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**Nicholles, K.H. and MacCummon, H.R.** (1975) Nutrient loading to Cook Bay ... Watershed. *Int. Rev. Gas. Hydrobiol.* **60**: 159-193.

**Riley, J.P. and Chester, R.** (1971) *Introduction to Marine Chemistry*, Academic Press, London and New York, 342 p.

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## Ecotourism, Marine Science and the Environment

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**ABSTRACT.** Ecotourism is the single fastest-growing sector within one of the world's booming multinational industries, and yet its credentials are fast slipping, its links with science and the environment are often minimal. So-called ecotours are now available to the most remote parts of Earth's wilderness – the snowfields of Antarctica and the Himalayan roof of the world – as well as some of the most popular – the pyramids of Egypt and wildlife reserves of East Africa. Even lunar tourism is now being mooted. Whereas mass tourism usually spells extreme environmental stress and ultimate disaster, ecotourism is supposedly more sensitive and environmentally friendly – but does it work and can it be sustained? The marine environment is particularly popular amongst ecotourists – remote island locations, Galapagos wildlife oddities, Australia's Great Barrier Reef, whale-watching cruises, sea-kayaking between the tropical islands of the Kingdom of Tonga, Red Sea diving, and many many more. As marine scientists, I believe we have a responsibility to engage in a dialogue with industry and government – what is and what is not ecotourism, what is best practise, what are the environmental consequences and where is it going in the 21st century?

### Introduction

The World Tourism Organization estimates that there were more than 663 million international travelers in 1999. Spending by these tourists was estimated at more than US\$453 billion. Tourist arrivals are predicted to grow by an average 4.1% a year over the next two decades, surpassing a total of one billion international travelers by the year 2010 and reaching 1.6 billion by the year 2020. Tourism is the world's largest employer, generating, directly and indirectly, nearly 200 million jobs or some 10% of the jobs globally.

There is little doubt that tourism is the world's largest industry with an annual turnover of US \$4 trillion. Ecotourism is its fastest growing component, with growth rates in excess of 30% per annum in many areas (Burns & Holden, 1998 and Carter & Lowman, 1997). The vast majority of this

growth is to be found in developing countries that desperately need foreign investment and currency. The urge to develop at a fast and unmanageable rate is all too prevalent in these areas, so that the original aims of eco-sensitive tourism are lost almost before they have been implemented. As a result there is strong encouragement from some quarters towards *sustainable tourism development*, in the hope that the environment and stakeholders in the areas in question can maintain an appropriate balance (Coccosis & Nirjkamp, 1995 and Wahab & Pigram, 1997).

For example, two of the key recommendations emanating from the World Tourism Organisation (WTO) and United Nations Environment Program (UNEP) sponsored International Conference on *Sustainable Tourism Development in Small Island Developing States*. Lanzarote stated:

