and concepts include 'featured species' (USFS 1971; Holbrook 1974:119); 'target species', or 'target taxon', (Wilcox 1984; Kremen 1994); 'high-impact species' and 'indicator species' Spellerberg 1991:93, 1992:52; Samways *et al.* 1995:486 ff.); 'conservation-focus species' (Samways *et al.* 1995:490); 'focal species' (Lambeck 1997; Miller *et al.* 1999; Zacharias and Roff 2001); 'category species' (Meffe and Carroll 1997:69 ff.); and 'surrogate species' (Caro and O'Doherty 1999; Andelman and Fagan 2000).

Not surprisingly, this plethora of expressions, all used in similar contexts, is often confused -- even by practitioners and major proponents of the terms and concepts. In addition, political or fiscal considerations, rather than the reputed primary (biological/ecological) criteria commonly drive selection criteria (Landres, Verner, and Thomas 1988; Pearson 1994). Consequently, there is widespread misunderstanding in regard to the meaning and application of the names employed to refer to species of special conservation concern. For decades, activists, biologists, conservationists, ecologists, and protected area managers have been debating how to define and organise concepts that have been in common use since the beginnings of modern ecology, as shown by a large body of literature (Thomas 1972; Landres, Verner, and Thomas 1988; Noss 1990; Spellerberg 1991, 1992; Mills, Soulé, and Doak 1993; Dietz, Dietz, and Nagagata 1994; Kremen 1994; Pearson 1994; Cowling, Samways, *et al.* 1995; Samways *et al.* 1995; Dublin 1994, 1996; Faith and Walker 1996; Power *et al.* 1996; Berger 1997; Lambeck 1997; Meffe and Carroll 1997; Simberloff 1998; Caro and O'Doherty 1999; Miller *et al.* 1999; Andelman and Fagan 2000; Entwistle 2000; Kotliar 2000; Leader-Williams and Dublin 2000; Williams, Burgess,

and Rahbek 2000a, 2000b; Zacharias and Roff 2001; Bowen-Jones and Entwistle 2002; Walpole and Leader-Williams 2002). Of particular relevance to this Special Issue is the fact that social scientists, particularly those specialising in environmental issues, rarely if ever use these expressions (see Moran 1990; Milton 1993), even though some of the terms should be the domain of these disciplines.

Deciphering Species of Special Conservation Concern

Apart from the terms used to denote certain levels of risk (endangered, threatened, vulnerable), legal status (legally exploited, protected), economic value (economically important, pest, plague), geographic provenance (endemic, exotic, indigenous, invasive, native) or ecological role (competitor, dominant, predator, prey), the more common terms used for species of special conservation concern have been 'keystone', 'indicator', 'umbrella', and 'flagship'. These four terms, singled out by earlier writers (Simberloff 1998; Zacharias and Roff 2001), appear routinely in discussions about priorities for biological conservation, the designation of protected areas, creation of rules and regulations, and many other aspects of conservation that have clear importance to the future of biological conservation and to the design and function of social institutions. Yet, confusion between these four concepts fuels debate and misunderstanding in the ecological and conservation literature, with discussions that enter into etymological and philosophical arenas. Hence, although this Special Issue is about flagship species, it is essential to clarify not only this term, but also the other three expressions with which it is frequently employed and often confused. In this light, a detailed bibliographic review is provided, with wide ranging citations, for those interested in exploring these issues in greater detail.

Keystone Species. The most precise biological and ecological criteria are needed to understand the role and function of 'keystone species'. The term itself was not used until 1969 (Paine 1969), although the concept of a single species critical to the structure and function of an animal community was clearly articulated by Charles Elton in his classic text *Animal Ecology* (Elton 1927:50ff., 129; see also Allee 1923:348 ff.); and before he employed 'keystone species', Paine (1966) had clearly explained the underlying concept. Alternate expressions that have been employed in the same way include 'strong interactor' (MacArthur 1972), 'mobile links' and 'keystone mutualists', (Gilbert 1980:19, 23) and 'ecologically significant species' (Wilcox 1984:643), together with a variety of combinations such as 'keystone herbivore', 'keystone host', 'keystone modifier', 'keystone predator', and 'keystone prey' (Mills, Soulé, and Doak 1993), 'ecosystem engineers' and 'keystone guilds' (Power *et al.* 1996). Adding to the terminological and conceptual complexity, Noss (1991:234) used the expression 'keystone abiotic factor', referring to fire as an example; Meilleur (1994:267 ff.) discussed 'keystone societies'; and Marcucci (2000) developed the thesis of 'keystone processes' in relation to landscape histories.

Keystone species are characterised by playing 'prominent roles in sustaining' other species (Terborgh 1986:339), or 'in maintaining the organization and diversity of their ecological communities' and having some 'exceptional' qualities 'relative to the rest of the community' (Mills, Soulé, and Doak 1993:219). Their significance for ecological processes far surpasses the abundance and biomass of keystone species (Power *et al.* 1996; Simberloff 1998). For example, some authors have argued that both pre-industrial and modern humans have been, or are, keystone species

(Meilleur 1994:269 ff; Kay 1998; O'Neill and Kahn 2000); and there is evidence that some populations of marine turtles may have had keystone functions before their numbers were decimated (Bjorndal and Jackson 2003). So important are species in this category that Caro and O'Doherty (1999) claim that keystone species are *not* 'surrogate species', differentiating them from indicator, umbrella, and flagship species. Hence, considerable importance has been attached to the identification, study, and conservation of keystone species. Of the four terms employed for species of special conservation consideration, keystone is most often used in the biological/ecological literature (Leader-Williams and Dublin 2000), and several authors have recommended concentrating research activities on keystone species (Power *et al.* 1996; Simberloff 1998).

However, as with other terms employed for species of special conservation concern, the use of 'keystone species' has been 'broadly applied, poorly defined, and nonspecific in meaning'. As a result, there have been attempts to summarise and synthesise 'the varied meanings of the term *keystone species*' (Mills, Soulé, and Doak 1993:219). There is no simple way to recognise and select keystone species, or list characteristics for *a priori* identification (Power *et al.* 1996; Simberloff 1998). Furthermore, a species that clearly plays a keystone role in one situation may have relatively little importance in another site, even if it is only ten metres distant (Power *et al.* 1996; Zacharias and Roff 2001:67 ff.). There is substantial variability between different temporal and spatial scales as far as concerns keystone species (Kotliar 2000).

