Indicators for an environmental assessment of French Tourism

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Biographical note
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Remark
This paper is presented on behalf of the French Institute for The Environment (*Ifen*, Ministry of Environment and Spatial Planning), as an outline of the main findings described in *Ifen*'s book, "Tourisme, Environnement et Territoires : les Indicateurs" (http://www.ifen.fr/pages/tourisme.htm)

Keyword
Tourism, Environment, Indicators, France

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INTRODUCTION

In the last few years, recognition of the environment as the "raw material" of tourism has become a recurrent theme in the tourism sector. Public opinion has also become much more aware of the most obvious impacts of tourism on the environment. Despite this, few studies have so far attempted to make exact assessments of the scale and the limits of interaction between tourism and the environment. The links are not always evident, because the impacts of tourism do not necessarily appear where they are expected. Do tourists actually attach any importance to the environment in the places they visit, and if so, to which features ? Is their environmental awareness changing ? What are the main features that attract visitors to France ? What are the main pressures exerted by tourism on the environment and what determines these pressures ? In what ways do private and public-sector organisations involved in tourism attempt to integrate environmental concerns in their policies, and are they successful in doing so ?

This paper is an outline of the book "Tourisme, environnement, territoires : les indicateurs", issued by the French insitute for the environment (Ifen) in December 2000 (Rechatin, Dubois and al. 2000). This report is the latest publication in Ifen's "Indicator" series. Ifen's indicators program has three directions :

- the assessment of links between different sectors of the economy and the environment (agriculture, industry, transports…);
- the monitoring of the performance of public environmental policies (Ifen 2000), thanks to performance indicators (the current trend is compared to targeted situation);
- the definition of sustainable development indicators at the national level (Rechatin, Theys and al. 1997; Levarlet 1999; Ifen 2001).

The theoretical framework on which this research was founded may not appear clearly in this paper, since it's a selection of most interesting results of the research. However, it's present all along the main document. The construction of environmental indicators is usually based on the pressure-state-response framework which was first stated by OECD (OCDE 1994) that began using it in the Eighties. The transparency of this approach is amenable to decision makers. Meanwhile, it has found less favour among scientists, for whom it appears too mechanicist, too Newtonian, and founded on a simplistic vision of causal links ; it badly accounts for the complexity and the uncertainty of knowledge that hallmarks environmental crises. The European Environmental Agency proposes an improved framework (AEE 1998): *Driving forces* (economic and social factors or trends) *Pressures, State, Impact, Response* (DPSIR), which was favoured in our research. The social and economic tendencies draw attention to framing elements which are not directly related to the environment but which it is necessary to follow, so as to understand the evolution of the activity considered and the stakes related to sustainable development (it would be the case for example for diminishing working time, demography, income increase, the Euro etc. when dealing with tourism). As far as the diagnosis is concerned, the distinction between *state* and *impact* makes it possible to part the direct effects of the pressures (on the environment…) from their effects on communities. It was finally decided not to present the final document following this framework: the main reproach was a separation of interrelated indicators in different parts of the book. We presented each environmental issue in separate chapters (water, energy, waste, natural heritage…). However, the DPSIR framework is the underlying structure of the document

Secondly, indicators are considered as a way to make environmental information more easily understandable and handy to the users (Rechatin 1999). Depending on the targeted stakeholders, the same issue can be presented in different ways. For example, the contribution of tourism transportation to greenhouse gas emissions was first evaluated for the whole tourism sector at the national level. It was also calculated for a specific Paris/ Nice trip, according to the mode of transport, to insist on individual responsibility. In practice, constructing a set of indicators must necessarily start with the choice of a editorial line which includes defining:

- expected objectives: assessment (of the main trends, of public policies…), help to decision-making, communication…

- the audience for which the indicators are built: civil servants which will require technical and detailed information, decision makers who usually demand highly synthetic information, enlightened public (scientists), general public…
- the type of desired products: complete sets of indicators or selected indicators, indicators just meant to feed traditional assessment reports... Indicators should not be defined with vague or imprecise objectives (either decision making, environmental assessment...), but with regards to expected products and publications. Experiences show that desired data for a specific project seldom match with those selected through general sets of indicators. Moreover, indicators should be considered as "part of" an overall assesment process, not as an objective by themselves.

Compared to other methodological researches on environment and sustainable development indicators for the tourism sector (Consulting and Audit Canada 1995; Middleton and Sieber 1999), the main constraint of this project was to calculate indicators, which shouldn't be undermined. Most authors acknowledge the fact the availability of data is the key point in the elaboration of a set of indicators (Middleton and Sieber 1999; SCOPE 1995; Ruitenbeck 1991), sometimes without drawing the conclusions: the elaboration of indicators and the inventory of data sources shouldn't be separate steps of the research (Cammarota and al. 1997). Indeed there's a gap between theoretical expectations on indicators and practical achievement in the tourism sector (Ceron and Dubois 2000, 2001). Confronting the theoretical objectives of an indicator to the availability of data forces to reject irrelevant or unrealistic ones.

National approach, local features

The hypothesis of this project was that some critical issues can only be evaluated at a broader scale than the destination level (national, European, or international). This is specially the case for the contribution of tourism to the environmental impacts of transports, usually ignored at the destination level, except traffic jams of congestion (OECD 2001). Transport was granted a central role in this project, to evaluate the links of tourism with greenhouse gas emissions, infrastructure development of air pollution.

A few attempts were made recently to calculate environmental indicators for the tourism sector at the national level (Spanish ministry of the environment 2002; Andriola and Seminara 1998; EPA 2001).

- Different perspectives were adopted : EPA decided for example to concentrate on leisure activities, and to calculate an "environmental footprint" of skiing, fishing, hunting, boating, golf, casino gaming, amusement/theme parks, historic/cultural attractions, conventions and conferences, and waterside recreation. A detailed methodology is provided by the authors. Since the reliability depends on this data collection and processing, this methodological documentation should be a common rule in indicator works. Ifen provided this methodology in its book. The EPA's method is based upon a search of ratios such as water consumption by overnight stay in hotels, or CO_2 emissions by passenger.km travelled. EPA's work is a considerable attempt to monitor the environmental footprint of tourism at a national level. However, the methodology provided reveals a lack of ratios really specific to tourist activities and equipments, which, beyond the seemingly impressive results, undermines the outcome of this work. Moreover, strong hypothesis are made that might induce wrong conclusions: the longer the stay is (e.g longer in waterside recreation than in casino gambling), the more important the environmental impact is, which might lead to conclude that shorter stays are better, although the need to reduce the intensity of transports of tourism would rather lead to incentives for longer stays (and less frequent departures).