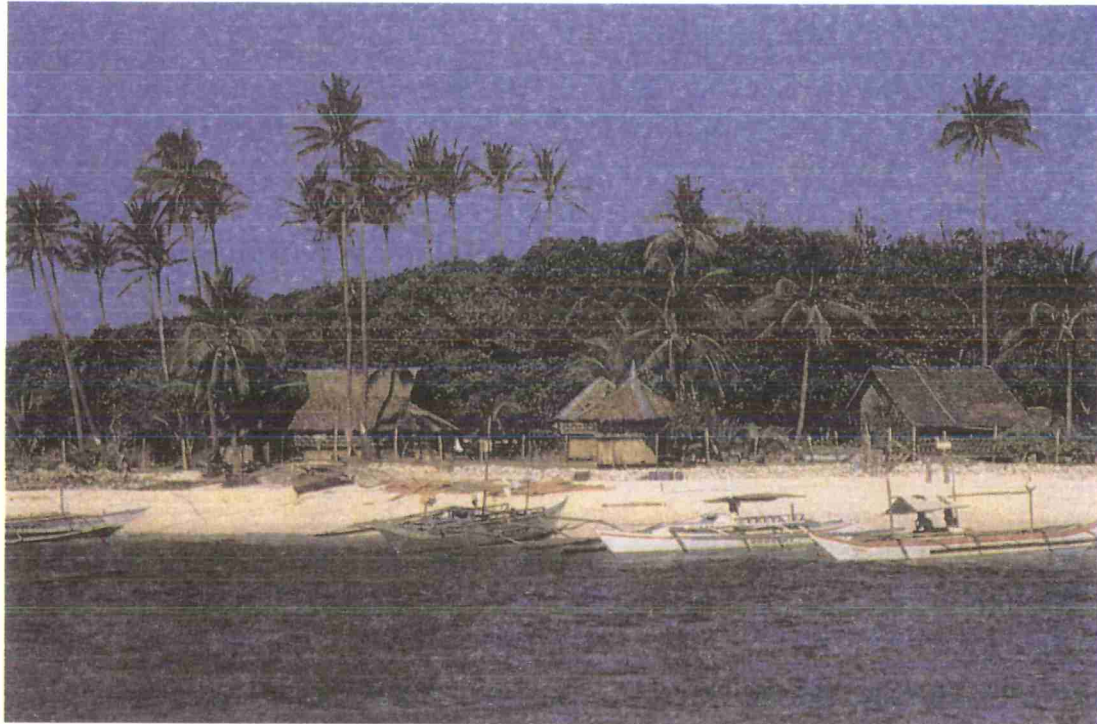


FIG. 1. Boracay Island, the Philippines. One of many small eco-sensitive islands threatened by the possibility of global sea-level rise, as well as by increase in eco-tourism.

*"Recognising the fact that sustainable tourism is about continuous education with all stakeholders, the need arises for the implementation of awareness campaigns and educational programmes, so that the investment is focused on people not only physical development." and "Private sector operators should play an increasing role in educating their clients on environmental issues. Several operators have demonstrated how doing this can help tourism destinations to improve their environmental standards and encourage better environmental practices."*

Clearly, the need for sustainable tourism development practices to be wholeheartedly adopted by every stakeholder is vital if developing countries and fragile ecosystems are to be able to co-exist with present levels of global tourism. With growth still expected in this already huge industry, the requirement of sustainability is not just vital but paramount (Hall & Lew, 1999).

In this paper, we seek to examine the aims and principals of sustainable *marine* ecotourism, document examples of good and bad practise in the

field, and explore the impact of educationally centred ecotourism on the uptake of sustainable practices by those connected to the tourism industry. We comment briefly on the implications for tourism along the Red Sea coast of Saudi Arabia. In part, the paper represents the essence of a presentation given at the *Second Symposium on the Red Sea Marine Environment*, held at King Abdulaziz University, Jeddah, Saudi Arabia, in November 1999. In part it draws from the work carried out in the field of ecotourism over the past five years in the Caribbean, the Galapagos Islands and Australasia (by DC).

#### ***Ecotourism Versus Standard Tourism: Exploring the Concept***

Ecotourism can be viewed as a concept on a number of levels. In its global context, ecotourism refers to a philosophy about the role that the tourism industry can play on this planet. Simply stated, this involves tourism that is both sustainable and environmentally sensitive, while benefitting development in its broadest sense and engendering holistic education. On a more local level, ecotourism can be viewed as tourism that operates within

ethical restraints that ensure the viability of a business in conjunction with continued protection and enhancement of the local environment and culture (Cater & Lowman, 1997 and France, 1997).

Ecotourism, therefore, is tourism with a conscience. It is holistic holidays. It is the side of the industry with a long term agenda that does not focus merely upon profit as the bottom line. Those involved in true ecotourism practices will have a number of concerns:

- 1) The health of the ecosystems in which they are operating.
- 2) Heightening the environmental awareness of their clients, at the same time as introducing them to something special or unique within the environment.
- 3) The economic and cultural well-being of the local community.
- 4) A long term plan of operation including the use of sustainable energy resources and the minimum of waste production.
- 5) The health and protection of the wider global environment.
- 6) The spread of sustainable practices and philosophies to other operators, communities and individuals.
- 7) Acting with respect and integrity towards the environment and its inhabitants.
- 8) Operating with a sense of balance towards all areas of activity and all stakeholders. Concern for the well-being of the tourist should not, for instance, be undertaken at the expense of the local community. In the same way if the well being of the client is being undermined by concern for the environment maybe the approach is wrong and a new operating strategy needs to be adopted.

