An assessment of the framework, legislation and monitoring required to develop genuinely sustainable whalewatching

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Whalewatching[1] is one of fastest growing tourism products in the world. Already estimated in 1998 to be worth €1.12 billion worldwide the industry is still growing at 12.1% per annum. Whalewatching in Europe is relatively new but expanding rapidly. Average rates of 8.8% growth per annum between 1991 and 1994 have increased to 19.6% between 1994 and 1998 (Table 1).

Table 1.The increase in the number of whalewatchers and their expenditure (€) in Europe (from Hoyt, 2000).

Year	No. of whalewatchers	Direct expenditures	Total expenditures
1991	158,763	2,532,000	6,373,000
1994	204,627	4,618,000	24,623,000
1998	418,332	12,373,000	51,552,000

Note: Tourist expenditures for whalewatch tickets (direct expenditures) and associated expenses incurred by tourists during as well as immediately before or after whale watching (indirect expenditures). A conservative estimate of the total expenditures from whalewatching near urban centers with day (or less) trips is 3.5x the direct expenditures (Kelly 1983, Hoyt, 2000). In remote centers, which require more spending on travel, food and accommodation, total expenditures are usually at least 7.67x the direct expenditures (Duffus, 1988, Hoyt 2000). For the most part, the 3.5 and 7.67 factors stand up to inflation as the ticket prices increase at approximately the same rate as the other expenses.

Whalewatching is becoming economically important in many EU countries however, tourism activities can have a detrimental effect on the behaviour of whales and the long-term sustainability of whalewatching has not been assessed. If whalewatching, along with other forms of marine ecotourism, are to be viable long-term economic alternatives for coastal communities in Europe, it is essential that activities are sustainable. To be genuinely sustainable, whalewatching should be both economically and ecologically sustainable.

The scientific management of whalewatching and tourism is extremely limited. There are few published studies of whalewatching operations (e.g. Corkeron, 1995; Findlay, 1997; Leaper et al. 1997; Berrow & Holmes, 1999) and, despite the economic importance of whalewatching, there have been few socio-economic studies on this industry. Although there are many other associated benefits such as conservation and education, whalewatching is an economic activity, whose principal

[1] defined by the International Whaling Commission as any commercial enterprise which provides for the public to see cetaceans in their natural habitat (IWC, 1994).

objectives are financial and require a return on investment. To be genuinely sustainable, whalewatching should be both economically and ecologically sustainable.

Potential frameworks for sustainable management

Regulations and legislation

A variety of voluntary and legislative measures have been used to manage whalewatching throughout the world. All countries in Europe have national wildlife legislation which tends to address issues of harrassement, disturbance and direct killing. However amendments are neccessary in most countries to manage tourism activities such as whalewatching. In 1994 the International Whaling Commission (IWC), established a Whalewatching Working Group and considered that there was a general view on the need for regulations to provide adequate safeguards for the whales as voluntary guidelines or codes of conduct may not always be strong enough controls (IWC, 1995).

The conservation management of cetaceans is covered by a number of international conventions ratified in Europe including the BERNE and BONN Conventions and CITES. Conventions which traditionally have not been investigated with regards resource management but could have potential include OSPAR. Within Europe the Habitats Directive is increasingly identified as being most relevant, as it provides provision for designation for marine protected areas and thus the regulation of whalewatching. However outside of Marine Protected Areas (MPA), additional legislation may have to be considered in order to provide a legal framework for tourism management. The most successful management potential exists where the number of operators and vessels are licensed.

Marine Protected Areas

Marine Protected Areas can play a strategic role in the management of marine environments and may be designated for a variety of reasons (see Kelleher & Kenchington, 1992). They are increasingly being considered as a framework for managing whalewatching. For example Stellwagen Bank off NE USA is one of the most important whalewatching sites in the world with at least 10 million whalewatchers between 1975 and 1993. The Stellwagen Bank National Marine Sanctuary (http://www.sbnms.nos.org) was established in 1993 in recognition of its importance for whales, largely determined from work carried out on whalewatching vessels, and the threat of excessive disturbance from the whalewatching industry.