- Ifen's work concentrated on the national level, whereas the Spanish ministry of the environment looked for a set of indicators that could be calculated from a national scale to regional and local scale. This will be very interesting to evaluate the spatial distribution of impacts, although the search of indicators available at all spatial level implies a narrowing of the range of issues discussed.

- Different works (Policarpo 2001; Ceron and Dubois 2001; Spanish ministry of the environment 2002) underscore the need to introduce filters in order to prioritise issues of concern. The Spanish ministry of the Environment gathered experts to discuss issues which should be assessed at first at national level and for selected tourist spaces (coastal areas…), with regards to criteria such as impact dimension, degree of responsibility of the tourism sector, degree of reversibility of the impact, degree of extension. Policarpo used exclusively the impact dimension criteria. This step of the process seems particularly adapted for associating

decision-makers with the environmental assessment. It requires the definition of an adapted procedure, so as to warrant the neutrality of the project manager in the selection of priorities. In Ifen's work, this wasn't addressed properly, since indicators were selected only by the research team.

At national level, there is a need to bring out the close links between changing patterns of tourism, their environmental impacts and more general social trends. For example, the way people divide their time between work and leisure is a factor that determines whether they take their holidays over short or long periods, which in turn determines the intensity of transport use for tourism. The tax system, the situation of the real estate market and regulations on construction work are all factors that influence the distribution of the various types of holiday accommodation and how much they encroach on the surrounding area. The organisation of the school year in France restricts people's choice of holiday periods over the year, so tourism has remained highly seasonal. The two fundamental components of tourism – travelling and staying away from home – produce two kinds of impacts on the environment. Tourist travel has repercussions on greenhouse gas emissions and on the creation of new infrastructure. Holidays spent away from home have repercussions on the use of space causing alterations and fragmentation of landscapes, on the pressures exerted on natural environments, on the production of waste and sewage and on water and energy consumption.

However, the sheer diversity of tourism in France requires more than a purely national approach to reporting. Tourist destinations are usually classified into four major categories that reflect their geographical characteristics and the expectations they conjure up among holidaymakers :

- seaside resorts, which are primarily associated with sea bathing and long summer holidays;
- mountain resorts, which are perhaps associated rather too closely with winter sports;
- cities, which are often destinations for business tourism and where cultural tourism tends to take precedence over visits to family and friends;
- the countryside, where tourist activities are varied but tend to revolve around country cottage holidays with family and friends.

Patterns of tourism obviously vary in each of these categories and their impacts differ with each type of environment. This is why the second part of our study consisted in analysing the specific features of each of these four types of holiday destinations, in order to assess the concentration of activities and their seasonal variations : importance of the environment for tourist activities, environmental pressures, responses in terms of the integration of environmental concerns and the development of activities or types of resorts that are specific to the areas concerned (yachting, islands, Alpine skiing or agro-tourism for example).

Secondary data rather than primary ones

The French Institute for the Environment (Ifen), a public institution founded in 1991 and working under the authority of the Ministry of Spatial Planning and Environment, is responsible for collecting, analysing, collating and distributing scientific and statistical information on the state of the environment. It isn't really supposed to produce new data through specific surveys, but to interpret existing ones from the environmental angle. This implies the use of secondary data rather than primary ones.

Addressing a topic which is not yet covered by a long-established system of official statistics required considerable efforts to collect and process relevant data. The statistic unit of French tourism directorate had only six employees when this study was carried out. For instance, an environmental assessment of the tourism sector required very localised data on accommodation capacity, at the community level, to calculate indicators such as number of bed places per km of coastline, or to cross data on tourism pressure with data on natural heritage. The research team had to collect data from various sources (professional syndicates, national statistic services) for all kind of accommodations and to check their reliability. Very simple indicators, such as the evolution of accommodation at the community level between 1990 and 1999, revealed unexpected difficulties.

It was also necessary to translate tourism statistic categories in an environmental perspective. For example, a stay away from home involves one trip, an overnight stay involves using water and energy and producing sewage and waste, while the occupancy rate of each type of accommodation partly accounts for the size of its environmental "footprint". Conversely, interpreting environmental data in the light of patterns in tourism

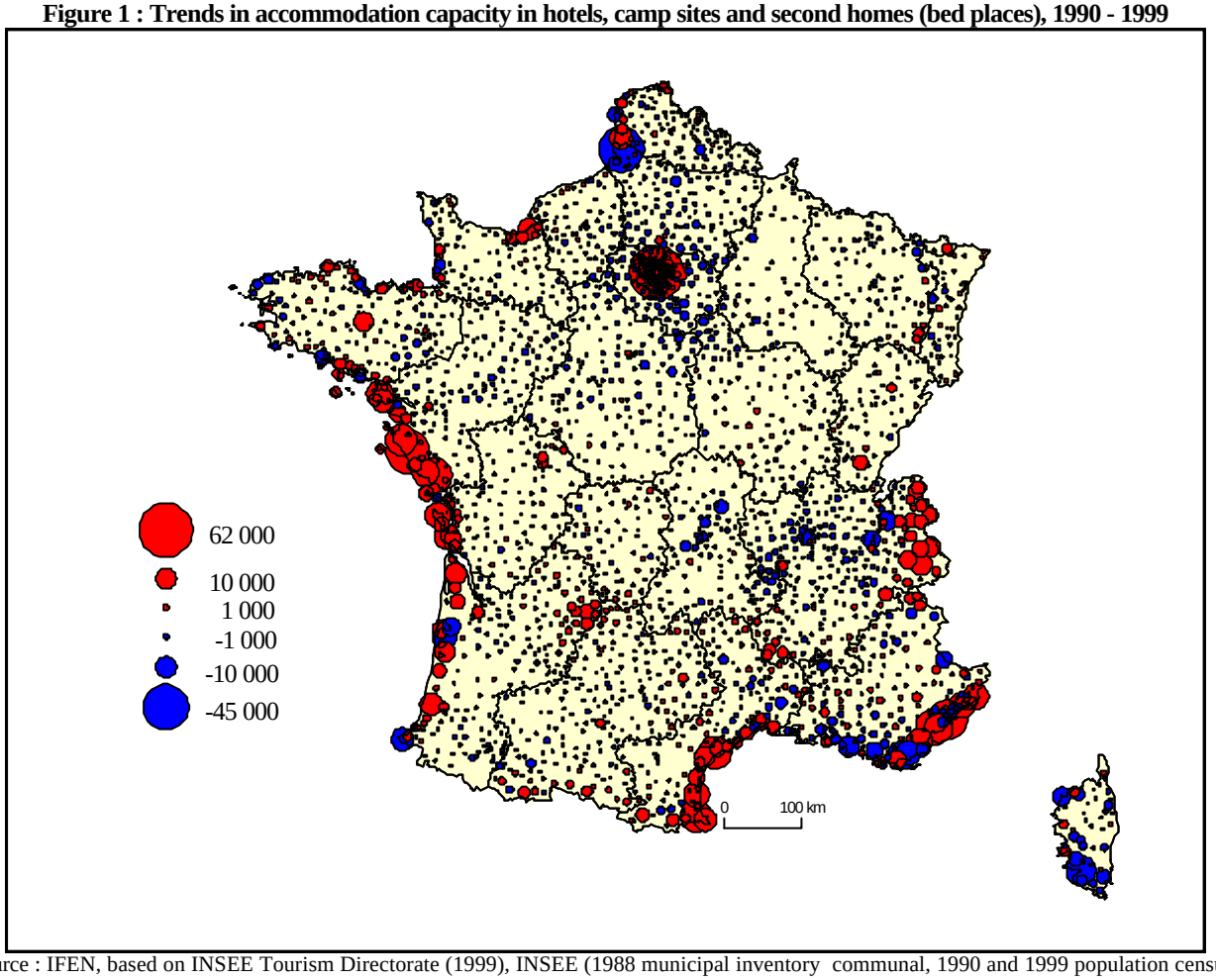
illustrates the importance of the environment for tourist activities. We also had to cross-reference data on tourism and data on the environment to obtain indicators, for example of potential tourist pressure on natural areas, conflicts between tourism and other uses of the environment, tourist concentrations in natural areas or the effectiveness of environmental measures (sewerage systems for example) in tourist resorts. To build up these indicators, the Ifen research team called on many data producers whose findings have rarely been linked to the topics of tourism and the environment until now.