### **Marine Ecotourism**

Mindful of all the concerns listed above, *marine ecotourism*, in particular, centres around putting people in intimate contact with the marine realm. A special focus is made on imparting knowledge and understanding that will contribute to a feeling of union and closeness to this environment upon which the world relies for so much.

Activities that can be considered compatible with marine ecotourism can include: diving, free diving/snorkeling, sea-kayaking, sailing, surfing,

beachcombing, marine conservation and research projects, rod and line fishing for food, and coastal walking. Activities that do not fit into the marine ecotourism mould, despite being marine based, include: jet skiing, powerboating, large-scale cruise ships, all-inclusive beach resorts, and excessive shell collecting.

It is not a simple situation, however, as many marine ecotourism operators rely on diesel and gasoline as much as any powerboater. An example being the whale watching operation and the small power boats utilised in the Galapagos Islands for transporting tourists around the archipelago. So it is more about the attitude and philosophy behind the operation rather than the specific activities alone that really count in defining (marine) ecotourism.

### **Standard Tourism**

Simply put the difference between ecotourism and standard tourism is one of philosophy, attitude and commitment (Burns & Holden, 1998 and Theobald, 1996). As described above the activities undertaken by an operator are a portion of what makes an operator "eco". For example, sailing rather than power boating, sea kayaking rather than jet skiing. But most importantly the company philosophy will show a commitment to sustainable development and to the well-being and education of its clients, staff and local community. Standard tourism will not have all, or any, of these attributes, or certainly not as its primary goals. Some may show a cursory commitment to the environment for publicity sake but it will be no more than skin deep. Any ecological concerns must be prevalent throughout the operation in all areas of activity to be considered "eco". It is not what a company does in front of its clients or onlookers that counts, it is what happens when no one is watching that really matters. Many examples exist of operators that outwardly recycle and save waste oil etc. with the premise of proper disposal later on but are guilty of tipping into the sea at a later date when no one is watching.

The factor of scale is also of consequence when comparing eco with non-eco marine operators. A true marine ecotourism operator appreciates that small is beautiful and that every ecosystem has its

particular carrying capacity. This fact will be carefully considered at all times and a conscious effort will be made to only operate on scale that is truly sustainable. However, within the standard tourism industry, economies of (large-) scale will undoubtedly take precedence. If a bigger hotel and airport can be built to contain and transport more people it will be done so in order to maximise profits. This is most probably the single biggest contributor to the destructive nature of the standard tourism industry, and its most significant difference from the ecotourism sector.

### *Marine Ecotourism: Case Studies*

Although ecotourism is such a fast-growing industry and despite the clear global trend towards ever-increasing interest and concern in the environment, including that of the ocean realm, there are still relatively few examples of marine ecotourism that truly comply with the criteria discussed above.

### *Caribbean Region*

Knowing the Eastern Caribbean well after five years working there (DC), we know of only one or two operators that have a truly sustainable and ecologically-sound management approach. Considering the hundreds of companies that operate in the region this number is staggeringly low. Organisations such as PADI (Professional Association of Diving Instructors) are starting to take a much more proactive role in the pursuit of sustainable practices and as such a large and well-organised entity is starting to work in the marine tourism industry. The impact of this company is significant as it operates in virtually every part of the world where marine ecotourism is viable. If companies such as PADI take the lead others will follow, often through economic necessity.

Most of the tourism industry that operates in the Caribbean region knows that it needs to be more eco-friendly if only from a marketing standpoint. For instance Sunsail, the world's largest yacht charter company, makes a statement of concern for the environment on the front page of their brochure. As important stakeholders in the Caribbean and operators in some of the most pristine and fragile marine environments on Earth, they recog-

nise at a basic level that protection of the environments in which they work is in everybody's interest. However, the nature of a Sunsail base shows that this is little more than lip service. All the best intentions are put aside once the stress of maintaining deadlines and keeping customers happy comes to the fore. Money and deadlines tend to take precedence over concerns for the environment.

