

# **MANAGEMENT OF THE BELGIAN COAST**

## **OPINIONS AND SOLUTIONS**



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by

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## 1. SUMMARY

To determine the view with which the Belgian public sees the Belgian coast and in order to obtain their opinions and solutions to the problems along the Belgian coast, a questionnaire survey was held by telephone or personally with 20 respondents in each of 5 groups active in the coastal zone. The five groups entailed 1) politicians on various levels of authority, 2) coastal entrepreneurs and business people, 3) naturalists and scientists, 4) coastal residents and 5) tourists. Respondents generally rated the information about the coast and its problems coming from scientists as unclear and unavailable, whereas the information from interest groups and the media was most available but sometimes inaccurate.

The majority of respondents from all groups saw the coast as over developed and over commercialised and perceived the lack of nature as a serious disadvantage. Other important problems mentioned were: 1) structural chaos due to the lack of an integrated long term structural plan for the entire coast with legal power to avoid unnecessary duplication of facilities and other damaging practices along the coast, 2) the absence of strict application of structural plans and rules, even the few with a legal base such as the Dunes decree 3) continued frittering of and construction in dunes and natural areas 4) traffic and parking problems 5) environmental degradation due to mass tourism 6) aging of coastal cities and lack of investment into tourism by the government and private sector and 7) dune water exploitation which puts the dune vegetation in jeopardy due to lowering of the water table. Solutions put forward addressed the above problems, the most important being an immediate stop to building in the dunes, and nature conservation and restoration.

Nature conservation policies were perceived to have improved over the last 3 years but more was deemed necessary. Economic and industrial growth in the coastal zone was seen as undesirable, and touristic development was to be strictly controlled and guided. Alternative types of (all weather) recreation, especially nature recreation, were lacking. Respondents held especially past municipalities responsible for the current coastal problems, at the same time blaming the higher authorities for giving too much power to the municipalities. Furthermore, most respondents were skeptical about the application of the Dune decree and structural plans and their power to protect the remaining natural areas. The root of the problems seem to lie in lack of coordination and communication between different authorities responsible for the coastal zone. Education of tourists and multi-disciplinary research in the coastal zone are essential for any management policies to stem the pressures on and reverse the degeneration of the coastal zone.

## 2. BACKGROUND

### 2.1 The Belgian coast

The 65 km long Belgian coastline is bathed by the North Sea. Several sand banks on the shallow continental shelf are the habitat and feeding grounds for marine birds, fish and invertebrates (Seys *et al.*, 1993; Herrier & Thomas, 1995) and are exploited for building sand and beach replenishment. Due to marine erosion and coastal defense to protect the low altitude coastal planes a great part of the sandy coast is interrupted by stony breakwaters and concrete dikes (Herrier & Thomas, 1995). Of the 65.4 km coast, 35 km is protected by dikes and 26.8 km by dunes, with or without dune base reinforcement (AWZ, 1993). The only 2 salt marshes left are those of the Ijzer estuary at Nieuwpoort and the tidal inlet of the Zwin (Fig. 1). These provide important feeding grounds for coastal birds and waders (Herrier & Thomas, 1995). The Royal Yacht harbour in the Ijzer estuary at Nieuwpoort is the biggest yachting harbour in Europe (pers. comm. Mr. L. Herrier, Dienst Natuurbehoud, AMINAL, Brussel). 'Het Zwin' is a 530 ha privately owned nature reserve on the Belgian/Netherlands border with tidal creeks, salt marshes, mud flats, dunes and coastal forest that, apart from the exceptionally rich flora it harbours, constitutes an important breeding and feeding place for coastal birds and waders (Vanherck & Van der Veken, 1988) and is listed as a Ramsar site (Maes & Cliquet, 1996). The salt marsh is currently in danger of silting up by past beach replenishments at Knokke-Heist in 1977 and 1986 (Provoost & Hoffmann, 1996). The 'Westhoek' is a 340 ha dune reserve at De Panne on the western border with France. Here wandering dunes still exist and the integrated coastal system of sea/beach/dune/polder is almost intact. Apart from the 2 aforementioned reserves, as well as Doornpanne (200 ha - Koksijde) and Duinbossen (150 ha - De Haan), 9 of the 20 coastal reserves are less than 20 ha in size (Provoost & Hoffmann, 1996) and are thus not ecologically independent nor sufficiently buffered from the direct surroundings, which makes survival of the inhabitant (parts of) animal and plant populations more difficult.