FRENCH TOURISM IS STILL HIGHLY CONCENTRATED IN SPACE AND TIME

Tourism attracts more tourism…

Recent trends in accommodation capacity were defined by comparing the 1988 and 1998 municipal inventories of paying accommodation and data on second homes from the 1990 and 1999 population census (INSEE). The comparison enabled us to locate areas of potential tourist pressure on the environment.
In 1999, coastal and mountain municipalities alone (1 643 municipalities, or 4.5% of the total) accounted for 48% of accommodation capacity in hotels, camp sites and second homes. Most highly popular tourist regions (such as the northern Alps, the Atlantic and Mediterranean coastlines and the Deauville region) have seen a steep rise in their accommodation capacity since 1990. On the other hand, accommodation capacity has dropped locally in a number of long-established coastal tourist resorts (as in the Bouches-du-Rhône area around Marseille, part of the Alpes-Maritimes or the Morbihan region in Brittany). Because of competition from other economic sectors and the arrival of new working or retired residents, many second homes have been converted into main residences, a trend which may signal a change in the vocation of these areas. Elsewhere (Massif Central, Ardèche and Tarn gorges, the Cévennes range, the Périgord and the Dordogne Valley, for example), a number of important tourist centres are emerging, sometimes attaining tourist densities (in terms of the number of beds per km2) that are equivalent to those in the most heavily used coastal and mountain resorts.

Figure 1 : Trends in accommodation capacity in hotels, camp sites and second homes (bed places), 1990 - 1999



Source : IFEN, based on INSEE Tourism Directorate (1999), INSEE (1988 municipal inventory communal, 1990 and 1999 population census)

The problem of school holidays.

Although the situation is changing in qualitative terms (increase in the number of short holidays and decrease in the average length of stays), the main tourist seasons have remained constant and are determined by the dates on which family holidays begin, and by expectations of sunshine in the summer. In 1998, almost 30% of holidays away from home in France were taken during July and August alone (*Directorate for Tourism / Sofrès, SDT survey*).

The policy of spreading school holidays more evenly over the year, which was adopted partly in response to requests from winter sports resorts hoping to lengthen their peak season, may well produce positive effects on the environment by reducing the intense pressure on transport infrastructure and modulating demand for new ski lifts and ski resort accommodation. Summer holidays are already being staggered in many European countries : for example, the school year begins between the 8th August and the 15th September in Germany and between the 10th and 20th September in Italy.

Various factors suggest that tourist seasons may become more evenly spread over the year, although the actual effects of these changes are still uncertain :

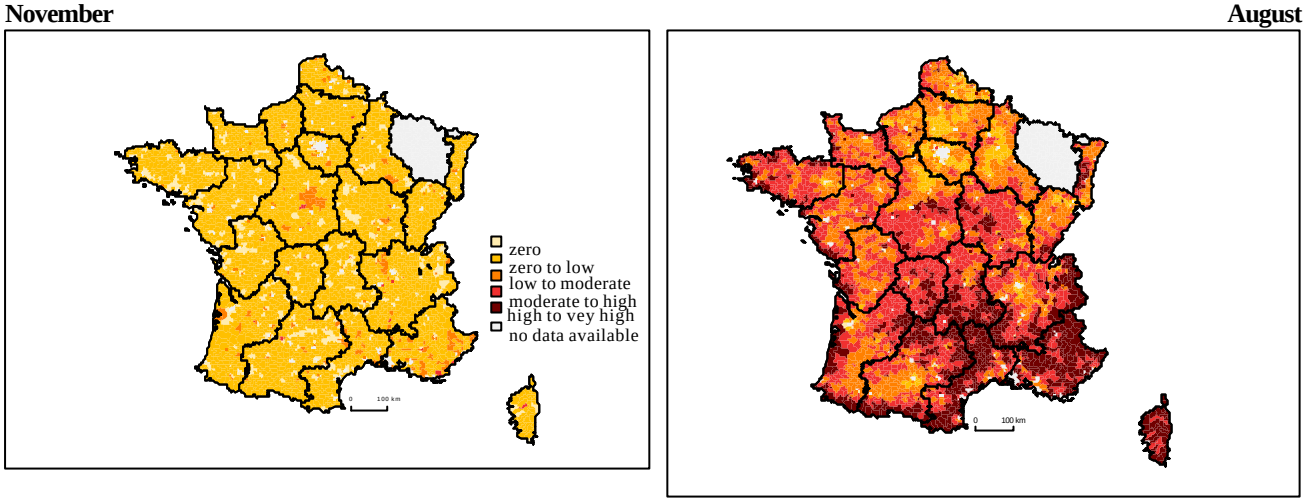
- the reduction in working time, which may help to diversify annual holiday cycles,
- increasing numbers of retired people, for whom school holiday periods are not a problem
- increasing tourist numbers from neighbouring European countries, where holiday periods are different.

However, staggering holidays means attracting tourists out of season, and many resorts that are well equipped for specific activities, such as sea bathing or skiing, are finding it difficult to diversify their tourist supply. The idea of enjoying deserted beaches in winter hardly compensates for the lack of sunshine. The main problem is the lack of activities in tourist resorts that are designed for much larger numbers. It is therefore important to look more deeply into the motivations of tourists and to make more accurate assessments of actual out-of-season tourist numbers, so that appropriate incentives can be introduced. The

Conseil général (*département* authority) for the Var, for example, has been largely focusing its promotional efforts on off-season tourism.