### *New Zealand*

The New Zealand people and government appear to take marine ecotourism very seriously with resulting high standards in operations and excellent organisation. Kaikoura on the east coast of the South Island is a fine example. Upwelling of nutrient rich water off the coast results in an abundance of marine life and a comprehensive food chain. Various species of Cetacean top this chain. Sperm whales are resident year round and grow up to 18 metres long and 45 tonnes. Other visiting species include: The largest creature ever to have lived on Earth – the Blue whale – as well as Pilot, Minke, Beaked, Brydes, Fin, Sei, Humpback, Southern Right and Orca whales. Dusky, Common, Bottlenose, Hector's and Southern Right Whale Dolphins are all seen in the waters off Kaikoura. Combine this impressive list with large numbers of New Zealand Fur Seals, occasional visits by Leopard and Elephant Seals and huge numbers of seabirds such as Albatross, Penguins, Petrels, Shearwaters, Shags, Cormorants and Terns and the status as marine ecotourism centre of the country is obvious.

There are a number of operators in Kaikoura offering trips to swim with dolphins, see the whales and seabirds, cage-dive to see Makos and Blue sharks, and kayak and swim amongst the seals. Interestingly, since this paper was initially written, the shark cage operation has been indefinitely suspended. The reason given being that the operation was believed to be affecting the natural behaviour of the sharks. The stopping of this profitable operation is a good example of environmental protection being of greater importance than short term profits. Other operators offer flights and helicopter rides over the area to view whales from the air. But on visiting Kaikoura there is no sign of *Gold Rush* style competition for trade that can be found in other areas of the globe, instead one finds a compact town centre with only a few specific operators

all offering their own niche product. The Department of Conservation has worked in conjunction with the tourism operators themselves to develop sustainable practice guidelines and strict permits of operation. All operators expressed a belief in the importance of minimal environmental impact and positive educational tourism practices. Most have mission statements filled with zero emission proposals, funding for research and heightening awareness among tourists of not just local but global marine issues.

In addition, there is a definite swell of interest amongst the town residents, many of whom are traditionally fishermen, towards a community that is dedicated to a cohesive and inclusive management plan for the future development of sustainable ecotourism in Kaikoura. This plan outlined in a council document on display in the local library has the well being of the marine and terrestrial environments along with the local culture of Maori and White New Zealanders at its heart. It can thus be said that Kaikoura is working as a community to offer high quality marine ecotourism whilst ensuring continued health of the marine ecosystem and a livelihood for its residents.

From a marine science viewpoint, Kaikoura is also receiving some international exposure. National Geographic has expressed the belief that it is the most likely location for mankind to first experience live contact with giant squid. As such, they are focussing their bid to film them there. A marine science department, with international collaboration is also being proposed. There is an obvious symbiotic relationship to be garnered here between the marine science department and the ecotourism industry. A land based marine science experience would offer an obvious tourism attraction to visitors, especially during inclement weather periods when trips to sea are unfeasible.

### ***Indian Ocean Islands***

In small island states that have been ecologically impoverished over many years by introduced species, such as many of the Pacific and Indian Ocean Island nations, ecotourism can play an important role in bettering the environment. This can be carried out, either through funds generated by visiting tourists being used to fund eradication and replant-

ing programs, or through the hard work of paying volunteers, such as utilised by Earthwatch Institute and Coral Cay Conservation.

The Chagos Archipelago in the middle of the Indian Ocean is an interesting example. The British Government first annexed the islands and later leased them to the American Airforce. They have recently been returned in rights to the original native inhabitants, but land degradation makes for an uncertain livelihood. The infestation of the islands by introduced species such as rats, mice, pigs and goats by visiting sailors over many centuries has clearly had a very negative impact upon the natural ecosystems of the islands. In order to generate the necessary wealth to enable controlled regeneration of habitats, one obvious solution for this idyllic group of coral fringed islands is marine ecotourism.

The type of tourism is obviously vital. A low key development of a handful of locally owned guest houses and assorted activities such as snorkel and diving tours, fishing trips and beach holidays would generate a healthy income, some of which could be ploughed into eradicating the introduced pests. Volunteer projects of the Earthwatch or Coral Cay Conservation type would also provide manpower for the regeneration project.