No go zones are often a feature of MPA and can aid management by providing areas for whales to be free from disturbance by whalewatching. Critical habitats such as calving areas, rubbing beaches (for orcas) are often those areas designated no go zones.

In Europe the Habitats Directive offers the best opportunities for managing whalewatching. This Directive requires member states to designate sites for the conservation of specific species and habitats (Annex II), under the Natura 2000 network. All cetaceans are listed under Annex IV and two species, bottlenose dolphin *Tursiops truncatus* and harbour porpoise *Phocoena phocoena*, are listed under Annex II, species whose conservation requires the designation of Special Area of Conservation

(SAC). Bottlenose dolphins are frequently the target of whalewatching as they are coastal and readily approach boats. Whalewatching in Europe on this species occurs in the Azores, Canary Islands, Croatia, France, Greece, Ireland, Italy, Portugal and the UK.

MPA have also been established in Europe outside the framework of the Habitats Directive. The Ligurian Sea Sanctuary was established by France, Italy and Monaco in 1999. Although mainly concerned with industrial and fisheries impacts, the MPA will also attempt to regulate whalewatching operations.

MPA require adaptive management, that is a form of management based on solid scientific grounds and on performance of studies allowing a systematic evaluation to be made of the degree to which management objectives have been attained. In such a context, scientific research plays a strategic role.

Codes of Conduct/Guidelines

Models of best practice including codes of conduct and accreditation schemes are increasingly being promoted for the management of whalewatching. Most countries and communities involved in whalewatching have some regulations including codes of conduct with which whalewatching operators are asked to comply. Often these are voluntary but have legal enforcement in some areas, which may be through local by-laws or within the wider legislation of marine protected areas.

Carlson (2000) recently reviewed international whalewatching guidelines, including six countries in Europe (Azores, Canaries, France, Ireland, Norway, UK). There is a wide range of including restrictions on the number of boats close to cetaceans, a minimum approach distance and sometimes a maximum time allowance during each encounter. However the International Whaling Commission Whalewatching Working Group suggests voluntary guidelines or codes of conduct may not always be strong enough to control whalewatching activities especially if there are management conflicts (IWC, 1995).

Both Portugal (Azores) and Spain (Canaries) have recently approved new regulations especially for the management of whalewatching. In the Azores and Canaries companies dedicated to whalewatching must apply for a permit and in the Canary Islands all vessels must carry a monitor-guide to ensure codes of conduction are respected. In the UK and Ireland guidelines for whalewatching operators have been published but no specific regulations have been passed. In an MPA such as the Shannon estuary, Ireland (a Special Area of Conservation for bottlenose dolphins) whalewatching is a notifiable activity and operators, as well as recreational craft, are legally obliged to adhere to the codes of conduct.

Voluntary guidelines, often developed by operators, can be more restrictive and comprehensive than those included in a legislative framework. For example the boater guidelines promoted by the Northwest Whalewatching Operators Association in the Pacific Northwest which is a favoured area for orcas (http://www.nwwhalewatchers.org/whalewatchguidelines.htm) are promoted beyond the boundaries of the San Juan Islands National Wildlife Refuge and Wilderness Area.