Figure 2 : Tourism in France in November and August according to Mayors

November **August**



Source : IFEN, based on INSEE (1998 municipal inventory)

TOURISM AND THE ENVIRONMENT : CONFLICTING EXPECTATIONS

There are many preconceptions as to the sensitivity of tourists to the environment and it is not always easy for tourist operators to distinguish between fundamental and secondary issues. Sensitivity among tourists depends first of all on how well environmental information is displayed and distributed. Visitors walking around a city may well be aware of litter in the streets, but they may not always know when air pollution is in excess of permissible thresholds, even though the seriousness of the two problems is of a very different order. In coastal resorts, increased surveillance of bathing water quality and the Blue Flag award scheme have greatly helped to increase public awareness of sewerage problems, for example.

Rather than seeking out outstanding natural and environmental features, French holidaymakers are particularly sensitive to peace and quiet, landscape quality, health risks and restrictions on access to natural areas. They tend to look for an authentic feel in the place where they are staying, but have high expectations as to amenities and conveniences.

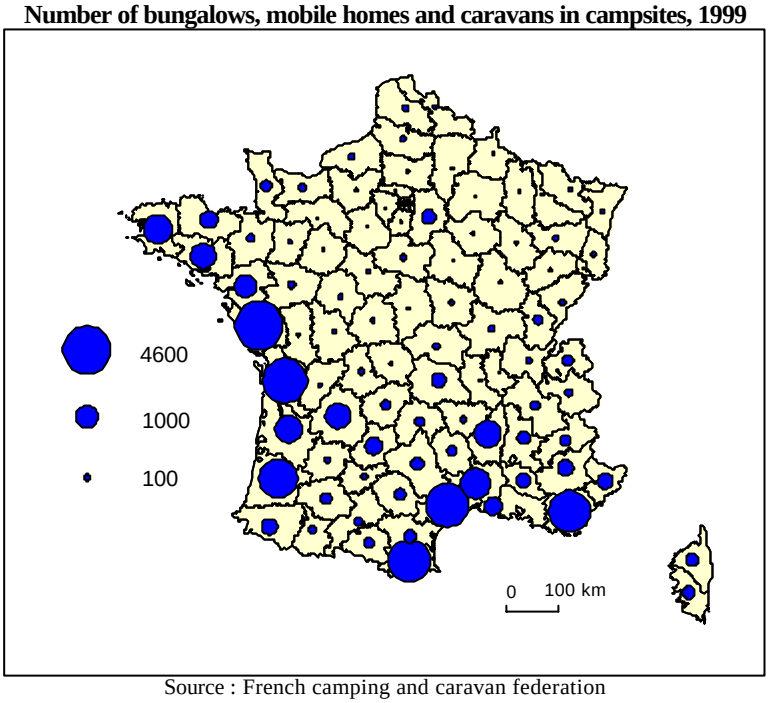
High expectations and increasing demand for amenities

Higher expectations as to the amenities provided in tourist accommodation are increasing the demand for energy, which is fortunately being moderated by improvements in energy efficiency. More and more hotels are providing television in each room and installing air conditioning systems and swimming pools. Air conditioning units consume 90 to 150 kWh per m2 annually (*Accor*), and swimming pools about 300 kWh per m² (*Inestene*). Energy consumption increases with the standard of tourist accommodation. A survey by the Accor hotel group has estimated average energy consumption per m3 and per year at 157 kWh in a Formula 1 hotel, which is less than in a principal private residence (190 kWh per m2 and per year), 230 kWh in an Ibis hotel, and 380 kWh in a Sofitel hotel. Demand is also encouraging operators to install increasingly powerful equipment. Energy requirements for the 670 million ascents made each year on the 4 000 ski lifts in France (*SEATM*) amount to 571 - 734 GWh, which is equivalent to one quarter to one third of the yearly output of a nuclear power station. Using snow cannons to ensure snow cover throughout the season or maintaining an interior temperature of 29 °C in the "tropical seas paradise" of the Center Parcs chain obviously requires a great deal of energy.

Similarly, the increasing proportion of individual houses built as second homes has increased the demand for land. From 1988 to 1997, the average surface area of a second home increased from 57 to 80 m^2, with plot sizes increasing from 700 to over 2000 m^2 (*MELT, SITADEL*). The same trend has become apparent in the gradual alteration of landscapes that are occurring in campsites. Although campsites were seen for long time as a cheap but rather basic form of holiday accommodation, they are now attracting a much more affluent

clientele. More and more campsites are installing recreational facilities, such as swimming pools, tennis courts and even golf courses. At present, 42% of French campsites offer catering services, almost 30 % have a swimming pool and 20 to 35% offer simple rented accommodation (bungalows and chalets).

Figure 3 : Gradual landscape alteration in campsites
Number of bungalows, mobile homes and caravans in campsites, 1999



Source : French camping and caravan federation

The French population seems to be increasingly motivated by the natural environment, as borne out by the rise in the number of visitors to national parks and regional nature parks and to nature reserves and islands and other sites managed by the National Coasts and Lakeshore Conservation Agency (CELRL), and also by the increasing popularity of nature-based leisure activities.

According to a 1996 *Cofremca* study on visitors to national parks, tourists in mountain areas have a concern for the authentic character of protected areas : 64% were not interested in picnic areas with amenities, 91% rejected the idea of souvenir shops and 93% did not want to see fast-food restaurants in national parks. Visitors are also aware of the problem of excessive tourist numbers : 48% said there were too many people on footpaths and 43% felt they did not see enough wildlife. However, only 12% would agree to an admission fee to visit certain sites, only 13% would agree to pay for parking. Few thought that compulsory professional guides were a good idea. Respondents to the survey were more receptive to the idea of restricting access to natural sites by reducing the size and increasing the distance of parking areas.

The French population also seems very much aware of the impacts of coastal tourism. In a 1991 *Sofrès* survey, 42% of the interviewees thought that seaside real estate development is the main cause of coastal degradation, with 31% incriminating "seaside industries" and 12% blaming tourist infrastructure (yachting harbours, campsites and golf courses). Responding to the question on their expectations of seaside areas, 81% said they wanted to experience unspoilt nature, 33% expected freedom of access to the sea and 28% wanted as little urbanisation as possible. Only 7% wanted to see more tourist amenities and high residential potential. Despite this, in 1992, 54% of the respondents spent holidays less than 500 metres from the sea shore, and 66 % stayed less than one kilometre away (*ONT*).