The key to using ecotourism for protection and development of environments lies in it being intelligently managed. There is little doubt that tourists diving a coral reef in small numbers is more sustainable than the reef being dynamited for its coral to be used as building materials or trinkets. However, how the tourist dives that reef is also vital. Firstly the boats going to the reef need to be moored to mooring balls rather than anchors being dropped that can kill huge swathes of coral. Secondly the divers need to take especial care never to touch the coral and mind their buoyancy and position in the water. All these aspects of interaction are simple matters of raising awareness and education. Operators should be encouraged to do this of their own free will and desire but laws to enforce sustainable behaviour are often necessary to dissuade the less scrupulous.

### ***The Role of Education***

*"We cannot win this battle to save species and environments without forging an emo-*

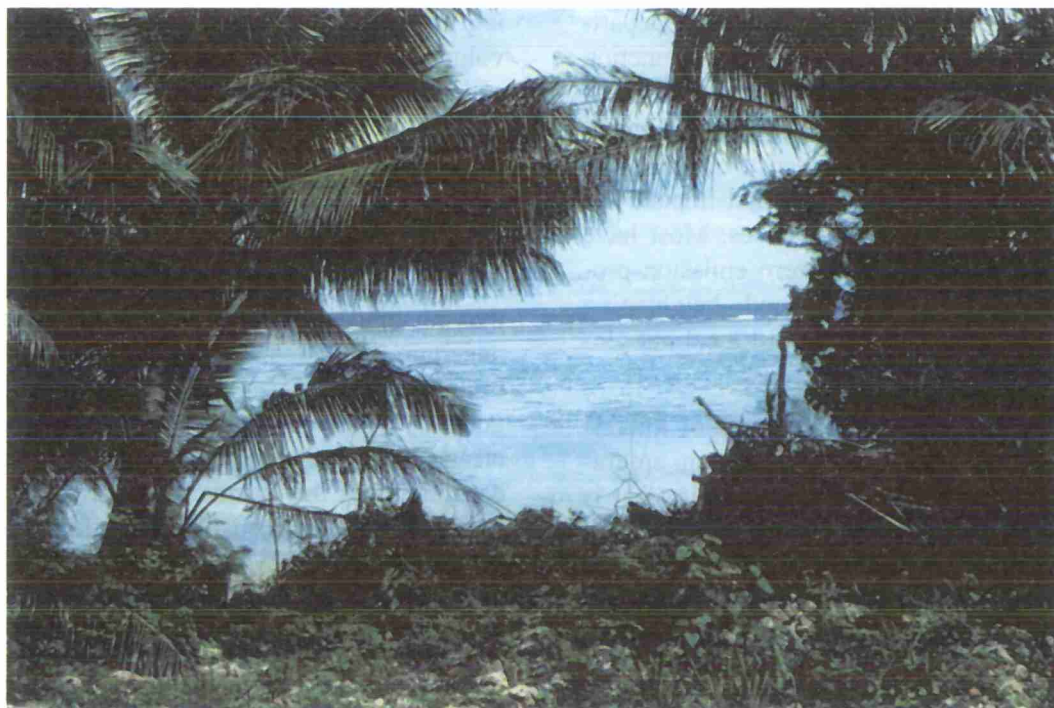


FIG. 2. Coral Lagoon, Guam, western Pacific Ocean. Already a very popular holiday destination for many tourists, especially from Japan and South Korea. For the most part, the tourist industry has not been eco-sensitive in Guam.

*tional bond between ourselves and nature as well – for we will not fight to save what we do not love" by Stephen Jay Gould).*

Ecotourism without education is not true ecotourism. A strong focus on education is therefore vital throughout the tourism industry. Most people do not knowingly or purposely damage the marine environment – most damage is done through ignorance. Any steps taken to educate all the stakeholders in marine ecotourism should be welcomed and encouraged. Education comes in a number of forms and is different for each of the principal stakeholders.

#### ***The Individual Tourist***

It is important to be able to provide relevant information about the ecosystem being visited, about the manner in which humans impact the ecosystem, and to allow for the personal relationship that an individual can build with the ecosystem and its benefits to the well-being of that individual. In addition, the means of delivery of any practical educational material is vital. A passionate, well educated and articulate guide is the most powerful tool

to heighten client satisfaction when used in conjunction with the ecosystem itself. It is fair to say that, the most vital area of education that can be improved, which would consequently improve marine ecotourism immensely is the utilisation of such guides. The most important role they can play is in the nurturing of a sense of stewardship and connection within the tourist.