At the beginning of the 20th century the coastal dune massive, constituted by foredunes, primary vegetated dunes, wandering active dunes with slacks and salt marshes, spanned the entire Belgian coast. The first onslaught on the dune belt came in 1886 when King Leopold II constructed the coastal tramway through the dune fields, followed by the Royal Coastal road in 1933 which encouraged the

founding of coastal towns within the dune belt (Baeteman, 1995). The biggest disruption came after the Second World War with the increase of mass tourism resulting in construction of holiday homes and flats, camping sites and parking areas within the dune fields (Bossu, 1991). Due to the unbridled construction of holiday homes and very high apartment buildings just behind the foredunes, the expansion of coastal towns towards each other resulted in ribbon development along almost the entire coast (WES, 1992c), with foredunes existing along only 33 km of the 65 km coast (Bossu, 1991). Currently, of the 6 000 ha dune fields, only 3 500 ha remain undeveloped, of which only 2500 ha are destined as green areas (Herrier & Thomas, 1995). According to an earlier Regional Structure plan, the rest is classified as residential, recreational or military areas (400 ha) or agricultural land (600 ha) (Herrier, 1994). This effectively meant that 40% of the coastal dunes were predestined as building ground. Of the remaining dunes 50% are privately owned (Provoost & Hoffmann, 1996). The dunes currently are under threat of trampling by tourists, the constant pressure for speculation and construction of holiday accommodation, recreation and parking sites and the layout of golf courses, expansion of the Zeebrugge harbour and dune water extraction (Maes & Cliquet, 1996, Chapter II.8.).

Oostende, situated in the middle of the Belgian coastline, is the biggest coastal city with about 120 000 permanent inhabitants, mostly above 65 years of age. Apart from the general 'greying' of the population along the coast due to the lack of job opportunities for economically active sectors, the infrastructure and buildings are also deteriorating (WES, 1992c, Chapter 5).

The (West Vlaanderen) Provincial Structure plan for the coastal zone drawn up in 1992 (WES, 1992c) made suggestions in the field of traffic infrastructure, accommodation, the agricultural and economic fields, but was not legally binding. It was advised that the Royal coastal road that links all coastal towns is narrowed by transforming the lateral lanes into parking space and to lengthen the A18, a parallel road more inland, for heavy and fast traffic. Local roads at right angles from the A18 (in the form of a comb structure) would provide access to each coastal town. The parking problem would be alleviated by providing parking sites underground and around the edges of city centres with improved public transport to the centres. More train stations are necessary on the west coast and the coastal tramway should be lengthened westwards to connect with the train stations so that less private transport is necessary to reach the coast. As far as the need for accommodation is concerned, it was suggested that old houses should be demolished to make space for new

accommodation instead of building accommodation in new sites. This would also ease the pressure on the dunes and open areas. As far as agriculture is concerned, the WES found that a third of the land allocated to agriculture on a previous structure plan has been lost to parceling out of building sites (WES, 1992c, Chapter 7) They also warn against intensive agricultural practices (e.g. horticulture in hot houses and pig breeding) in the low carrying capacity soils of the coast. These will require extra water which will further lower the water table level not to mention the pollution with pesticides and manure.

## 2.2. Coastal tourism

Tourism along the Belgian coast has increased by 38% between 1965 - 1992. (Wesstoerisme, 1992). In contrast to longer visits, one-day tourism has increased over the past years, with almost 12.5 million visits recorded in 1991 (WES, 1992c) of which 9.5 million occurred from April to September. This trend is expected to continue in the future due to the increased mobility of the population. This increase, coupled to the strong seasonality of coastal tourism (78% of visits in the summer) is expected to further deteriorate the already existing traffic congestion (queues to and from the coast) and parking problems experienced in the coastal towns. One-day tourism is also couple to increased trampling of sensitive dunes and nature areas (WES, 1992c).

The Belgian coastal zone is visited by more than 10 million people per year of which 85% are Belgians and the rest Germans, Netherlands and other nationalities (pers. comm. Mr. P. Borean, Westtoerisme). In 1990 the total touristic accommodation capacity in the Belgian coastal zone was 491 000 beds, of which 60% were contributed by 59 000 rental flats and second homes. In the coastal towns, hotels contribute only 6% and 159 camping sites contribute 26% to the touristic accommodation capacity, of which 48 sites are illegal (unlicensed). Seven camping sites are situated in the dunes, 3 of them are unlicensed and illegally situated, e.g. on dunes at Blankenberg, Lombardsijde (Kosmos) and Cristal Palace at Westende (WES, 1992c). In the 65 km long coastal zone, 57.5% of the surface area is occupied by recreational sites and infrastructure related to tourism (Maes & Cliquet, 1996).