According to an analysis of correlation's between the tourist attractions of municipalities and their natural and cultural resources (outstanding natural areas, boating lakes, listed sites and historic monuments), the attractiveness of the countryside has more to do with the quality and diversity of ordinary landscapes than with the presence of outstanding sites. These findings confirm those of various surveys, which show that

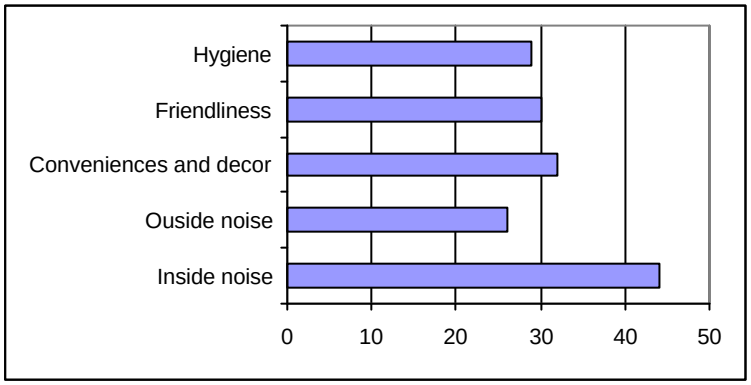
"authenticity" and "real values" are among the most important reasons for spending holidays in the countryside. There appears to be strong market potential for tourist products geared to the discovery of the natural world. In 1997, 26% of respondents to a *Sofrès* survey carried out for the French Agency for Tourist Project Engineering (AFIT) had spent time in the country on discovery type holidays (i.e. not in second homes or with family) during the previous 12 months. 43% (11% of the base sample) said they would be prepared to purchase one of the "nature and wildlife" tourist products suggested in the survey. A very large majority of these potential customers (over 90%) were interested in combining purely nature tours with activities based on local culture, crafts and culinary specialities. While 80% of respondents thought that nature-based tourism requires some kind of environmental discipline, they rejected the idea that such activities should be restricted to an elite clientele of enlightened amateurs, and 75% thought they did not have enough information on holidays of this type in France. Efforts to develop nature-based tourist products therefore need to take account of this clientele of non-specialists with an interest in varied tourist offerings.

Peace and quiet : a priority for holidaymakers

For French holidaymakers, peace and quiet are the top priority by far among the various important aspects of their holiday environment. 43% of respondents to a June 1998 *Credoc* survey ranked peace and quiet at the top of their list. When asked more specifically about the important aspects of holiday accommodation, peace and quiet ranked second, just after hygiene but ahead of conveniences and prices.

Figure 4 : How hotels need to improve

Question : "What general improvements would you like to see in hotel accommodation ?" (%)



Source : Ministry of the Environment (noise abatement delegation) ; Ministry of Tourism, 1992 : survey on customer satisfaction regarding noise levels in French tourist hotels, carried out by the Association for research on pollution, environment and transport.

Effects on tourism of environmental and health crises

During the first half of the 1990s, tourism was somewhat disrupted by adverse economic factors (1993 recession) and political events (Gulf War and the 1995 bomb attacks). The attack on the World Trade Centre of 11th September 2001 confirmed the influence of the geopolitical context on the health of the tourism and transport sectors. Tourist activity, which is highly sensitive to situations over which it has no control, and also to the way events are handled by the media, has been faced in recent years with an increasing number of health and environmental crises.

Impact of the Erika oil spill on tourism along the French Atlantic coast

The oil spill from the Erika oil tanker in the first quarter of 2000 affected coastal regions stretching for 400 km along the Atlantic coast from the south of Finistère in Brittany to the north of the Charente Maritime *département*, an area that comprises 25 to 30% of all accommodation capacity along French coasts (*IFEN, based on INSEE Tourist Directorate, 1999 population census*).

The first final reports for the Pays de Loire region show a drop of 27% in rentals of furnished accommodation, 21% in campsite turnover and 9% in tourist hotels (Pays de Loire regional tourist monitoring unit - *Observatoire régional du tourisme des Pays de Loire*). The drop in turnover for the tourist sector in the three regions affected is estimated at 300 to 450 millions Euros (*Association Ouest Littoral Solidaire*), and losses in trading margins that are eligible for compensation from the International Oil Pollution Compensation Fund (IOPC) at 160 to 180 million Euros (*Central Tax Inspectorate*). Estimated

losses concern not only the 2000 season, but also the next two or three years (risks of losing "non captive" customers). In June 2001, applications for tourism-related compensation amounted to the equivalent of 80 million Euros overall (*State Secretariat for Tourism*). The IOPC compensation rate was provisionally fixed at 60%, to be topped up to 100 % by the State.

Analyses of the entire 2000 season have brought out the factors of vulnerability and resistance to the consequences of the Erika oil spill. The situation varies widely depending on the type of tourism involved, the coastlines affected, the tourist activities concerned and tourist expectations with regard to health and the environment. Some seaside resorts have been able to offer other tourist resources, such as the attractions of their inland areas, while those where tourist offerings are limited to seaside activities have seen a more substantial drop in the number of visitors. For all these reasons, camp sites (which saw a drop in turnover ranging 13.3% to 27.1% depending on the *département*) appear to have been more affected than hotels, where losses range from 1.8% to 7.7% and where the clientele is more varied and spread more evenly over the year. Finally, the crisis was cushioned somewhat by the fact that the region is less dependent than others on its foreign clientele (foreign tourism dropped 7% to 19.3% in hotels and 12.7% to 37.3% in campsites, depending on the *département*) and has a high rate of customer loyalty (figures for visitors from the region itself and holidaymakers using second homes vary from a drop of 3.1% to an increase of 11.2% in non trading accommodation) (*Tourist Directorate, based on Central Tax Inspectorate statistics).*

Finally, in the first half of 2000, communication targeting tourists was caught between a concern to provide information on the condition of beaches and possible health risks, and the need to restore a positive image of the coastal areas affected. The rapid succession of contradictory messages and images did not always help to give holidaymakers a true picture of the situation.

The December 1999 storms

In the final analysis, the storms which hit France on the 26th and 27th December 1999 only had a moderate impact on tourism. With the notable exception of the Charente coastline, the areas most affected were inland. Immediately after the storms, access to some forest areas was banned by Orders of the Prefects, which created a severe handicap to tourist professionals in the regions concerned (especially around Paris, in the Vosges mountain ranges, the Limousin region and Charente Maritime). According to the French Ramblers' Federation (*Fédération française de la randonnée pédestre*), 10 000 km out of the 65 000 making up the long-distance rambling network were affected and 40 000 km out of a total of 120 000 km of local footpaths were affected. The impacts of the storms were probably most severe in periurban parks and woodlands, where access was sometimes banned for many months. The storms raised the question of a possible increase in extreme weather conditions (including drought) associated with climate change, which would affect the tourist industry and would need to be planned for.