The tourism industry is perfectly placed to offer opportunities for that personal reconnection to occur. In fact, holiday time is increasingly the only opportunity that many people have to interact in any meaningful manner with nature. Those lucky enough to see dolphins or whales in the wild, dive on a coral reef, hike through rainforest or over mountain ranges are most often moved not only by the sheer beauty and magic of nature, but also by its fragility and susceptibility to human destruction. When accompanied by a passionate and informative guide, the impact can be even more profound. Thus, an ecotourism experience can facilitate the adoption of a sense of personal responsibility towards the wider global environment resulting in a commitment to ensure its protection.



FIG. 3. Mangrove Swamps, Florida. A UNESCO World Heritage Site preserving the unique marine ecology of the mangrove environment.



FIG. 4. Dolphins at sea. Many eco-tourist ventures offer whale watching and dolphin swimming expeditions. Great care has to be taken to ensure that these are truly eco-sensitive

### *The Operator*

It is reasonably easy to encourage operators to adopt certain practices if they are passionate about the idea of ecotourism and determined to do the best they can. In fact they will generally be very open to new ideas of operating that will lessen their impact and save them money. They will be open to education via journals, articles, workshops and books about how to improve eco-practices. However, other operators that are not so passionate, perhaps through lack of appropriate education, are less easily influenced. A combination of direct

education, strictly enforced operator regulations and codes of conduct, and the necessity of change wrought through consumer demand, is necessary.

### *The Local Community*

There are two significant misunderstandings of many local communities that want to become a part of the international tourism industry. The first is that what they already have is not good enough for tourists. Many believe that to entice the tourist dollar they will need to build big luxurious hotels and resorts, and serve hamburgers and fries washed



FIG. 5. Geologist at large on the ice flows of Newfoundland, Canada. Many high latitude areas, both Arctic and Antarctic, are prime targets for developing eco-tourism. They present a wealth of problems and challenges to the achievement of true eco-tourism.

down with Coca-Cola. Although there is an element of truth in this for some portion of the tourism clientele it is not true for them all. The second is that benefits to the local community will come largely by trickle-down from major tourist developments. However, although profits may be large for tour operators and, typically, expatriate owners, the negative impact of this type of development upon local communities is all too clearly documented.

The challenge for education for ecotourism is to disabuse local communities of these twin misconceptions. There is undoubtedly a major and increasing proportion of tourists who actively seek an alternative to the large-scale standard tourist destination. They want to live in, and learn about, nature and lives in other parts of the world, and are becoming ever more demanding that eco-sensitive practices are in evidence. This type of clientele is actively seeking the development of sustainable and community-based tourism, and it is in this way that one of the most important aspects of starting a business is assured – *the demand is there*. Education programs must be set in place to encourage local communities to stick with what they've got and take pride in it. An area in which education may be needed is in the raising of standards of cleanliness and hygiene to standard western levels. As many developing countries still have high levels of infant mortality due to poor hygiene the adoption of such a programme is clearly of benefit to all. A local community that takes pride in its culture, environment and history is a potent tourism destination. Education may be required in languages, environmental science, local history and customs, sustainable practices, hospitality, marketing and business. A community that has access to this sort of education can take great steps to keeping its way of life intact, have control over its economy and offer a unique experience to visitors.

#### ***Implications for Saudi Arabia and the Red Sea***

With reference to the companion paper presented at the *Second Symposium on the Red Sea Marine Environment on The Ocean Planet: Excitement, Challenge and Environmental Management*, we would stress again pre-eminence of the environmental challenge that faces the world today. In the words of Jacques Cousteau:

*"A threatened oasis. In our solar system, the Earth is the only planet with an appreciable supply of liquid water. This rare gift is essential for life and, consequently, as the only intelligent and conscious species, mankind should consider the protection of the water system – rivers, lakes, seas and oceans – as the first condition for survival."*

Tourism along Saudi Arabia's Red Sea coastline is little developed as yet, but there is enormous potential. In our view it is essential that any steps towards development of this industry is carefully planned and managed within the framework of sustainability and environmental awareness. It would be easy, no doubt, to build the Arabic version of the Spanish Costa Blanca or Italian Riviera along the Red Sea coast, but much would then be lost in terms of true cultural exchange and ecological protection. Some elements of the planning that should be considered are summarised below.