To be able to objectively identify a keystone species, there must be a considerable body of ecological understanding about the species in question, the species with which it interacts, and the environment in which it lives. Consequently, routine assumptions about the ecology of keystone species are rarely met. In fact, what determines when a certain species plays a 'prominent role', or has some 'exceptional' quality is often in the end a subjective decision (Miller *et al.* 1999), and some specialists have concluded that the only value of the concept is for its heuristic function (Mills, Soulé, and Doak 1993:222-223). It is remarkable that the standard argument of conservationists -- that every species plays a critical role in the ecosystem, and thus cannot be lost -- indicates that in the end *each* species plays some kind of important role, and could thus be nominated as a keystone species, depending on one's interest in promoting any particular organism (Zacharias and Roff 2001:67).

Indicator Species. A concept that has been used for decades is 'indicator' species; it refers to an index of some selected feature(s) of the environment (Thomas 1972). The concept was clearly elucidated early in the twentieth century (Elton 1927:127 ff.), and term itself was first used in 1908 (Zacharias and Roff 2001:61). An indicator species provides a *surrogate* measure for some environmental condition that is more difficult to quantify, and for this reason the species in question is referred to as an 'index', 'indicator', or 'evaluation' species (Landres, Verner, and Thomas 1988). Kremen (1994:407 used the terms 'focal' and 'indicator taxa' synonymously, thereby adding yet more terminology to the concept.

Many authors have noted that indicator species can be employed to gauge two rather different types of features. They can indicate certain environmental parameters, such as rainfall, wind strength, or concentration level of a heavy metal; and they can also be utilized as a surrogate measure of the population condition(s) of some other species. Indicator species have been called 'the most ecologically concrete

of all the focal species' (Zacharias and Roff 2001:63). So important is the indicator species to ecological work that some authors consider this to be in a class of its own, and sub-divide indicator species into lower level categories such as sentinel, detector, exploiter, accumulator, and bioassay organisms (Spellerberg 1991:97, 1992:52; Samways *et al.* 1995:486 ff.). An alternate proposal is two subclasses: 'composition indicators' and 'condition indicators' (Zacharias and Roff 2001:61 ff.). Noss (1990) even recommended that a series of indicators are required for ecological work, to which Simberloff (1998) responded that such a procedure defeats the purpose of setting up indicators in the first place.

The canary in the mine is the classical case of an indicator species, and one might assume that the concept should be very clearly understood. However, in considering the ecological uses of vertebrate indicator species, Landres, Verner, and Thomas (1988:316) concluded that 'an absence of precise definitions and procedures, confounded criteria used to select species, and discordance with ecological literature severely weaken the effectiveness and credibility of using vertebrates as indicators.' The selection process is confounded because in some countries, like the USA, rare and/or endangered species are selected as indicator species for legal reasons (Landres, Verner, and Thomas 1988; Pearson 1994).

The basic assumption is that indicator species provide a reliable assessment, and early warning, of environmental quality or population trends. These 'are measurable surrogates for environmental end points such as biodiversity that are assumed to be of value to the public' (Noss 1990:357). Because subjective, ambiguous criteria for selecting indicator species lead to confusion and inefficiency, there have been numerous and diverse attempts to encourage workers to develop objective, scientifically defensible selection criteria, and even to test these criteria (Noss 1990; Pearson and Cassola 1992; Kremen 1994; Pearson 1994; Faith and Walker 1996). Nonetheless, despite the plea for 'scientific objectivity', there are recurring arguments to consider such characteristics as economic importance and direct relation to national pride (Pearson 1994:77-78). Hence, social and political considerations can be incorrectly included in the selection criteria, thereby generating confusion. Many effective indicator species are common, and of no particular conservation concern on their own: what is critical are the surrogate measures they provide.

Perhaps the most pragmatic description of indicator species is '[w]hen all else fails, biologists ... may resort to the use of indicators as a means of obtaining some measurement of stress on a natural system. This would normally be a fall-back position ... when the possibilities for studying the valued ecosystem components, either directly or indirectly, are limited.' (Beanlands and Duinker 1983:69).

Umbrella Species. 'Umbrella' species are those in which the individuals have large area, and/or rigorous habitat, requirements; carnivorous mammals or birds are commonly selected. The biological characteristics of species chosen as umbrella species are meant to support the selection and management of protected areas, so a basic characteristic of an umbrella species is that its minimum territory size is at least as great as that of other species in the area under concern (Wilcox 1984).

The basic assumption is that by conserving the environment needed for a species whose individuals need large expanses of habitat, the individuals of many other species will be protected: their 'requirements for persistence are believed to encapsulate those of an array of additional species' (Lambeck 1997:850). However, when put

to the test, the assumption does not always hold true (Berger 1997). Several authors have voiced critiques (Simberloff 1998; Caro and O'Doherty 1999; Andelman and Fagan 2000) that there is little evidence to support the idea -- attractive as it is -- that selecting umbrella species for conservation purposes actually provides automatic cover for a diversity of other valued species: no matter how large the umbrella or how strict its habitat requirements, it is not likely to include all the habitat requisites of other important species. This is particularly troublesome in marine environments, notoriously dynamic in time and space (Zacharias and Roff 2001:69 ff.).

Because it has been argued that the ecological requirements of one species alone are rarely adequate to meet the needs of a large variety of species, some specialists have proposed that to be effective what is needed is not an umbrella species, but rather a carefully chosen multi-species group, composed of 'focal species' -- those organisms with the most stringent ecological constraints (Lambeck 1997). Miller *et al.* (1999) give a series of detailed suggestions about how to select umbrella species, including pros and cons of various criteria and assumptions. While this approach would provide much more information about environmental matters, and facilitate more informed decisions, in the end the complexity a multi-species evaluation would require complex ecological studies -- which is just what the umbrella species concept is meant to avoid by providing a relatively simple source of information, a situation comparable to similar arguments regarding multiple indicator species (Simberloff 1998; Zacharias and Roff 2001:70).

In many discussions of species of special conservation concern, and even in evaluations presented to clarify the situation (Caro and O'Doherty 1999; Andelman and Fagan 2000), there has been confusion between umbrella and flagship species. In some cases (Noss 1991:234; Andelman and Fagan 2000) these two categories have been grouped together, as if they were in the same class, apart from keystone and indicator species, thus leading to another common misunderstanding in these terms.