Current recreative facilities along the Belgian coast are of a small scale, classic type with limited variety and badly integrated with each other (WES, 1992c). Since they are open for only a restricted period of the year, and added the unpredictable

weather, the coast currently has little chance of competing with more sunny destinations that provide more modern facilities. More recreation parks with higher carrying capacities than dunes can release the touristic pressure on dunes.

### 2.3. Nature conservation and coastal zone management in Belgium.

The 300m wide strip of coastal zone in Belgium is controlled by institutions located at local, regional and federal levels, and thus highly fragmented (Herrier & Thomas, 1995). The 3 principal authorities in charge are: the Federal government (from the (12 km) seaward border of the territorial sea inland), Provincial authority (from the baseline (= low water of low water springs) inland) and local municipalities (responsible for the cleanliness of beaches) (Maes & Cliquet, 1997). Thus there is both overlap and fragmentation of management. Considering only nature conservation along the coast the following parties are involved: 1) the Ministry of Social Affairs, Public Health and Environment, 2) the Province of West Vlaanderen, 3) the section Nature, Forest and Green, 4) the section "Waterwegen Kust" (Waterways Coast), both of the Flemish Community and 5) all 16 the coastal municipalities/local authorities (Provoost & Hoffmann, 1996).

The 432.8 ha dunes owned by the Flemish Community are maintained for coastal defense purposes by the Coastal Harbours Service of the Department for the Environment and Infrastructure at a cost of about 10 million BEF/year. This entails the planting and fencing off of dunes against trampling, reinforcing dune bases, beach nourishment, constructing breakwaters and boardwalks and removing war bunkers (Vlaams Gewest, 1991).

The Flemish authorities (Community) are becoming aware of the problems that recreation and tourism are creating in the Belgian coastal zone. According to the MIRA report (Ameele & Verriest, 1994) the touristic sector was bent too much on economic growth in the past and neglected the principle of sustainable development. The lack of natural areas and of harmony between tourism and agriculture on the one hand and tourism and nature conservation on the other is mentioned and the various negative impacts of tourism on the environment are highlighted. The MIRA report also advises the removal of camping sites and other forms of holiday accommodation within dunes and nature areas by means of provincial and municipal structural plans with a legal base and warns against unplanned and uncontrolled touristic development of the polder areas. It recognizes, however, that additional laws restricting recreative expansion are useless if they cannot or will not be

enforced. Since natural areas are already scarce along the coast, it may be unwise to ban any touristic activity in them since the desired cooperation between tourism and nature conservation may be inhibited (Ameele & Verriest, 1994).

The increased environmental awareness and the realization of the importance of nature for tourism is reflected in the latest mission statement and policy document for 1995 -2000 of the Flemish Directorate-General, named as Toerisme Vlaanderen.

The aim of developing sustainable tourism is based on respect for the local inhabitants and the existing natural areas and environment as well as cultural resources. Thus the current policy is one of halting unbridled touristic and economic expansion in favour of nature conservation, the renovation and greening of coastal city centres and promoting forms of recreation that respect nature (Toerisme Vlaanderen, 1995). The current amended laws on nature conservation and the Nature Development Plan proposed by the regional Minister of Environment in 1990 are also aiming at sustainable development and restoration of natural areas, environmental quality of ecological standards and greening of cities, the increase of biodiversity of plants and animals and nature education of the public (Kelchtermans, 1990). This minister has also recently established a steering committee on integrated coastal zone management with the protection and management of two integrated coastal reserves (at the Westhoek and Zwin) as their first task (Herrier & Thomas, 1995). Part of the sandy banks (coastal and Flemish banks) will also be declared marine reserves in the near future (Herrier & Thomas, 1995).