- Small is definitely beautiful in the ecotourism industry, so that planned and intelligent management at this scale is essential.
- Baseline research on the Red Sea coastal environment is of paramount importance prior to any future development of tourism in the area.
- Establishment of regulations and guidelines at Government Departmental level for the encouragement of sustainable ecotourism development.
- The drawing up of contracts on behalf of the environment and the local communities involved to be agreed and signed by all stakeholders.
- Procedures for assessing and approving all new tourism developments followed by implementation of regular checks on all operating practices.
- Planned focus and investment in areas of energy conservation and consumption, waste management and recycling, and utilisation of local produce and resources. The adoption of solar power an obvious local resource in abundance.
- Planned emphasis on how both the Arabic culture and Red Sea ecosystem are interpreted for the tourists. Guides need to be well trained and supported.

In the continuing drive towards opening up of more and more parts of the world to tourism development, the challenge remains one of matching

profitability with sustainability, the spirit of adventure with environmental protection, and of meeting the educational requirements of all concerned.

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## تأثير السياحة على العلوم البيئية والبحرية

دوجال كروكيت و دورك ستو

كيكورا ، نيوزيلاندا و جامعة ساوثهامبتون ، بريطانيا

المستخلص. تقدمت السياحة البيئية بصورة سريعة خلال التقدم الصناعي ، وبالرغم من أن هذا التقدم لا يصدق ، نظراً لأن العلاقة بين العلوم والبيئة في الكثير من الأحوال تكون محدودة . وتتوفر السياحة البيئية الآن في جميع أنحاء العالم ، مثل المناطق الجليدية في الأنتاركتيكا ، وجبل الهيمالايا ، وكذلك الأماكن المشهورة مثل أهرامات مصر وحدائق الحيوانات المفتوحة بشرق افريقيا ، أيضاً بدأ التفكير في عملية السياحة لزيارة القمر . وفي نفس الوقت ، فإن الأعداد الكبيرة للسائحين تؤثر على البيئة ، والتي تؤدي في النهاية إلى تدميرها ، ونظراً لأن السياحة البيئية أكثر حساسية ، فهي تحدث فعلاً ويمكن استمرارها .

تعتبر البيئة البحرية بصفة خاصة من السياحة البيئية الشائعة - أماكن الجزر البعيدة - جزيرة جلاباجوس ذات الحيوانات المختلفة والشعاب المرجانية باستراليا ، ورحلات مشاهدة الحيتان ، والغطس في البحر الأحمر ، والعديد من هذه الأماكن السياحية . وباعتبارنا علماء في البيئة البحرية يجب علينا أن نتحمل مسئولية التحدث مع رجال الصناعة ، وتحديد ما الذي يعتبر سياحة بيئية ، وما الذي لا يعتبر سياحة بيئية ، وما هو العمل الأفضل ، وما نتيجة ذلك على البيئة ، وإلى أين ستصل في القرن الواحد والعشرين .



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• لا تنشر المواد إلا بعد التحكيم بواسطة اثنين من المحكمين المتخصصين . • المواد المقدمة للنشر يجب ألا يكون قد سبق نشرها أو مقدمة للنشر في جهة أخرى ، وإذا قبلت للنشر ، لا يُسمح بنشرها بنفس الشكل وبأية لغة أخرى إلا بتصريح كتابي من رئيس هيئة التحرير .