Flagship Species. The term 'flagship', or 'flagship species', has been fashionable amongst conservation biologists since the mid 1980s. The concept has most often been applied to the large mammals, or 'charismatic megavertebrates' such as tigers, non-human primates, elephants, and rhinoceroses (Myers 1983:99, 112-115; Kleiman *et al.* 1986:970; Mittermeier 1986:233, 1988; Western 1987). A national bird, mammal, or flower is an institutionalised example of the flagship species concept. Environmental organisations employ flagship species for public campaigns, distinguishing them from keystone and indicator species (WWF 2005c).

While the other three terms for species of special conservation concern are based on concepts that require considerable biological and ecological understanding, flagship species are most effective when information from market research is available: for the primary question is not about the biology or ecology of the species, but rather what the public thinks of it and how much they like, appreciate, or approve of the species (Dietz, Dietz, and Nagagata 1994). Nonetheless, when describing flagship species it is common for conservation biologists to 'tack on' -- either explicitly or implicitly -- qualities that are characteristic of keystone, indicator, and/or umbrella species. It is particularly common to insert in the description of flagship species, in addition to socio-cultural attributes, features that imply biological characteristics that will enhance the chances of conserving other species if the

flagship is conserved.

Despite confusion about how to characterise a flagship species, there is widespread agreement that the primary qualities are not biological or ecological, but rather social. To drive this point home, I list below relevant quotes and excerpts from some of the more relevant papers in the development and evaluation of the flagship species concept. In each case the respective authors have emphasised preferences and values held by the public; these are all cultural and social issues -- not the usual biological and environmental qualities deliberated for other terms regarding species of special conservation concern. In a word, each of these passages shows that social issues are fundamental for flagship species, while biological and environmental considerations are not essential for this concept (in all cases italics indicate direct quotes, while normal font is used for paraphrased expressions).

- ‘...we could move on to consider economic, political, legal and sociocultural aspects of the situation: the Bengal tiger requires large amounts of living space in a part of the world that is crowded with human beings, but it could stimulate more public support for conservation of its ecosystem (and thereby help save many other species) than could a less-than-charismatic creature such as a crab.’ (Myers 1983:99);
- ‘...is an important “flagship species” for the Atlantic forest region as well, and provides an excellent example of how primates can be used to sell the cause of tropical forest conservation as a whole.’ (Mittermeier 1986:233);
- ‘...charismatic megavertebrates...’ that are ‘...the best vehicle for conveying the entire issue of conservation to the public...’, both in the US and in the developing world (Mittermeier 1988:145);
- ‘The related category of flagship species is composed primarily of “charismatic megavertebrates” that serve as symbols for major conservation efforts.’ (Noss 1991:235);
- ‘...great pragmatic value for conservation...’ emphasising their importance as symbols and ‘...supreme indicators of success in conservation...’ (Noss and Cooperrider 1994:87, 162-163);
- ‘...well-publicized species...’ that can be used for raising funds and other forms of support, for not only conservation initiatives directed at the flagships, but also for other lesser-known species (Spellergberg 1992:27);
- ‘...biodiveristy attention-getters and legal levers...’ (Franklin 1993:203);
- ‘Umbrella species are often charismatic, so they also function as flagships or symbols of major conservation efforts.’ (Noss and Cooperrider 1994:8);
- ‘...popular, charismatic species that serve as symbols and rallying points to stimulate conservation awareness and action.’ (Samways et al. 1995:491);
- ‘Sociological priorities can be assigned, as well, such as “flagship” species of particular historic, aesthetic, or cultural significance, whose protection may engender public support and thus educate others about the importance of a healthy and diverse biota.’ Kellert (1996:183);
- ‘...elicits a strong protective reaction...’ because people have an interest in it and find it attractive; flagships draw more financial support (Meffe and Carroll 1997:83);
- charismatic vertebrate species associated with flagship species (Simberloff 1998:248);
- ‘...surrogate species may be used as flagships in a socio-political context for attracting public attention and funding for a larger environmental issue...’; flagship spe-

cies are distinct from indicator and umbrella species, for they are not characterised by representing other species, having well-known biology, or being easily sampled or observed; ‘...flagships need only be popular, not ecologically significant...’ (Caro and O’Doherty 1999:806, 807, 810);

- ‘Flagship species are charismatic creatures ... that have wide appeal and thus draw attention to a conservation objective. They are the foundation of public relations and education campaigns, and the outreach built around flagships may be critical to building popular support for a protected area.’ (Miller et al. 1999:82);
- ‘...charismatic species that attract public support...’ (Andelman and Fagan 2000:5954)
- ‘Species presented as “flagships” appear to be more often selected for their inherent public appeal, rather than their ecological role and potential to ensure protection on a wider group of fauna or flora.’ (Entwistle 2000:239);
- textbook and other published definitions for ‘flagship’ focus on the idea of ‘symbols’ that motivate the public, because they have sympathy, or are attracted to these species. In the main, ecological functions are fixed characteristics or property of the keystone, indicator, and umbrella species in question, while ‘flagship’, and to a lesser extent ‘indicator’ species, are context-specific; used for strategic reasons, rather than ecological or biological sense (Leader-Williams and Dublin 2000:56-59);
- ‘Conservationists often choose “flagship” species from among the largest and most charismatic threatened mammals in order to raise public support for conservation...’ (Williams, Burgess, and Rahbek 2000b:249);
- ‘...the flagship species concept relies on human compassion, sense of responsibility, and -- to some extent -- self interest.’ (Zacharias and Roff 2001:59)
- ‘The use of particular species or taxa as symbols or “flagships” has been adopted by a wide range of organisations and agencies as a means of engaging and informing selected audiences about conservation efforts.’ (Bowen-Jones and Entwistle 2002:189); and
- ‘The major misconception regarding flagships is that they necessarily have an ecological role.’ ‘Whether or not flagships fulfill [sic.] ecological roles as indicators, umbrellas or keystone species, however, is not related to their role as flagships. To be a flagship, they need only operate in the public relations and fundraising spheres’ ‘The concept of flagship species capitalizes on the fact that such species have the ability to capture the imagination of the public and induce people to support conservation action and/or to donate funds.’ (Walpole and Leader-Williams 2002:543, 544).