To combat the further destruction of the remaining privately owned dunes, the Dune Decree, proposed in 1993 and amended and ratified in 1995, prohibits any frittering of and construction in dunes and agricultural areas important to the dunes (Maes & Cliquet, 1996, Chapter II.8.). Further recommendations to protect dunes by the Coastal and Dune Working Groups of Natuurreservaten vzw, a nature conservation organization without profit as aim (Maes & Cliquet, 1996, Chapter II.8.) are:

- 1) create a fund to buy up dunes like the Conservatoire de l'Espace Littoral et des Rivages Laccustres, a parastatal institution buying up valuable sites along the coast of France (Meur-Ferec, 1995),
- 2) obtain the legal rights to expropriate privately owned dunes or force owners to properly manage their dunes (only 10% of the Belgian dunes are properly managed)
- 3) prohibiting dune water extraction
- 4) removing illegal camping sites and restricting access to decrease trampling in the dunes.

The 10 point plan for integrated coastal management along the Belgian coast (Natuurreservaten & WWF, 1994) proposes, apart from buying up dunes and managing them correctly, to demolish structures built in dunes and to allow breaching of the sea at certain sites where the coastal population is not endangered by it, i.e. at the Westhoek and Het Zwinet Zwin.. 'Soft' coastal defense by dunes is preferred to hard engineering e. g. dikes of the past. At least four beaches (at the Bay of Heist, Westhoek, Zwin and Ijzer estuary) are recommended for protected area status (Herrier & Thomas, 1995).

Although the need for inland protection and coastal defense prohibits the return to natural coastal processes along most of the Belgian coast, some active nature restoration projects are in progress, where dynamic natural processes are allowed to occur in sites where the coastal defense system will not be put in jeopardy. Examples are the removal of hard coastal defense structures in the Westhoek and Zwin reserves to allow breaching of the sea (Provoost & Hoffmann, 1996), and restoration of the salt marshes of the Ijzer estuary at Nieuwpoort by removing thousands of tons of previously dumped earth and expropriating and dismantling the former marine base at Lombardzijde to constitute a 50 ha coastal reserve where some rare birds can continue to breed (Maes & Cliquet, 1996, Chapter II.8.). Furthermore, demolition of buildings in the dunes (Marine base at Ijzer estuary and Home G. Theunis at Ter Yde) and the breaking up of hard roads to allow aeolian processes (Koninklijke baan at De Haan, at the Zwin and Doornpanne), are examples (Provoost & Hoffmann, 1996). A beach reserve is also planned on the accreting beach north of the Zeebrugge harbour where the public will be prohibited to access the beach during the breeding season of the several coastal bird species present there (Maes & Cliquet, 1996, Chapter II.8.; Herrier & Thomas, 1995).

Although it would be better for the recovery of damaged natural areas, the latest nature conservation policy is not to exclude tourists from the nature areas but to try to nurture appreciation for nature by allowing limited and guided access. Guided walks or hardened paths through the dunes increase the tourists appreciation for nature and prevent trampling (Provoost & Hoffman, 1996). The 'Natuurbehoud' (Nature conservation) decree will provide a more legal base for nature management and forcing private owners to manage their dunes properly (Provoost & Hoffmann, 1996).

## 2.4. Coastal Management Problems

The lack of integration and cooperation between different levels of authority in the coastal zone causes several problems. Existing laws and rules will have to be strictly applied in a coordinated way. Despite the legal power of the Dune Decree, several exceptions to it have already been requested, i.e. to build villas in the Zwin nature reserve and to lay out a golf course in the Lenspolder at Nieuwpoort. Currently, building still continues in the dunes (Maes & Cliquet, 1996, Chapter II.8.). The struggle for protection of dunes is further complicated by the competition for land from the agricultural sector. Even sandy coastal soils can be used for intensive agricultural practices such as hot houses for vegetable and flower production. This practice further lowers the water table and allows introduction of fertilizers and pesticides, apart from the construction of farm buildings.

Currently, 2 750 ha of ecologically valuable dunes still exist but need management. Only 20% of the protected dunes (dunes at the Westhoek, Ter Yde and the Ijzer estuary) are currently managed properly whilst the rest is left to infestation by unwanted dune vegetation (Provoost & Hoffmann, 1996). To avoid loss of species on the dunes by the overgrowth of sea-buck thorn *Hippophaë rhamnoides*, grey willow *Salix cinerea* and wild privet *Ligustrum vulgare*, a combination of extensive grazing, the cutting of grass, the hacking of shrubs and even burning and peating (removing the upper turf) is necessary. Education of tourists is also crucial, but lacking sorely. With only 2 nature conservation officials for an area of 525 ha it is evident that the lack of funds and personnel is a restricting factor (Provoost & Hoffmann, 1996). From experience in France and the Netherlands, 1 warden/100 ha is necessary, thus 5 for the West coast alone (Provoost & Hoffmann, 1996).