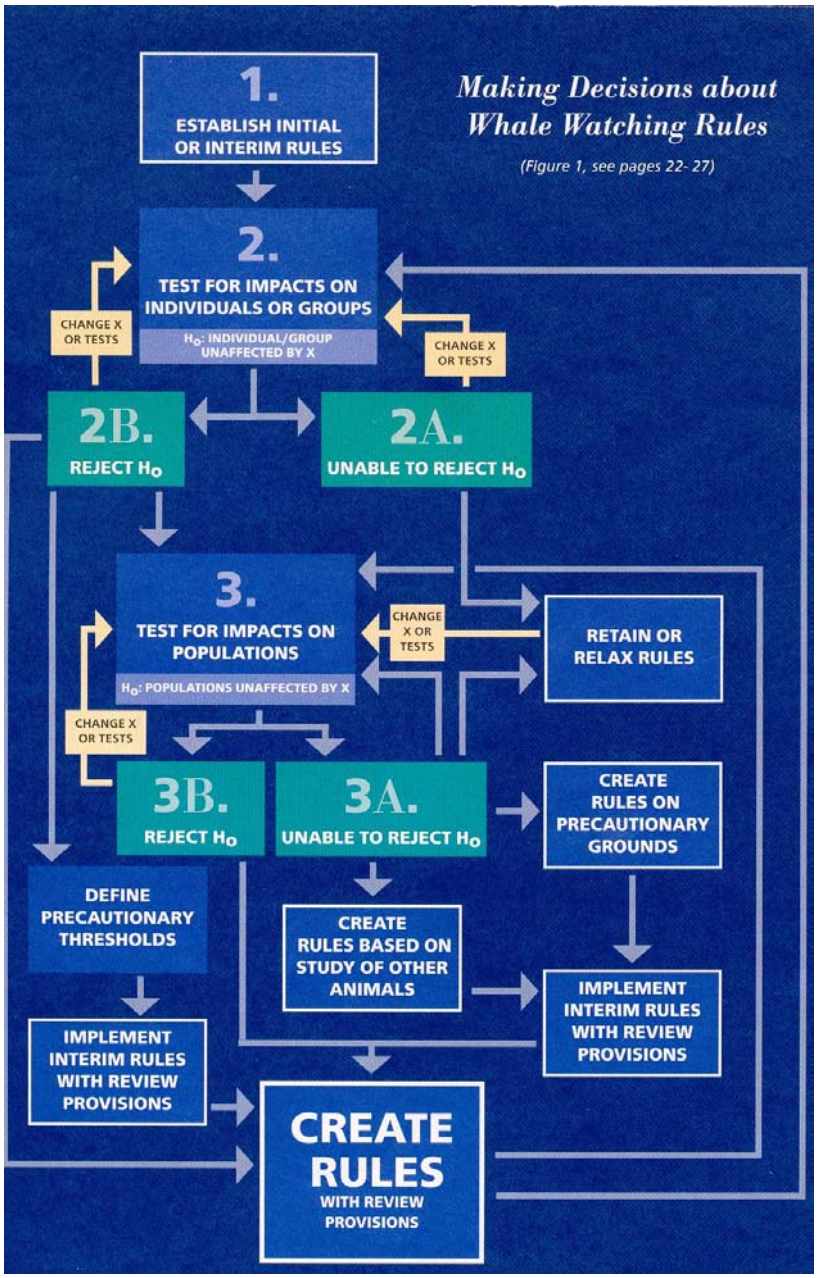

Figure 1. Making Decisions about Whalewatching Rules (from IFAW, 1995).

Essential for the scientific management of whalewatching is hypothesis testing. IFAW (1995) have produced a framework for assessing the effectiveness of each parameter used to determine impact (Fig. 1). However IFAW (1996) warn "it is very difficult to provide more specific recommendations, a priori, as to what would constitute biologically significant impacts warranting changes to the regulations or guidelines. Particular care needs to be taken to design studies so that they may have

the best possible chance of detecting any changes in behaviour. However, the participants emphasised that a failure to detect changes in behaviour would not necessarily mean that such changes were absent".

Research

Due to the lack of basic information on the ecology of cetaceans and the impact of tourism, research should be an essential element in the sustainable management of whalewatching. Research should not be seen as having a negative impact on whalewatching as Tilt (1985) found that in California whalewatchers were willing to pay more if the tour proceeds went towards whale research or education.

Developing sustainable whalewatching requires an inter-disciplinary approach between biological and social sciences to formulate management plans that promote wildlife encounters for tourists without harming wildlife. Research needs to establish "behavioural and reproduction benchmarks that will allow managers to recognize when the focal species is being disturbed, and if that disturbance has potential to harm the individual or the population". Traditional wildlife management agencies may not be equipped to incorporate social science research (Duffus & Dearden, 1990).