TOURISM AND ROAD TRANSPORT

Cars and more cars…

In 1994, 61 % of all journeys by car, excluding travel to and from work, were for private purposes (professional journeys : 36 % ; travel abroad : 3%). In that year, holidays and weekend travel accounted for 12% and 19% respectively of the 326 billion km travelled in family cars. The remaining 30% were local private journeys. These two journey types increased by 31% and 28% respectively from 1982 to 1994. 81% of the French population use their cars for private travel more than 100 km from home (*INSEE, Survey on Transport*). Even for distances greater than 1 500 km, 58% prefer to travel by car. The figures show that car traffic is much more sensitive to the summer holiday effect than rail or air traffic (*Figure 5*).

Holidaymakers are travelling further and more often, but for shorter periods

The average duration of holidays taken away from home dropped from 18 to 13 days between 1975 and 1994 (*INSEE survey on holidays*). From 1982 to 1994, the number of private journeys per person and per year increased from 3.1 to 4.8, and the average distance travelled increased from 100 km away from home to 800 - 890 km (*INSEE survey on transport*). These trends alone increased the number of kilometres travelled for holiday purposes by 31% from 1982 to 1994.

Figure 5 : Effects of tourism on traffic along major roads
Weekly traffic per mode of transport in 1998

Source : National road traffic information centre, Directorate-General for Civil Aviation, SNCF
Average per transport mode = base 100
Road traffic : 31 traffic survey points representing traffic on major roads
Air traffic: weekly traffic in Paris airports (Orly and Roissy)
Rail traffic: weekly TGV (high-speed train) traffic

Towards less polluting holiday travel ?

Because of their increasing in frequency and their concentration over short periods in the year, tourist journeys are causing seasonal saturation in transport infrastructure. Based on results from 31 survey points, peak car traffic during the week is 60% higher than the lowest weekly traffic figures (+34% over average traffic flows). This peak traffic coefficient can be much higher for some roads that are little used outside holiday periods, reaching 250 % on the A10 at Saint-Savin for example, and 230% on the N75 at Sisteron. In a single day, peak traffic can be as high as 800% over the figure for the day with the lightest traffic (CNIR). Most traffic congestion outside Paris occurs on the main holiday departure and return dates, with bottlenecks on some main roads and motorways in the south-east of France, which regularly reach saturation point (A7, A8 and A9 motorways).

The contributions of tourism to emissions of atmospheric pollutants are generally under-rated. Between 5% and 7% of all greenhouse gas emissions in France are caused by tourist transport. A family of two adults and two children travelling from Paris to Nice by air on a peak day will contribute more atmospheric pollutants of any type than with any other type of transport. A journey by plane will contribute five times more to global warming than the same journey by diesel train (160 kg carbon equivalent as against 30 kg) and 2 to 4 times more than the same journey by car. However, pollution emission figures for aeroplanes are slightly better than for cars when only one person is travelling. Train journeys are the least polluting in all cases.

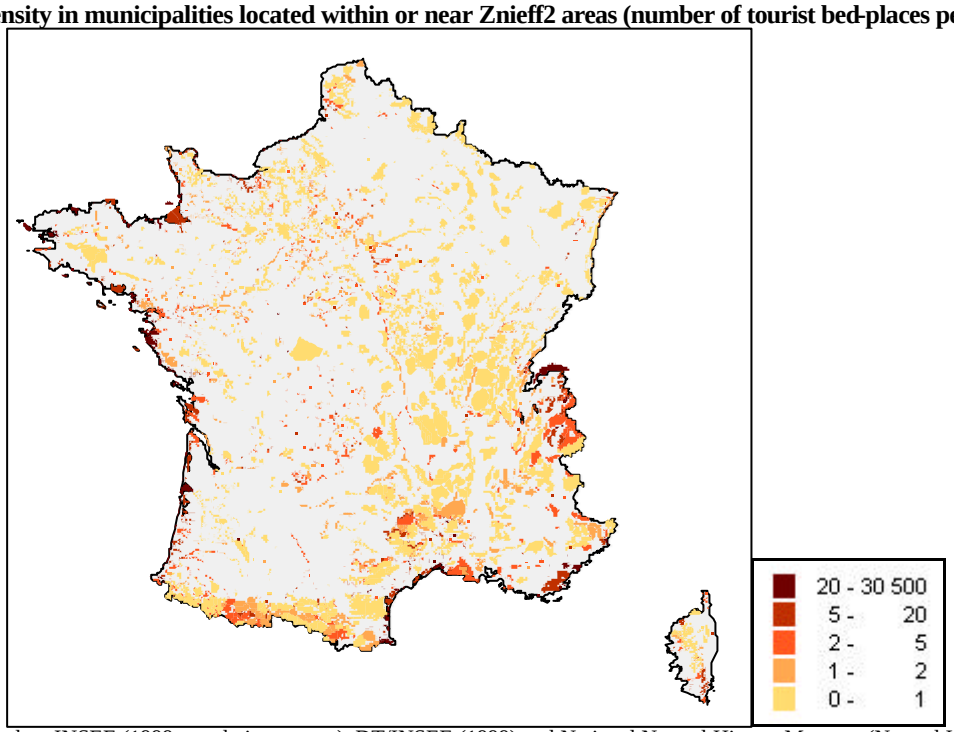
Holidays without a car ?

People tend to go on holiday by car so they can travel about freely, get away from city life (especially to the country) and avoid problems with luggage. However, the last few years have seen a considerable growth in holidays organised around alternative means of transport (cycling, river cruises or hiking). Although holidaymakers still travel by car to the departure point of their walking tour or cruise, the trend nevertheless reflects a change in attitudes which deserves to be encouraged by appropriate measures. Such efforts are undertaken to mark and maintain footpaths, develop walking and hiking itineraries in each *département.* Canal maintenance and landscaping are undertaken by the *Voies Navigables de France* company, and so on. However, progress in implementing such measures is slow and difficult because of conflicting interests among the many different stakeholders concerned. To do without their cars on holiday, people need adequate public transport to get to their destinations, as well as alternative transport once they arrive (AFIT).

Does ecologically sound accommodation exist ?