Dune water is currently utilized as a source of water - not only in emergencies. This extraction results in lowering of the water table with mortality and alteration of dune vegetation (Maes & Cliquet, 1996, Chapter II.8.). Three quarters of the 20 000m<sup>3</sup>/day of water used on a touristic peak day is obtained from the dunes (WES, 1992c).

The further expansion of the Zeebrugge harbour will destroy the breeding grounds of important coastal birds species (Provoost & Hoffmann, 1996). The construction of an artificial peninsula will hopefully provide alternative breeding sites.

### 3. MATERIALS AND METHODS

A questionnaire survey was held per telephone or personally with 20 respondents each from 5 groups, all in some way actively related to use or management of the Belgian coast. The five groups entailed:

- 1) Politicians, policy makers and executives e.g. environmental officials of coastal towns and members of local councils. These respondents came from various levels of authority, i.e. the federal government, Flemish Community, provincial and local councils.
- 2) Entrepreneurs in the coastal zone, i.e. business people, tourist officials of local and provincial authorities, estate agents and building constructors active within the coastal zone.
- 3) Naturalists, i.e. scientists (ecologists, botanists, zoologists etc) involved in research projects in the coastal zone as well as activists for nature and dune protection, members of nature conservation groups such as Natuurreservaten vzw.
- 4) Inhabitants, i.e. local residents that live permanently on the coast and
- 5) Tourists that visit the coast purely for vacations, including those that had a holiday house on the coast.

Each questionnaire survey (see Addendum 1) lasted from 10 - 55 minutes. It was stressed that all opinions would be treated strictly confidential and that all data would be used in an anonymous way.

Respondents were asked to judge their personal knowledge on coastal problems on a scale from 1-5 with 1 being very poor and 5 very good. They then had to judge the clarity and accuracy with which scientists, the media, interest groups and municipalities offer information about the coastal zone and its problems. They were asked to mention all problems along the Belgian coast and their possible solutions. Furthermore, they were asked to list the problems/frustrations they personally experienced in their activities on the coast (as opposed to the general ones mentioned earlier). The seriousness of the problems were assumed to be proportional to the frequency with which they were mentioned, i.e. the problems

mentioned by more respondents being more widespread and pressing than those mentioned by few respondents.

Respondents were also asked what their opinion was about the current nature conservation policy and what effect they thought it would have in the economic, social, ecological, touristic and agricultural fields along the Belgian coast. They were also asked to comment on the coastal structure plan (WES, 1992a, b & c) for the Province West Vlaanderen wherein the entire coastline is situated and what influence they expected the plan to have on the coast in the future. What hopes they had in the Dune decree being actualised was also estimated.

Respondents were asked to evaluate the importance (a score of 1= not important and 5 = very important) of several statements related to the coastal zone. The percentage of respondents giving different scores were calculated rather than the average score for each statement to demonstrate which groups gave what importance to each statement.

Finally respondents were asked who or what they thought was most responsible for the current coastal problems and what their future vision for the coast was.

#### Statistical tests

The rating of personal knowledge of coastal matters and problems and differences in the rating of clarity of information offered by scientists, the media, interest groups and local authorities were tested for by the Kruskal - Wallis and the Tukey HSD tests. The opinions of the different groups about the effects that the current nature conservation policy was expected to have on various fields (economic, social, agriculture, etc.) in the coastal zone was submitted to 2x3 and 2x4 Contingency tables to test for significant differences. Significant differences between the groups of respondents in average scores given to evaluate the importance of matters in the coastal zone were tested for with ANOVA and the LSD post-hoc test.

#### 4. RESULTS

Personal knowledge of coastal zone matters and problems were rated highest by the naturalists and politicians and lowest by local inhabitants and tourists (Table 1). There was also a significant difference in the rated clarity of information on coastal zone matters conveyed by different groups (Kruskal - Wallis test:  $H = 33.33$ ,  $df = 3$  N

= 400, p = 0.00) with information offered by the media and interest groups being rated higher (clearer, more accessible and more understandable, although sometimes inaccurate) than that offered by scientists and local authorities/councils in the coastal zone (Tukey HSD ad hoc test).