In this light, Bowen-Jones and Entwistle (2002) presented detailed suggestions on how to identify ‘appropriate flagship species’, suggesting ten criteria that need to be considered; of these, two are focused on biological characteristics, and the other eight deal with qualities that involve socio-cultural relations between the species and society in question. Thus, without stating it -- and evidently without fully appreciating it -- many conservation biologists have coined, defined, and used a term whose conceptual basis relates to human attitudes and behaviour -- clearly the bailiwick of anthropology, communications, linguistics, sociology, and other disciplines often referred to under the catchall of ‘social sciences’.

Although the idea of a flagship species -- a symbol, an organism that has some special relationship with society, a species that attracts attention -- is ostensibly simple, it is remarkable how many authors have confounded this idea with other concepts for other types of species of special conservation concern. For example, Samways (1993a; 11) stated that '[i]nsect flagships have value in determining to what extent the landscape is truly fragmented, and to what extent it is variegated' -- clearly referring to ecological attributes and not qualities of human attraction. Likewise, in referring to seven countries that have 'congruence', or overlapping, endemic species of insects, Cowling, Samways, *et al.* (1995:179) concluded that '[t]hese countries are clear flagships for unique biotas', while Zacharias and Roff (2001:59) claimed that 'the presence or abundance of any of the four types of focal species [which includes flagships] ... is a means to understanding the composition, state, and/or function of a more complex community'. One of the most common grey areas is in postulating that the conservation of a flagship species '*in situ* will result in the conservation of a significant number of other species across a wide array of taxonomic groups, and in functioning natural systems (see Dietz, Dietz, and Nagagata 1994:33).

Moreover, several authors have pointed out that a flagship function in one locality may or may not be relevant in another, because biological and social situations -- particularly attitudes and cultural values -- can vary significantly. Depending on the objectives of a particular project, once potential flagship species have been identified for their attraction value, subsequent criteria can be used to select a flagship species that also presents certain ecological criteria (see, for example, Dietz, Dietz, and Nagagata 1994:35; Bowen-Jones and Entwistle 2002).

One source of doubt is what species can be valid candidates for flagship species. The expression 'charismatic megavertebrates' is routinely attached to flagship species; surveys in Brazil, Germany, Japan, the UK and US, found that various social groups, including students, tourist operators, and tourists, have marked preferences for large animals, particularly mammals and birds (Kellert 1980; 1993; 1996; Kellert and Berry 1979, 1980a, 1980b; Kellert and Westervelt 1981, 1983; Westervelt and Llewellyn 1985; Dietz, and Nagagata 1986; Plous 1993; DeKay and McClelland 1996; Goodwin and Leader-Williams 2000; Gunnthorsdottir 2001), consistent with the way funding is spent on endangered species in the US (Metrick and Weitzman 1996). In many studies it was concluded that the more similar an animal is to humans, the more likely it is to be preferred. Nevertheless, there are some very clear examples of flagships that have been neither megavertebrates -- nor even a vertebrates, nor charismatic. Some excellent flagships have included organisms that are small, unattractive, evolutionarily 'primitive', poorly regarded, or even dangerous; these include bats (Bowen-Jones and Entwistle 2002); the nocturnal, burrow-living cahow (Johnson 2003); lizards (Entwistle 2000) -- even man-eating Komodo dragons (Walpole and Goodwin 2000, 2001; Walpole, Goodwin, and Ward 2001; Walpole and Leader-Williams 2002); snakes (Daltry *et al.* 2001); sharks (PFC 2000); moths and butterflies (Greenslade 1993:54,56; Yen 1993:224); dragonflies (Samways 1993b:119); orthopteroid insects² (Rentz 1993:125, 127); giant earthworms (Yen 1993:225); kapok trees (Bowen-Jones and Entwistle 2002); wild corn (Iltis 1988); and even freshwater algae (Tyler 1996).

Hence, while marine turtles are 'just lowly reptiles', there is no inherent reason why these large, mysterious, harmless, attractive animals should not serve as effec-

tive flagships. Indeed, as explained above, the countless ways that these animals have been celebrated by humans, and particularly the diversity and frequency of their use as symbols by contemporary societies, show that marine turtles are well established as iconic symbols and clearly serve as flagship species.

Case Studies of Marine Turtles as Flagship Species

Background of this Special Issue

In September 2003 the Centre for Maritime Research, of the University of Amsterdam and of Wageningen University and research centre, organised a conference entitled *People and the Sea II: Conflicts, Threats, and Opportunities*, which provided a venue for convening a group of people, diverse in disciplines, institutions, and research interests, to discuss initiatives related to marine turtles, and from there, explore generalities in the people-sea interaction. A double panel provided time for six presentations, two of which have been revised and included as papers herein. In addition, other colleagues who could not attend the conference, as well as scholars contacted after the fact, were invited to contribute to an edited, multi-author volume. Of particular interest were researchers involved with innovative projects, but having limited connections with specialised English language publications.

In preparing their papers, several authors asked for an authoritative definition of flagship species, but only general suggestions and guidelines were provided. As described above, there is considerable variation in the use and definition of flagship species, as well as the other classes of species of special conservation concern, and it was felt best to let each author respond to the general task of describing marine turtles as flagship species as they felt best. In some cases, early drafts of the paper focused principally on conventional issues of biological conservation: the status of the species, research on its biology and ecology, and efforts to protect the animals and their associated habitats; this led to editorial suggestions that the authors concentrate on aspects beyond the biological and ecological, and describe how work that focused on marine turtles had resulted in impacts that transcended the species. Hence, each of the authors who submitted publications to this Special Issue was given -- within limits -- a free hand in how they wanted to address the question of marine turtles as flagship species, but at the same time, they were encouraged to probe questions beyond both the conventional conservation discourse and simple descriptions of flagship characteristics. After initial review by MAST editors, each paper was sent to at least two external reviewers, relying on at least one specialist outside of the natural sciences. This approach, it is hoped, will nurture exploration of what the flagship as a symbol has done and can do in the relationship between people and the sea.

What to Look for in this Special Issue

Not considering either this introductory paper, or the final paper summarising the contents and exploring avenues for future work, the papers in this Special Issue are grouped into five categories: 1) descriptions of conservation programmes focused on marine turtles, 2) regional overview, 3) research on why flagships are attractive and implications for conservation activities, 4) discordance and conflict in flagship functions, and 5) implications of marine turtles in the formation of policy. In each

of these studies the attraction of marine turtles has served to promote conservation initiatives; the flagship value has been employed to enhance public support. While this theme is common to all these papers, the design of the particular strategy has varied tremendously between examples. At what point was the flagship value actively employed? By what means? What ramifications did this have in conservation and social arenas? Were the strategy and initiatives evaluated, and how? These, and other basic questions on project design and function should be kept in mind when reading the following papers.