Generally speaking, because of the positive and negative aspects that are inherent to each type of tourist accommodation, it is virtually impossible to rank them in order of ecological soundness. Hotels use a lot of water but they save space, while camp sites in natural areas raise problems with sewerage and use up a lot of space, but do not generally cause irreversible alteration to the landscape. Second homes, although they are often and rightly criticised in coastal and mountain areas, can in some cases help to rehabilitate abandoned traditional dwellings in the countryside, and liven up depopulated villages during the holiday season. The environment soundness of different types of holiday accommodation can therefore only be assessed in the light of the specific features of each area and by cross-cutting a wide range of criteria. The wide variation in the use of different types of accommodation (from about 5 weeks per year for second homes to about 30 weeks for hotels) is a major factor in determining their efficiency in terms of land use. Proportionally, a much larger number of second homes would be needed to accommodate the same number of people as those using a hotel or tourist residence. However, many other considerations, both quantitative and qualitative, are involved in appraising the use of space. Though highly variable, the average "footprint" of one tourist bed is estimated at 30 m2 for a hotel and 100 m2 for a second home (Blue Plan). The type of construction (collective or individual, existing dwelling or new development, reversibility of amenities and so on), whether they are located in natural areas or towns and their integration within the landscape (use of local materials etc.) are also important factors.

Figure 6 : potential pressure of tourism accomodation on natural areas
Tourist density in municipalities located within or near Znieff2 areas (number of tourist bed-places per hectare)



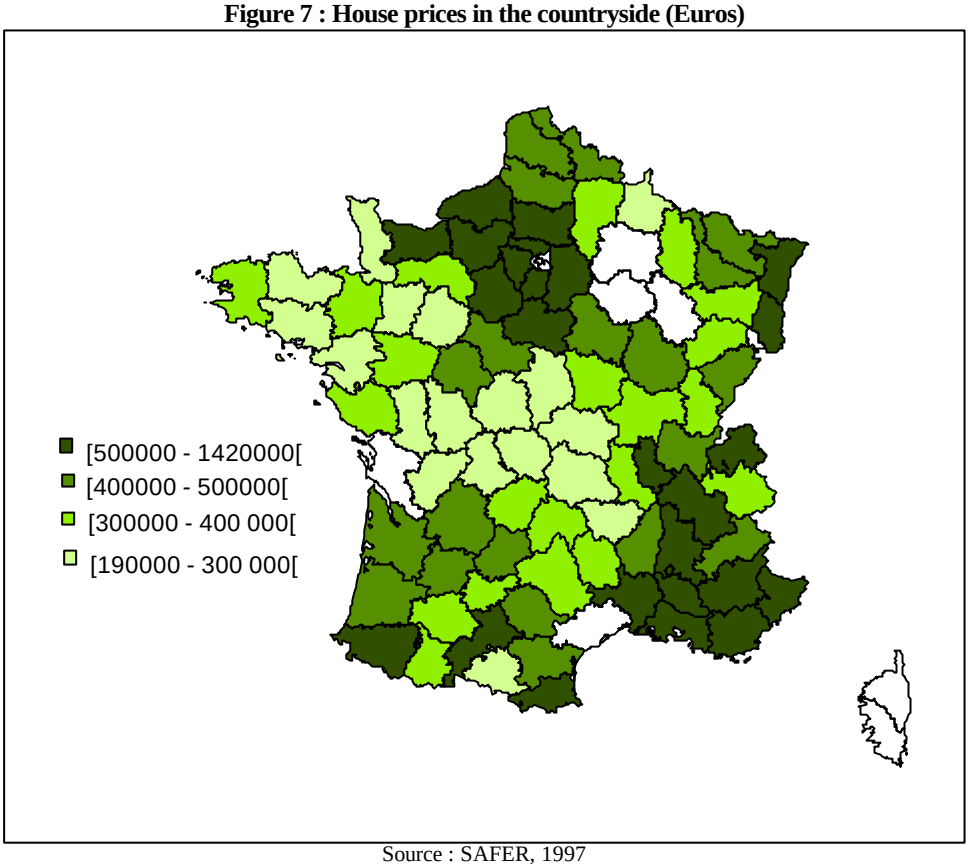
Source : IFEN, based on INSEE (1999 population census), DT/INSEE (1999) and National Natural History Museum (Natural Heritage Inventory)

French holidaymakers tend to prefer second homes to rented accommodation

From 1982 to 1998, almost 335 000 new second homes covering over 22 million m2 were built, with concentrations varying widely across the country. From 1991 to 1998, the national average for new second homes was 4 per municipality, but the figures were as high as 88 in very popular tourist areas, 208 in seaside resorts and 434 along the Languedoc-Roussillon coast (*MELT, SITADEL*). With their very low occupancy rate (2 to 11 weeks a year on average), the use of land by second homes can seem very wasteful. Rented

accommodation, timeshare schemes and house swaps (second or main homes), which can help to improve the occupancy rate, have not really found favour with French holidaymakers on an enduring basis. The construction of second homes within housing blocks, which take up less space, has been in decline since 1990 and accounted for only 20% of the area taken up by new second homes in 1997. Standardised tourist accommodation (as in residential holiday villages) may help to improve the overall occupancy rate.

Figure 7 : House prices in the countryside (Euros)



Source : SAFER, 1997

Environmental labelling for tourist accommodation

Several highly dependable labelling schemes ("*Gîtes Panda*", "*Clés vertes*" for camp sites or "*Hôtels au naturel*") are attempting to extend their reputation beyond the strictly environmental sphere. The *Clés Vertes* scheme, for example, which began in Denmark, awards an ecolabel to open-air accommodation and was recently adapted to the context in France (where 44 camp sites received the label in 1999), through a partnership between the French Naturist Federation and the Foundation for Environmental Education in Europe. The label is awarded on the basis of 38 criteria that are divided into 3 categories ("imperatives", "medium-term imperatives" and "ideal situation"). As yet, however, only a small number of establishments have joined these schemes.

Environmental concern and joint efforts among tourist resorts

Tourist resorts are beginning to embark on projects that combine environmental concerns in the broadest sense with commercial effectiveness, by focusing at once on authenticity, local resources, accommodation with character and concern for the quality of life and the natural environment .
An association called "*Les plus beaux villages de France*" was founded in 1982 to protect, promote and develop the municipalities that receive the label. Municipalities joining the scheme have to fulfil a number of criteria concerning aspects such as the rural character of the area (less than 2 000 inhabitants covered by the district administration or *Chef-lieu*), an architectural and/or natural heritage attested to by the existence of at least two protected areas or monument around, specific features of the built-up environment (immediate surroundings of the village carefully maintained, homogeneous buildings and varied itineraries) and village architecture (appropriate choice of building materials and colours, etc). The quality of the local heritage has

to be supported by active enhancement and promotional measures and by the provision of cultural and other activities. The main features taken into consideration concern traffic and parking management, floral decoration, the way advertising and electricity and phone lines are treated, recreational facilities, public amenities and a sound knowledge of tourist numbers and behaviour. The label is therefore awarded in recognition of efforts to enhance a high quality local heritage for tourist development purposes.
The "*Station verte de vacances*" label was created in the Loire region in 1964 for municipalities or groups of municipalities totalling less than 6 000 inhabitants, and places particular emphasis on the environment and the quality of life. Stipulations under the new charter, which was adopted in 1999, include protection of the natural heritage, efforts to meet European standards on bathing and angling waters and to control pollution of all kinds (including noise), and access to natural areas (especially by marking and maintaining footpaths).