Table 2 lists the general problems along the Belgian coast mentioned by respondents. Only 2% of respondents, all of them residents on the coast, were generally satisfied with the condition of the Belgian coast (no 38, Table 2). The ten most frequently mentioned problems in the coastal zone (Table 3) were not very different between groups although each group had unique problems it considered important. In all groups, respondents considered the ribbon development of high flat buildings along the coastline and the lack of nature and nature protection the most serious problems. Politicians, entrepreneurs and naturalists considered the lack of integrated long term structural planning and the lack of strict application of rules (e.g. Dune Decree) and past structural plans second in importance, while the inhabitants and the tourists rated the traffic problems and environmental degradation by mass tourism as second in importance. The latter problem was also mentioned by 90% of the naturalists. Naturalists, inhabitants and tourists also complained about the frittering of nature and dunes into small pieces as well as the continued construction on dunes, while naturalists and politicians found that too much authority was given to the local municipalities and lamented the lack of legal binding power of the structural plans for the coastal zone. Traffic problems were also mentioned amongst the ten most important problems by all groups except the naturalists, who probably avoid the coast during holidays.

Commonly mentioned problems unique to some groups were the following: Only entrepreneurs considered the aging of coastal city centres, e.g. Oostende and the lack of investment in tourism by the government and private sector a serious problem. Especially naturalists were highlighting the extraction of drinking water from and the drying out of dunes as a problem. Naturalists and tourists additionally feared for the degradation of the polder-dune transition zone (by intensive agricultural practices and massive camping sites) and found pollution of the sea water and air due to traffic congestion disturbing.

As with the coastal problems mentioned, there were a lot of similarities between the groups in solutions put forward for problems in the coastal zone (Table 4). The four most mentioned solutions in all groups were a) better coordinated nature conservation, b) long term structural planning along the entire coast as a unity, c)

commitment and strict application of structural plans and rules in the coastal zone and d) the halt of construction on dunes and parceling out of dune and natural areas. All groups, but especially inhabitants (65%), tourists and entrepreneurs (each 50%) wanted improved traffic infrastructure and more parking space. Educating the public and tourists by providing information was considered an important matter by naturalists (60%), politicians (50%) and inhabitants (40%). In addition, recreational variation for all weather conditions and nature recreation was mentioned frequently by all groups except tourists.

Apart from similarities, there were solutions mentioned characteristic for certain groups. Active nature restoration (demolishing buildings in the dunes, expropriation of privately owned dunes, restoration of the salt marsh at the Ijzer estuary, allowing the sea to breach the foredunes at certain points) and the integration of sea, beach, dune and polders was suggested by 65% of naturalists and more than half the politicians (Table 4). Especially politicians (50%) found vertical and horizontal integration and coordination between different levels of authority important whereas most naturalists (80%) found financial and personnel support and governmental subsidies essential to apply the Dune Decree effectively. Mainly entrepreneurs (65%) wanted renovation of coastal city centres to draw more tourists and suggested more investment into tourism by the government and the private sector. Only politicians and naturalists (each 45%) were concerned with protection of the dune-polder transition zone and suggested using alternative sources of water to that extracted from the dunes. Finally, only inhabitants (15%) mentioned better security and more recreational facilities for the youth throughout the year.

Seventy-eight percent of respondents thought that the current coastal problems could have been avoided (Table 5). Sixty percent of respondents felt that the past governments should have done some long term structural planning for the entire 65 km coastline as an integrated unit from the fifties onwards and should have applied this strictly. Four percent felt that more appreciation for nature in the past could also have helped. Only 15% said that the overdeveloped coastline was an unavoidable and natural evolution after the war.

When asked about the current state of nature conservation along the coast, 39% of respondents felt that nature conservation had improved over the last 3 years, but 44%, especially inhabitants (60%) and tourists (80%) felt that more still had to be done (Table 6). Naturalists (30%) were most enthusiastic about active nature restoration, i.e. demolition of buildings in dunes, allowing transgression of the sea,

recreating strips of integrated sea/beach/dune/polder systems. Ten percent of politicians and 15% of the naturalists found the authorities lacking in their nature conservation actions. Politicians (20%) found that nature conservation lacked coordination, that structural plans had to be strictly applied and that there should be more support from the government for nature conservation in the form of more finances and personnel.