Ideally baseline research on the distribution and relative abundance of cetaceans should be carried out prior to the start of whalewatching. In reality this has rarely been possible (Berrow et al. 1996) and often it is the availability of whalewatching vessels that facilitate research projects which would not be generally possible without this facility.

Carrying capacity

The carrying capacity of whales to whalewatching is the ultimate constraint to sustainable whalewatching and all activities should be carried out within it. Unfortunately there is little or no information on the carrying capacity of whales to whalewatching. IFAW (1995) list some biological and population parameters that may be impacted by whalewatching. To assess carrying capacity the most sensitive parameter must be determined and its limits assessed and whalewatching managed to within these constraints.

If carrying capacity exceeds demand then whalewatching could be sustainable if on the other hand demand exceeds carrying capacity then management will be neccessary.

If, for example, the amount of time vessels are within 100m of cetaceans is the most sensitive variable, then whalewatch operation must work within these limits. This does not necessarily mean that the industry is limited, but must restrict this element of the operation to within sustainable limits. This could mean limiting the amount of time vessels are within 100m on each trip.

Education

Similar to ongoing research, education should be an integral part of developing sustainable whalewatching. Information on the species and habitat being exploited should be available to whalewatchers and operators alike. Information on the

legislation and codes of conduct etc should be promoted at all opportunities together with the sensitivity and conservation value of the site.

Stakeholder involvement

Increasingly the involvement of stakeholders in resource management is critical to the success of sustainable development. Stakeholders, both state bodies, local authorities and local community groups and private companies should be identified and invited to contribute to the process. Responsibilities and aspirations should be agreed upon and a development plan together with timescales and the resources required to implement plan.

At sites where there are significant numbers of whalewatch operators they have formed associations or organisations. There are 36 operators from Washington State and British Colombia who are members of the Whalewatching Operators Association NW (http://www.nwwhalewatchers.org).

Funding

Sustainable development of whalewatching requires long-term funding commitment. State agencies are unlikely to, and should not necessarily, be expected to fund monitoring of whalewatching activities in the long-term. The "polluter pays principal" has been applied to industrial development throughout Europe and may be appropriate for the whalewatching industry.

The whalewatching industry could generate the funds necessary for monitoring of their activities through membership fees of Operators Associations or a trip levy. Some organisations such as the Whale Watching Operators Association NW fund research which provides them with the information they can use to educate passengers and the public and themselves. Swim-with-dolphin operators in the Bay of Isles in New Zealand also pay a levy which is used to fund research and monitoring. The funds are administered by a Committee comprising operators, scientists and New Zealand Department of Conservation staff and although though this levy is not legally binding the operators freely contribute as they can dictate what research is funded.

A number of studies have shown that willingness to pay (WTP) when based on levies is much higher if the funds are demonstrably used for research and monitoring (Tilt 1985, Orams 2000). Research, education and monitoring should not be seen as a luxury but a necessary part of the sustainable management of whalewatching. It should be considered an operating overhead, similar to boat fuel and insurance. Unless funding is built into the operating costs of the whalewatching industry then it is unlikely that whalewatching can become genuinely sustainable.

Monitoring indices to assess the sustainability of whalewatching

Despite the economic importance and longevity of whalewatching in many parts of the world there is surprizingly no long term monitoring of the whalewatching industry and its effects on cetaceans at any whalewatching location. There have been

a number of short-term studies to assess the effect of tour boats and other activities (e.g. swim-with-dolphin operations, Samuels et al. 2000) on cetacean behaviour but no ongoing monitoring. There are data being collected as part of other studies, which could be used to address tourism related issues, but they are not designed to assess impact.

Biological monitoring

In order to develop genuinely sustainable whalewatching the effect of tourism activity on the species and habitat being exploited must be quantified and the impact assessed. This information is essential to determine carrying capacity, which is the amount of activity a species or habitat can be subjected to without affecting its long-term viability, and is the biological framework within which whalewatching is constrained. In practice it is extremely difficult to quantify carrying capacity and this has not been achieved at any whalewatching location in the world though some locations are attempting to address this issue (e.g. Shark Bay, Australia). The studies referred to below are not meant to be exhaustive but indicative of the type of work and results available.