Conservation Programmes Focused on Marine Turtles. This group of papers sets the stage, with descriptions of different ways that conservation projects have used turtles as symbols to promote and nurture a wide base of interest and support for their work. In many cases, the realisation that alliances need to be developed with people who exploit turtles and their habitats has been the primary motivation for developing community-based conservation activities, and including as many and varied stakeholders as possible. All five papers in this category (Delgado and Nichols 2005; Laporta and Miller 2005; Marcovaldi, Patiri, and Thomé 2005; Martin and James 2005; Shanker and Kutty 2005) are first-hand descriptions from practitioners who were motivated to conserve marine turtles, and in doing so became involved in social issues, using the flagship to attract interest and serve as a 'calling card' to attract diverse stakeholders.³

One of the longest-running programmes for marine turtle conservation is Brazil's national programme, *Projeto TAMAR* (Marcovaldi, Patiri, and Thomé 2005). During the quarter century of its development, the programme has been awarded an impressive number of national and international prizes and won world renown for its remarkable use of marine turtles to attract attention and motivate a diversity of stakeholders, from isolated fisherfolk to urban politicians and government officers. TAMAR has come to symbolise community participation, the fostering of processes of consultation, establishment of partnerships, and promotion of self-sufficiency and cultural valuation. Originally a project of IBAMA, the federal environmental agency, the programme developed its own NGO with a hybrid administrative procedure that provides it with credibility and direct access to government. This structure gives TAMAR flexibility to work with different bureaucracies, responding to unpredictable federal support. Beyond this adaptability, TAMAR has also been able to establish social and cultural priorities that are rarely considered, much less institutionalised, in conservation programmes. In addition to the twenty-one field stations stretching over more than a thousand kilometres of mainland coast and remote oceanic islands, the programme has a substantial presence in several urban centres. TAMAR has developed effective marketing strategies to maintain its staff of over 1,000 people, and a wide diversity of projects and activities, including biological research and monitoring; outreach, education, training, cultural activities, and other forms of community development; product development, promotion, and sales; and administration and fund raising. By innovatively employing images of marine turtles, the programme promotes its conservation and community work, not to mention the sales of sundry fashionable items, and manages an annual budget of nearly 3 million US dollars (Marcovaldi, Patiri, and Thomé 2005).

The Karumbé project, TAMAR's younger southern neighbour, manifests several rare qualities: seemingly endless energy for a wide variety of activities, from

community education, outreach, and development, to promoting international treaties (Laporta and Miller 2005). Working in a part of the world where little has been recorded about marine turtles -- indeed, where their regular presence is often unknown, the group provides important insights into poorly documented aspects of turtle biology well outside the tropics. Although this was originally the main attraction for the formation of the group, and the source of its rapid growth through the incorporation of students, interns, and volunteers, Karumbé has fast become a vigorous promoter of collaborative work with the fishing industry. Indeed, fishermen from various artisanal and industrial fisheries are now active members of Karumbé, participating in regional turtle meetings and even in publications. Building on the TAMAR experience, the Karumbé project prioritises collaborating with fishermen and other members of coastal communities, who are actively involved in various initiatives. With a series of brief accounts by various members of the project, this paper provides a flavour for the ambiance of community participation. It shines with an innocent enthusiasm for, and celebration of, building bridges of communication and collaboration between formerly separate sectors of society. The young students' zealous attraction to marine turtles and collaboration with coastal communities, coupled with the experience and survival strategies of professional fishermen who share an interest in the turtles, has been the driving force behind their advances in scientific research and accomplishments in conservation and community development. The authors report that a 'transparent, careful and honest attitude, plus time and patience ... made the miracle of building up trust possible' (Laporta and Miller 2005). As the authors point out, the resolution of community problems bears directly on the resolution of conservation issues for marine turtles.

The fast-growing *Grupo Tortuguero* in northwest Mexico also prospers through the celebration of diverse inter-relationships between people and marine turtles (Delgado and Nichols 2005). As usual in so many marine turtle initiatives, the seeds of this programme were planted when the founders began conducting biological research. Not only do the Gulf of California and surrounding waters present unique situations for marine turtle biology, but the area also has a complex history, with diverse ethnic and socio-political groups: some traditions relating to marine turtles date back generations. The authors trace how marine turtles are much more than a source of meat, but have various values in different social contexts: catching turtles and consuming and sharing turtle meat and products is a way of life for many people. Although these reptiles are totally protected in Mexico, there is a thriving illegal trade. Legal and institutional attempts to regulate exploitation have been of little use, for prohibition presents a cultural dilemma: the *illegal* possession and consumption of marine turtles are symbols of wealth and power. The influential networks involved in the black market have converted marine turtles into symbols of the benefits of rampant crime and corruption. With an emphasis on community participation, *Grupo Tortuguero* uses marine turtles as mobilising symbols. Beyond participation by a variety of stakeholders, a sense of equity among the participants has been essential. The programme has established three priority areas: development and maintenance of networks, participatory research, and strategic communication and education to promote conservation ethics. It also gives considerable attention to the principles of network science as well as community-based social marketing (CBSM). Making use of the attractive flagship qualities of marine turtles, the pro-

gramme has captured the attention of not only students and teachers, but also of other people who could easily be considered as 'enemies' (Nichols and Safina 2004): turtle poachers and traffickers, if not also those in 'high places' who openly, and scathingly, flaunt laws meant to protect resources for society as a whole (Delgado and Nichols 2005).