#### التقديم للنشر

• تقدم المواد من أصل وصورتين باللغة العربية أو الإنجليزية منسوخة على الآلة الكاتبة على مسافتين وعلى وجه واحد فقط ، وعلى ورق مقاس (A4) ، مع ترك بوصة لكل هامش ، ومترقمة ترقيمًا متسلسلاً بما في ذلك الأشكال والجداول . • لا يزيد البحث عن خمس عشرة صفحة ، مشتملاً على ملخص واف باللغة الإنجليزية للأبحاث المكتوبة باللغة العربية ، أو باللغة العربية للأبحاث المكتوبة باللغة الإنجليزية . • يشترط أن تقدم المستخلصات ، والهوامش ، والجداول ، والتعليق على الأشكال والمراجع في صفحات مستقلة . • أفضلية النشر ستكون للأبحاث التي لها علاقة بالبحر الأحمر والخليج العربي والمياه المجاورة .

#### الكتابة

• يبوب المقال على النحو التالي :  
١- عنوان المقال ويكون مختصراً ومعبّراً عن مضمون المقال . ٢- اسم المؤلف (المؤلفين) . ٣- عنوان المؤلف (أو المؤلفين بنفس الترتيب) . ٤- المستخلص لا يتجاوز مائتي كلمة . ٥- المتن : ويُقسم إلى عناوين رئيسة محددة وفق المنهج البحثي المتبع (على سبيل المثال : المقدمة ، المواد والطرق العملية المستخدمة ، النتائج ، المناقشة والمراجع) .  
• يستخدم النظام المتري والاختصاصات المقننة (SI) . • في نهاية المقال ، تكتب المراجع تحت عنوان « مراجع » وترتب ترتيباً أبجدياً ويتبع في كتابة كل مرجع نظام اسم/ تاريخ/ عنوان المصدر كاملاً ومختصراً في المجلات/ رقم المجلد/ أرقام الصفحات المعنية مثال :  
Haswell, W.A., (1905) Studies on Turbellaria. *Qurat. J. Mic. Sc.*, 49: 425-467.

#### الجداول

• تطبع في صفحات مفصلة وعلى مسافتين وتُرقم الجداول ترقيمًا متسلسلاً خلال المتن ، ويكون لكل منها عنوانه المعبر عن مادته .

#### الأشكال

• تقدم الأشكال مرسومة بالحبر الصيني على ورق كلك أو ورق أبيض سميك مقاس ١٨×١٣ سم . • يراعى في الصور الفوتوغرافية وضوحها وتباينها وتطبع على ورق لماع . • لا تقبل الأشكال الملونة إلا إذا كان للون دلالة علمية . • تُرقم جميع الأشكال (الرسومات الخطية والصور وغيرها) ترقيمًا متسلسلاً . • يكتب اسم المؤلف ورقم الشكل خلف كل شكل بالقلم الرصاص . • يقدم التعليق على الأشكال منفصلاً .

#### تجارب الطبع

• ترسل نسخة من تجارب الطبع للمؤلف لمراجعة الأخطاء الطباعية وتعاد خلال ٧٢ ساعة إلى رئيس هيئة التحرير . وفي حالة وجود أكثر من مؤلف يحدد مسبقاً عنوان المؤلف الذي ترسل إليه تجارب الطبع وطرق الاتصال به . • غير مسموح بإجراء أية تعديلات ، سواء بالحذف أو الإضافة .

#### المستلزمات

• يحصل مؤلف (مؤلفو) كل بحث على ٥٠ مستلة من كل بحث بدون مقابل . • يتحمل المؤلف (المؤلفون) تكاليف مازاد على ذلك طبقاً لما يقرره المركز ، وعلى المؤلف (المؤلفين) طلب المستلزمات الإضافية قبل الإحالة للطبع ويكون السداد مقدماً .

عدد خاص

مجلة جامعة الملك عبدالعزيز: علوم البحار، م ٢٢، عدد خاص: الندوة الثانية لبيئة البحر الأحمر، جدة ١٩٩٩م، ص ١-١٤ بالعربية، ص ١-٢٥١ بالإنجليزية (١٤٢١هـ/٢٠٠١م) ردمد ٨٨٤٠-١٠١٢



# مجلة جامعة الملك عبدالعزيز علوم البحار

عدد خاص: الندوة الثانية لبيئة البحر الأحمر  
جدة ١٤٢٠هـ (١٩٩٩م)

المجلد ١٢

١٤٢١هـ

٢٠٠١م

مركز النشر العالمي  
جامعة الملك عبدالعزيز  
جدة