Short-term studies

The reactions of whales to whalewatching may be negative, neutral or occasionally positive. One of the first studies to assess the reaction of whales to whalewatching vessels was carried out by Gordon et al. (1992) who studied sperm whales in Kaikoura, New Zealand. Indeed there has probably been more work carried out on the effects of whalewatching on sperm whales than any other species (IFAW, 1996). This work showed that although there was some effect of whalewatching vessels, it was considered minimal and additional whalewatching licenses were issued by the licensing authority, the New Zealand Department of Conservation. Blane and Jaakson (1994) recorded avoidance responses by belugas (*Delphinapterus leucas*) to tour boats in the St. Lawrence River, Quebec, Canada. These included bunching together, longer dives and shorter surfacing time. Similar avoidance reactions were reported by Janik and Thompson (1996) for bottlenose dolphins in the Moray Firth, Scotland. Indeed dolphins avoided whalewatching vessels but there was no change in behaviour when ships, yachts or fishing boats were in the area. Corkeron (1995) showed whalewatching vessels affected the behaviour of humpback whales migrating through Hervey Bay, Australia especially whales with calves.

A more favourable response was reported by Ransom (1998) who analysed encounter duration of whalewatching vessels around spotted (*Stenella frontalis*) and bottlenose dolphins on Little Bahama Bank, Bahamas. Between 1996 and 97 observations of boat interactions within 1.2 km of the tour vessel and of swimmer interactions in water found significant increase in encounter duration. Possible explanations included dolphin habituation to swimmers, dolphin tolerance of humans, increased operator experience. More recently Bejder et al. (1999) showed hectors dolphins (*Cephalorhynchus hectorii*) readily approached dolphin boats but their behaviour changed, with less frequent approaches, when encounters exceeded 70 minutes. Whalewatching vessels have been used successfully to assess relative abundance and distribution of minke whales (Leaper et al. 1997).

Monitoring studies have also been carried out from land. For example Yin (1999) studied dusky dolphins (*Lagenorhynchus obscurus*) in Kaikoura, New Zealand from land and reported statistical differences in their behaviour depending on vessel

distance from the dolphin group. There was a tendency for more course changes by dolphins when vessels were within 300m and 100m of groups. Briggs (1991) described 24-hr observations conducted from blinds on shore at 2 main rubbing beaches for killer whales (*Orcinus orca*). He reported a 50% decrease in time at rubbing beaches from 1987-89. There was a near constant presence of fishing vessels during season and gun shots were heard on 35% of days that fishing vessels were moored (directed at shore and in water). Recreational boats following whales in straits were usually stopped from entering reserve by a ranger. Rubbing beaches are considered such an important part of the whales' habitat that a reserve was established to protect them.

Impacts of whalewatching are likely to be cumulative rather than catastrophic which emphasises a need for long term studies and for cautious interpretation when evaluating disturbance from short term studies (Bejder et al. 1999). In addition present information on baseline parameters is considered insufficient to measure subtle changes in behaviour that may be caused by whalewatching.

Long-term studies

Studies using long term data sets are scarce. Watkins (1986) reviewed research cruise logbooks from whalewatching vessels in Cape Cod, Massachusetts, USA over 30 years to evaluate responses of whales to research vessels in vicinity of Cape Cod. He compared whale behaviour before and after initiation of whalewatching and found whales primarily responded to underwater sound, light reflectivity and unexpected tactile sensation. The rate of habituation was often rapid but varied with individuals and stimulus and different species had different responses to vessels. He suggested that changes in whale behaviour have been gradual and therefore emphasized the need for long term monitoring. Interestingly although he recommended that skippers of whalewatch vessels used quiet, cautious approaches to whales, skippers have felt it was not neccessary as whales have apparently began to accept the presence of whalewatch vessels. There are a number of long term population studies using photo-identification from whalewatching vessels (IWC 1990) and these data could be used to address the long term impact of whalewatching however to date no published review is available.