The Nova Scotia Leatherback Turtle Working Group (NSLTWG) has also challenged the dogma on marine turtles in both biological and social arenas. In the former they show that leatherback turtles (*Dermochelys coriacea*) occur regularly in waters far from the tropics, much closer to the North Pole than to the equator; but it is the social arena that is germane to this Special Issue (Martin and James 2005). Enforcing conservation practices in marine environments is a major challenge, so full participation and cooperation by resource users is fundamental; thus, the project has aimed to engender a stewardship ethic among commercial fishers and other stakeholders. NSLTWG needed to avoid, or defuse, an adversarial 'we-they' situation in which the fishing community perceives researchers and conservationists as enemies. Hence, it was necessary to motivate fishermen to want to cooperate and conserve marine turtles. Moreover, cooperation is through volunteerism -- not from the provision of financial or other tangible incentives -- thus distinguishing this from many other projects involving scientist-fisher data-gathering ventures. The working premise of NSLTWG is based on altruism. The fishers provide specialised information and skills, sometimes including generous -- if not self-sacrificing -- assistance, services, and materials. In return, the NSLTWG provides the fishing community with information on marine turtles and associated issues, camaraderie, and recognition of the knowledge and assistance received from the fishermen. Signs of success include the numbers of people and communities who are participating and their many acts of altruistic collaboration. The authors suggest that participation is driven by a sense of responsibility, and that it will nurture a stewardship ethic for ever-more effective conservation measures developed and supported by the fishing community. A basic challenge that they highlight is to maintain sufficient interest and commitment over the long-term; and for this, outreach programmes are essential (Martin and James 2005). While the authors never use the term 'flagship species', the paradigms described are completely consistent with others where the authors plainly knew that they were employing these special characteristics of marine turtles: clearly, both the fishing community and the researchers are attracted to the leatherback turtles.

Three case studies from India show how differently the flagship symbol can be used (Shanker and Kutty 2005). Two of these, discussed here, illustrate how turtles successfully promote conservation initiatives, while the third, contradictory case, will be taken up in a subsequent section. The Students' Sea Turtle Conservation Network (SSTCN), in Madras (now called Chennai), is a project to conserve nesting turtles and their eggs. However, the benefits of the conservation activities are not clear, and it has been debated for years if the wildlife management component of SSTCN is warranted: a relatively modest number of hatchlings are released as the result of considerable effort and sacrifice. Yet, over the past two decades thousands of people have been attracted to the project, patrolling the beach in hopes of seeing a turtle. Hence, the SSTCN has been an effective outreach project, alerting the populace of a major metropolitan area about conservation needs; indeed, several of India's leading ecol-

gists and conservationists are ‘graduates’ of the SSTCN. While the Students’ Network project lacks participation from neighbouring fishing communities, *Theeram Prakarithi Samrakshana Samiti* (Coastal Ecosystem Protection Committee), is the product of a fishing community at Kolavipalam, Kerala, that organised to protect marine turtles, their nesting beaches, and nearby mangrove forests. *Theeram* is a classic case of community self-organisation, and shows the levels of motivation, cooperation, and organisational skills that have developed in response to concern for a flagship species. Attracting national attention, they have acquired recognition and support from local and state authorities -- a rare event. The members, self-taught in marine turtle and estuarine biology, are now treated as local experts and celebrities: they have acquired sufficient skills, motivation, and credibility to take legal action against powerful networks of illegal sand miners. The innovative nature of this project has attracted widespread recognition,⁴ including a national prize and documentaries⁵ as well as investigations by social scientists. Both the turtles and the villagers have benefited by *Theeram’s* activities. Marine turtles were knowingly used to attract students and draw the attention of the general public: they were consciously employed as flagships (Shanker and Kutty 2005).

Regional Overview. One paper summarises how marine turtles have been used, or perceived, as flagship species in the Caribbean. Eckert and Hemphill (2005) list turtle symbols in a variety of situations. They describe how several protected areas throughout the region were established, because they provide nesting and/or foraging areas for marine turtles; and at the same time these areas provide valuable protection for habitats on which other species depend. Several conservation initiatives in the region, for example to regulate coastal development or use of coastal areas, focused on marine turtle conservation, and thereby had wider consequences for biological conservation. The authors review how the concern about marine turtles drowned in trawling operations resulted in gear modification programmes, national legislation, the promotion of a hemispheric treaty, and a dispute before the WTO. More specific to their region, Eckert and Hemphill (2005) describe how these reptiles served as flagships in the Caribbean Environment Programme (CEP) of the UNEP Regional Seas Programme in the development of the Action Plan and the Protocol concerning Specially Protected Areas and Wildlife (SPAW). As they explain, because marine turtles are so attractive, and tourism is a major part of the economy in the Caribbean, these reptiles are of considerable importance to the regional tourism industry. Of particular note is the Cayman Turtle Farm on Grand Cayman Island, which has gradually taken on ever-greater tourism functions, with relatively less importance to the farming of turtles and sale of their meat and other products. The authors point out that theirs is the first attempt to evaluate marine turtles as flagship species in the Caribbean, encouraging greater investigation and testing of the assumptions.

Research on how and why Flagships are Attractive. Two papers report on actual research designed to understand how the flagship species function of marine turtles has affected people involved in nature tourism (Tisdell and Wilson 2005) and volunteering for a conservation project (Campbell and Smith 2005).

Tisdell and Wilson (2005) question whether popular flagship species automatically accrue conservation benefits by examining three case studies through the lens of tourism activities. Marine turtles are strong attractors for tourism, and in

places like Australia these reptiles are popular (Tisdell, Wilson, and Swarna Nantha in press). Indeed, they are one of the few animals that have a world tourism guidebook specifically devoted to them. Tourism can contribute in several ways to conservation goals: species and habitats can be conserved in response to needs of the tourist industry; increased awareness by tourists can lead to enhanced political support; better education of visitors can lead them to adopt more appropriate behaviours and actions. These gains may also promote the conservation of other species and habitats. Yet, despite its popularity, turtle tourism rarely satisfies all the requisites of ecotourism: often absent are cultural and educational elements. Moreover, tourism exists to produce economic returns, and financial goals may take precedence over conservation and social needs. Tourist behaviour can be detrimental to turtles and their habitats, and promote harmful, even illegal, activities such as black market trade. What goes under the name of 'ecotourism' is regularly held out as beneficial -- to both people and the environment -- but this is by no means a general rule. On the other hand, some forms of tourism that have no eco-friendly label may afford clear benefits for the species, environments, and host societies involved. Tisdell and Wilson (2005) describe the development of turtle tourism at Mon Repos, Australia, explaining its many benefits to turtle conservation and research, as well as to the local economy. In contrast, hatchery projects in Sri Lanka present numerous risks for conservation activities, despite their 'ecotourism' label; and unwitting tourists often support harmful rather than beneficial activities. Tourism at Cayman Turtle Farm, although not ecotourism, can help educate visitors and raise awareness. The authors warn that some tourism activities may involve hoaxes, especially because turtles are so attractive: hence, there can be a clear cost to being a flagship species.