Environmental policies among major tourist operators

Whereas environmental management schemes (including certification procedures) have become increasingly widespread among large industrial corporations, they are still in their early stages among hotel chains and leisure parks. The Accor hotel group, which has created its own environment department and defined an environmental charter for hotel managers in 1998, is seen as a pioneer in the field. In 1999, the group signed a framework agreement for cooperation with the French Agency for the Environment and Energy Management (ADEME) which covers the 2 600 hotels in the group as well as its car rental business. The first measures completed under the agreement include the installation of solar water heaters in several hotels in southern France. The Center Parcs chain obtained ISO 14001 certification in 1999 for the environmental management systems implemented in thirteen of its European parks, including two in France (Normandy and Sologne). Environmental management measures are designed to optimise spending (on water and energy in particular) and to provide opportunities for mobilising the company's human resources around strong and mutually agreed commitments to environmental goals. However, now that environmental plans and charters are being adopted, their actual implementation needs to be closely monitored.

CONCLUSION : DIRECTIONS FOR FURTHER RESEARCHES IN IFEN

This Ifen study has scanned a topic that is rarely addressed and little documented. Information systems on tourism are not yet as sound as they should be, so the indicators developed are by no means beyond criticism and some deserve to be further discussed and improved. The limitations of this document mainly stem from the fact that indicators can only be built up when the right data is not only available but also highly reliable. When relevant data was unavailable at national level, the Ifen research team used local information which, given the localised nature of tourism, proved to be indispensable. Finally, the data available was not sufficiently robust to deal adequately with the situation in the overseas *départements* and territories (DOM-TOM), with the impacts of French tourism abroad (practice among French tourists abroad, French tour operators and hotel chains working in other countries, etc.), or with the impacts of tourism on landscapes. The DOM-TOM, which are visited by over 2 million tourists each year generating some 300 millions euros in revenue, and where many features are directly linked to tourist activities such as sailing, cruises and scuba diving, or to local environmental conditions (fragile coral atolls and reefs), deserve to be treated as a distinct tourist area.

Despite these failings, this study has not only quantified known phenomena so that the true scope of the problems raised can be assessed, but has also brought out issues that have rarely been considered to date and which are likely to make up an important research topic at Ifen in the years to come. The work involved in enriching and perfecting the resulting databank will contribute to the achievement of many objectives, including statutory monitoring (of the tourist-related aspects of the Mountain Areas and Coast Acts in particular) and in-depth studies of interactions between road and air transport systems and the environment.

REFERENCES

Agence Européenne de l'environnement (AEE) (1998) *L'environnement en Europe : le second rapport d'évaluation*. Elsevier Science ltd. Danemark.

Andriola L. and Seminara M. V. (1998) Indicatori di performance ambientale per il settore turistico. In *Decimo raporto sul turismo italiano*. ENIT/ISTAT/ Touring Club Italiano, pp.357-373.

Cammarota M., Costantino C. and Fängström I. (1997) Joint Final Report of the Sectoral Infrastructure Project. Tourism (electronic edition).

Ceron JP. Dubois G. and Raoul-Duval J. (2000) Théorie et pratique des indicateurs de développement durable: leçons d'une application au tourisme. Limoges : CRIDEAU. 18p.

Ceron, JP and Dubois G (2001) Tourism and sustainable development indicators: two French experiments facing theoretical demands and expectations. In *Proceedings of the International Sustainable Development Research Conference*. April 5-6 2001. Manchester: University of Manchester.

Consulting and Audit Canada (1995) *Ce que les gestionnaires du tourisme ont besoin de savoir. Guide pratique pour l'élaboration et l'emploi d'indicateurs de tourisme durable*. Madrid : Organisation mondiale du tourisme. 45 p.

EPA (2001) A method for quantifying environmental indicators of selected leisure activities in the United States. Washington : EPA. 92p.

Ifen (2001) Propositions d'indicateurs de développement durable pour la France. Orléans : Ifen. 106p.

Ifen (2000) *Spatial planning and environment. Policies and indicators*. Paris: Ministère de l'Aménagement du Territoire et de l'Environnement. 272 p.

Levarlet, F. (1999) *Les indicateurs de développement durable. Méthodes et perspectives*. Coll. Etudes et travaux. Orléans : Ifen. 133 p.

Middleton, V. T. C. and Sieber W. (1999) Tourism and the Environment at European level. A practical framework for assessing the issues with particular reference to Coastal Mediteranean and Alpine Regions. Copenhague : European Environment Agency**,** 38 p.

OECD (2001) Household tourism travel: trends, environmental impacts and policy responses- Report n°ENV/EPOC/WPNEP(2001)14. Paris: OCDE, 57 p.

OCDE (1994) Indicateurs d'environnement. Paris : OCDE

Plan Bleu (1997) Tourisme. Indicateurs de développement durable. Première recherche d'indicateurs selon quelques références bibliographiques. Sophia- Antipolis : CAR/PB. 25 p.

Policarpo David (2001) Recherche sur les indicateurs pour un tourisme durable: une méthode et un choix de définition d'indicateurs pour un développement touristique durable, dans les pays en développement. Mémoire de DEA Recherches Comparatives sur le Développement, EHESS. 207 p + appendix

Rechatin C. (1999) La diffusion de l'information sur l'environnement. Le reporting environnemental. Coll. Notes de méthode. Orléans : Ifen

Rechatin C., Dubois G. and al. (2000) *Tourisme, environnement, territoires: les indicateurs*. Orléans : Ifen. 261 p.

Rechatin C., Theys, J. and al. (1997). Indicateurs de développement durable: bilan des travaux étrangers et éléments de réflexion. Coll. Notes de méthode n°8. Orléans : Ifen. 72 p.

Ruitenbeek H.J. (1991). Indicateurs d'un développement écologiquement durable : vers de nouveaux principes fondamentaux. Ottawa : Conseil consultatif canadien de l'environnement. 35p.

Scientific Committee on Problems of the Environment : SCOPE (1995) Environmental indicators: a systematic approach to measuring and reporting on the environment in the context of sustainable development. Workshop of Ghent, 9-11 January 1995

Spagenberg J H and Bonniot O. (1998) Sustainability indicators. A compass on the road towards sustainability. Wuppertal Institute für Klima, Umwelt, Energie. Wuppertal Papers N° 81. 33p.

Spanish Ministry of Environment, General Direction of Environmental Quality and Assesment (2002) Environmental Indicators for Tourism.W ork document for the International Seminar on Environmental Indicators for Tourism. Murcia, Spain, 8-10 April 2002.