One novel attempt to monitor the effects of whalewatching involves Rhythum Based Communication (http://www.whalecontact.com/research) which attempts to determine the biological stress of the relevant individual(s).

The deficiencies in long term monitoring have been recognised by both the scientific community and the industry and there are a number of initiatives attempting to develop ongoing monitoring programmes (e.g. http://www.planeta.com/planeta/01/0103whales.html; Berrow & Holmes, 1999).

Monitoring Visitor Satisfaction

Managing whalewatching is as much about managing people as managing whales (Orams 2000). In order to develop sustainable ecotourism, monitoring people and product satisfaction is also essential, but despite the economic importance of whalewatching there have been few surveys to determine whether or nor whalewatching operations are sustainable and even fewer to assess whether the needs of those who will pay to see whales are being met (Orams 2000).

The presence of whales and their proximity to the boat influences the whalewatchers satisfaction but Orams (2000) also showed a high degree of customer satisfaction can also be achieved in the absence of whales. It is important to note that there are a number of factors other than whales for successful whalewatching and identifying and providing these elements are as important as watching the whales.

Tour operators are becoming increasingly aware of the necessity to adopt good practices and ensure that there impact both environmentally and culturally is minimised (see http://www.toinitiative.org/home.htm). Sustainable management of whalewatching in many countries is being driven by tourism agencies and organisations as well as by conservation bodies and a partnership between both is essential for successful implementation.

Requirements of monitoring programme

A clear indication of the objectives of a monitoring programme is essential as different indices will monitor different aspects of the life-history or habitat of a species. For example; the EU Habitats Directive requires a "favourable conservation status" to be maintained in designated marine protected areas and monitoring programmes should be designed to determine compliance with this objective.

A long-term ongoing monitoring scheme should measure parameters that are sensitive enough to detect change at the appropriate scale. Analysis of these data may act as an early warning that something is changing, which may be an indication that the target species are receiving too much attention, and this should trigger a dedicated study. IFAW (1995) provide a list of potential biological and operational parameters that could be used to monitor impact (see Box 3.3.1). Some parameters will be more useful than others and are species or location specific.

Long term monitoring must also be financially sustainable and thus attempting to monitor population changes through recruitment, mortality or immigration/emmigration is likely to be financially unsustainable (Wilson et al. 1999). Monitoring will be more effective if a regular commitment is maintained over a long period providing extensive reporting, rather than short-term, intensive studies.

Summary and Recommendations

The main recommendations from this work concerning the frameworks and monitoring required to develop genuinely sustainable whalewatching can be summarized as:

i) Relevant authorities must develop the capacity to regulate whalewatching through licenses as the most successful management potential exists where the number of operators and vessels are licensed.

ii) Marine Protected Areas are most relevant where critical habitats or resources have been identified. MPA require adaptive management, that is a form of management based on solid scientific grounds and on performance of studies allowing a systematic evaluation to be made of the degree to which management objectives have been attained.

iii) Models of best practice including codes of conduct and accreditation schemes should be developed and promoted for the management of whalewatching.

iv) Research should be an essential element in the sustainable management of whalewatching, due to the lack of basic information on the ecology of cetaceans and the impact of tourism. Research should not be seen as having a negative impact on whalewatching as many whalewatchers are willing to pay more if the tour proceeds went towards whale research or education.

v) Education should be an integral part of developing sustainable whalewatching.

vi) Increasingly the involvement of stakeholders in resource management is critical to the success of sustainable development.

vii) Funding of monitoring programmes should be met by operators and considered an operating overhead, similar to boat fuel and insurance and could be sourced through a levy system.

viii) In order to develop genuinely sustainable whalewatching the effect of tourism activity on the species and habitat being exploited must be quantified and the impact assessed.

ix) Monitoring people and product satisfaction is also essential to develop sustainable ecotourism.

x) Long-term monitoring schemes should measure parameters that are sensitive enough to detect change at the appropriate scale and must also be financially sustainable.

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