Campbell and Smith (2005) investigate the poorly researched field of conservation volunteers and the importance of the turtle flagship as an attraction. Volunteers can provide numerous contributions to conservation programmes, and understanding what motivates them -- particularly in regard to marine turtles -- is critical to understanding the flagship function. Data from interviews and exit surveys showed that people who volunteer, and even pay, to work at the turtle research station at Tortuguero, Costa Rica, are attracted by several motives, both 'intrinsic' (altruistic) and 'extrinsic' (self-interest). These included contributing to conservation activities and helping with meaningful causes, acquiring experience and information for development of career and/or teaching materials, working out-of-doors, visiting the tropics and societies other than one's own, and personal enjoyment. However, the most frequently cited motive was to work with marine turtles on a nesting beach, and this high preference for turtles was found generally for all volunteers. Yet, overall, more women than men volunteer, especially for turtle conservation, and the authors raise the possibility that these reptiles may not be equally attractive between genders. Earlier studies showed that turtle volunteers do not represent society at large, but are biased toward people with higher education and income, whites, and women; and this must be considered when evaluating the impact of turtles as flagships. As the authors conclude, because of the interrelationships between different motives, it is difficult to isolate the role of just marine turtles; they also point out that participation in turtle conservation programmes is likely to enhance the flagship value of the turtles. Campbell and Smith (2005) ask whether environmental conservation is a 'northern concern', and point out the need for more information from southern

ENGOS and their supporters. While no definitive answers to what motivates volunteers could be provided, the authors point the way for specific studies to actually evaluate the attractive value of turtle flagships -- something critically needed to be able to understand this concept. Other studies presented in this Special Issue clearly show that environmental conservation is very much a southern concern, where supporters come from all walks of life.

Discordance and Conflicts in Flagship Functions. Three papers evaluate cases of conflict resulting from the use of marine turtles as flagship species. The case of turtle hatcheries in Sri Lanka (Tisdell and Wilson 2005) was discussed above, and the remaining two studies deal with even more complex issues (Kinan and Dalzell 2005; Shanker and Kutty 2005). While the geographic settings, cultures, and economies are very different, these papers share similar messages about the complexity of the flagship function.

Focusing on the Pacific, Kinan and Dalzell (2005) show how the same flagship can be employed simultaneously by different sectors of society to promote conflicting objectives. Growing concern about the incidental catch (bycatch) of marine turtles in fishing operations has reached the most ardent manifestation among conservationists in the case of longline fisheries and the leatherback turtle (*Dermochelys coriacea*) in the Pacific (Anonymous 2004). Under the banner of marine turtle conservation some ENGOS have lobbied tenaciously through public relations and legal campaigns not just to regulate this fishery nationally, but to close it globally. The authors argue that the resultant management decisions -- particularly the closure of Hawaii-based longline fishery -- have complicated, not facilitated, the resolution of bycatch problems. For both legal and social reasons cooperation with the fisheries sector is less effective than it has been in bycatch issues with species other than marine turtles. Kinan and Dalzell (2005) conclude that 'turtles are the flagship species for litigation', arguing that much of the discourse for longline closure is untenable, and not supported by scientific studies. Management objectives of some ENGOS employing the turtle flagship are in direct conflict with the economic, cultural, and political aspirations of citizens of small island states: a longline fishery represents a lucrative economic alternative, where few other employment opportunities or means to 'modernisation' exist. Moreover, in several Pacific territories marine turtles are symbols of cultural identity, recuperation, and rights, because of their importance in diverse cultural contexts; and it is argued that controlled use of turtles for cultural reasons would strengthen effective conservation of marine turtles in the region. Here again the authors show how the same flagship when viewed from conflicting perspectives is likely to produce contradictory, even counter-productive, results.

Although two examples from India show marine turtles serving as flagships to promote conservation and community-based initiatives (Shanker and Kutty 2005, see above), the third illustrates how complex the flagship concept can be. In Orissa, home to the largest concentrations of marine turtles anywhere on the planet, the celebrity status of the turtles has evidently confounded the situation. At the root of the conflict is the seasonal conversion of vast expanses of beach into putrid scenes of mass death, with tens of thousands of reproductive turtles washed up dead, just inshore of where the most intense trawl and gill net fishing occurs. Here, contention about turtle excluder devices (TEDS) has been long and intense. The former director of the Central Marine Fisheries Research Institute proposed introducing the gear

into the Orissa fishery in 1983, and for nearly a decade there have been various initiatives to instruct trawl fishers about TEDs, and even to make the equipment available at no cost. But, trawler fishermen reject the gear as well as fishing area closures, blaming various other factors on the turtle deaths. Their defences are as innovative as they are incredible, with claims that turtles are dying in the tens of thousands every year, because of 'labour pains' and 'migratory stress' -- unknown in the evolutionary history of any turtle species, from anywhere on the planet. Remarkably, artisanal fishers collaborate with the trawler fishermen and reject the state fisheries regulations -- enacted primarily to support the small-scale fishery, whose gear and fish stocks are often destroyed by trawlers. This has resulted from the misunderstanding that regulations are to protect turtles. The high profile, confrontational approach of turtle conservationists has prompted polarisation and conflict; the high visibility of the turtle conservation campaigns has resulted in antagonism. Hence, Shanker and Kutty (2005) question if the more appropriate term for the image conjured up by marine turtles is that of a 'gunboat' rather than of a flagship. In these cases, rather than sensations of attraction and appreciation, some sectors of society respond with spite and loathing.

Implications of Marine Turtles in the Formation of Policy. One paper describes how international marine policy has been affected by marine turtles, and the relevance of these events not only to the conservation of these reptiles, but broader issues such as international commerce and governance. Bache (2005) first discusses four aspects of policy development: the role of science, influence by non-governmental organisations (NGOs), domestic actors and institutions, and international actors and institutions. In describing the tensions between advocates of the scientific method and policy development, she explains that although the former are meant to focus on discovering the 'truth', the latter deal with values and other constructs that are outside the realm of science. However, when there is uncertainty, scientific results can be used simultaneously to advocate contradictory positions. In the end, policies are promulgated through an interplay of various actors and interests. Within this framework, the author describes the shrimp-turtle dispute at the WTO. During the 1970s, shrimp trawling was recognised as a major source of mortality for marine turtles in the US, which led -- after intense conflict -- to gear modifications and the development of national policies to mitigate the bycatch problem. This in turn led to national legislation that influenced bilateral policies, and then the international arena through the WTO, which resulted in major global impacts not only to marine turtle conservation issues, but also to bycatch mitigation policies, the trade-environment relationship, and trade policy. Bache (2005) explains how these various events also led to the development of multilateral environmental instruments, focused on the conservation of marine turtles and their habitats. All this was promoted by the fact that marine turtles are attractive to a wide sector of society, and concern for these flagship species provided the public support that prompted many of these complex events. This example is the epitome of how the attraction of flagship species can be channelled to promote substantive policy developments with impacts in economic, social, legal, and environmental arenas.

Conclusions

Marine turtles have served as powerful symbols since prehistoric times, a role that continues in contemporary societies with diverse manifestations. Hence, these reptiles are classic 'flagship species': animals that attract the attention of various social groups, and thus can be used to motivate people in certain ways. With the amount of confusion in the conservation literature it is fundamental to understand that the flagship concept is independent of biological and ecological attributes, but depends on social phenomena.

The papers in this Special Issue of *MAST* provide varied perspectives on the notion of marine turtles as flagship species, the most common of which is to attract attention and support for conservation programmes. In many cases, projects originally designed by specialists in the natural sciences for research and conservation of marine turtles had to be expanded -- or modified -- to include community-based participation, communications, and other aspects that fall outside the usual realm of biology. Whether or not the marine turtle flagship was part of the original project design or became incorporated along the way, it now plays a critical role in many programmes. This is clear for *Projeto TAMAR* in Brazil, the Karumbé project in Uruguay, *Grupo Tortugero* in Mexico, the Nova Scotia Leatherback Turtle Working Group (NSLTWG) in Canada, the Students' Sea Turtle Conservation Network (SSTCN) in Madras, and *Theeram Prakariti Samrakshana Samiti* at Kolavipalam, Kerala, India. The generality of the attractive, inspirational marine turtle symbol holds true despite wide ranging differences in geography, religion, language, educational level, social status, and other cultural aspects, whether referring to the practitioners or the targets of these various programmes.

In some cases, however, the same symbol represents disparate -- and conflicting -- interests of different sectors of society. Hence, while conservationists see the marine turtle as a valuable symbol to rally support for the protection of endangered species and creation of protected areas, other people may view the same turtle as a marketing tool, or as an emblem of cultural identity and revitalization, or perhaps even as an symptom of problems and obstacles to their interests; and in the last case the symbol is viewed as something to be despised, if not destroyed. The contrasting ways in which marine turtles are employed as symbols by different sectors of society in the Pacific illustrates how the same flagship can represent contradictory interests and goals. Even more extreme is the situation in Orissa, India, where instead of idolising turtles, the trawler fishermen have demonised them.

These contradictions demonstrate that although widely used by conservationists and ecologists, the term 'flagship species' -- not to mention allied terms -- is not well defined, and is often confused -- even by practitioners who champion the concept. Despite enlightened suggestions on how to select effective flagship species (Bowen-Jones and Entwistle 2002), we still do not really know how a flagship functions above other potential symbols, and what social processes and phenomena are involved in making these organisms so attractive and effective at motivating people.

Two papers in this Special Issue point the way to answering basic questions about flagships and the social processes underlying them. Understanding how the tourism industry in various places interacts with marine turtles -- how turtles serve as attractions for tourism, as well as for conservation programmes -- provides insights

on how different interest groups collaborate, or compete, in the use of the flagship. In some cases what appears to be collaboration may in fact be misrepresentation and hoax. In this light, understanding what motivates people to volunteer, and even pay, to work on turtle projects provides basic information for understanding the flagship species phenomenon. Clearly, the turtles serve as important attractions, but many cultural, demographic, and motivational considerations, among others, need to be investigated to be able to more fully understand how the flagship operates in various sectors of society.

To this end, it is essential to understand public attitudes, values, and knowledge systems, but here also there are major gaps in the scientific information. Although public surveys, assessing the values attributed to certain species by different sectors of society in several countries have shown general popularity for large mammals and birds -- those animals that most resemble humans, this finding may result in part from investigators focusing more research on these types of animals. In some cases the general public can clearly be attracted to marine turtles and other large reptiles, including even highly dangerous animals (Tisdell, Wilson, Swarna Nantha in press). If research on public opinion is concentrated on certain kinds of mammals and birds, and relatively little is attention paid to other organisms (see Kellert and Berry 1985) then investigators themselves may unknowingly be swayed by the attractive qualities of the flagship. Hence, methods for evaluating values and other social processes need to be carefully reviewed.

The complexity, and disparity of meaning and symbolism, that occur with marine turtle flagships underscores the need to scrutinize the flagship concept in considerable detail. What does it really represent? To whom? How does it work? How and why do some animals take on special values for society? And, for those concerned with conservation: how can the use of a flagship species be made most effective as a communications and management tool? For example, what is it that motivates the world community of marine turtle specialists (Frazier 2003b) to be so dedicated to the study and conservation of these reptiles? Beside the need for honest self-reflection, research in a diversity of social science disciplines (anthropology, communications, economics, linguistics, psychology, sociology, and others) is required.

What is clear is that concern for marine turtles has resulted in far more than a global network of conservation projects. The impacts of various enterprises focused on these reptiles have touched the very heart of modern society, with profound implications on much wider issues such as community empowerment, international relations, and governance. At the root of these discussions is the never-ending debate about humanity's role in the world.

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Notes

¹ The tardigrade is a microscopic invertebrate, related to the arthropods and better known as a ‘water bear’.

² The term ‘orthopteroid insects’ includes such things as crickets, grasshoppers, and katydids.

³ With few exceptions in the studies described herein, the people who actively go to sea to fish are men, so in most cases they are referred to as ‘fishermen’. This in no way should be considered a sexist political statement: it quite simply is a description of the gender of the people who are actively fishing.

⁴ An internet search on 'Theeram/Kolavipalayam/Turtle People' locates dozens of websites that report on the project, such as (Basheer 2003).

⁵ See 'Aamakaar -- The Turtle People' by Chrysalis Films <<http://turtlepeople.com/>> (Godfrey 2005).

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