The current nature conservation policy was expected by 43% of respondents to have zero effect on the economic climate in the coastal region, especially by naturalists, inhabitants and tourists (Table 7). Twenty-two percent of respondents believed that the economy would be positively, and 20% that it would be negatively affected, while 13% expected both positive and negative effects, depending on the situation. Especially politicians believed in positive (40%) and both positive and negative effects (30%), whereas entrepreneurs and tourists (both 35%) were the most negative about the economic effect. On the social scene, 68% of respondents expected a positive effect, 19% a neutral and 4% a negative effect, while 6% did not know what to expect (Table 7). The greatest consensus was in the ecological and environmental field, where 99% of respondents expected positive results. As far as tourism is concerned, 84% of respondents had high hopes for improvement, while 11% expected neutral effect in this field. The effect on agriculture was believed to be neutral by 40% of respondents, while 34%, especially entrepreneurs and tourists, did not know what to expect. Negative effects were expected by 16% of respondents (Table 7).

There were significant differences amongst groups in opinion about the structural plan for the coast ( $\chi^2 = 75.7$ , df = 36, p = 0) with only 21% of respondents considering the plan reasonably good (Table 8), most being entrepreneurs (40%) and naturalists (30%). Fourteen percent considered it a drawback that the plan was only a guideline and not legally binding. A total of 24% of all respondents did not know the structural plan, mostly inhabitants (45%), tourists (35%) and entrepreneurs (25%). Of the latter uninformed, 71% were, however, aware of the Dune decree and approved of it. The category 'other' included singular responses such as 'Agriculture neglected' and 'Polder not sufficiently protected'. Only 1 respondent was certain that the structural plan would have a positive effect on the current problems in the coastal zone, 44% were skeptical, 35% hopeful (but uncertain) and 20% did not know. Similarly, when asked if they believed if the Dune decree would be applied and have a positive effect on dune conservation, only 1 respondent was certain, 50% were skeptical, 29% hopeful and 19% did not know.

Problems that respondents experienced personally in their activities on the coast were topped by mass tourism (22%) and all its consequences such as environmental degradation, trampling, noise, vandalism, etc., mentioned particularly by inhabitants (30%) and tourists (35%). The second most mentioned problem was traffic and parking problems (16%), again most commonly mentioned by inhabitants and tourists (Table 9). Especially politicians (25%) and naturalists (40%) complained about the lack of finances and personnel in the execution of their tasks in the coastal zone as well as the lack of communication and coordination between different levels of authority and between the coastal towns. Politicians (25%) and entrepreneurs (25%) found that the political processes and decisions went too slow, while inhabitants (25%) and tourists (10%) complained about the lack of recreation and security for kids. Other irritations mentioned were dog faeces, pollution of air and sea water and the building frenzy in the form of continued building on the dunes.

Respondents were asked to evaluate several issues with respect to the coastal zone on a scale of 1 to 5, with 1 not and 5 very important (Table 10). Most respondents (52%) gave little importance to further economic and industrial expansion in the coastal zone, with 12% wanting better and more efficient use of the already existing economic structures. Matters such as sustainable exploitation of coastal resources, maintenance of carrying capacity of the coastal environment, increased faunal and floral biodiversity, unpolluted rivers and waterways and high quality of living each received the highest score from more than 80% of respondents. Significant differences in average scores given to some of the above matters occurred between the respondent groups (Table 10). Tourists gave the lowest and inhabitants the highest average scores to quality of living (esthetics, public health, pristine unpolluted environment, etc.) while entrepreneurs gave the highest importance to increased, but controlled and integrated, development of the touristic industry along the coast.

When asked who was most responsible for the over development of the Belgian coastline and consequent problems, 29% of respondents named the coastal municipalities most guilty. Politicians on all levels of authority (municipalities, Province West Vlaanderen, Flemish Community and Federal government) were considered by 19% of respondents to be most responsible and thus in second place. Estate agents and builders were considered most guilty by 16% of respondents while 11% felt that everybody, including the public, had contributed equally to the problem. Seven percent of respondents felt that mainly the higher authorities, i.e. not the

municipalities, but the provincial, regional and federal ones were most responsible due to lack of control over the municipalities. Six percent of respondents were neutral.

The future vision of the Belgian coast desired by respondents generally encompassed the solutions to problems listed in Table 4 with the emphasis on nature conservation and restoration and coastal city renovation and greening. In addition, 6% of respondents also hoped for protection of the architectural heritage that survived the building frenzy along the coast.

## 5. DISCUSSION

This report demonstrates that the great majority of respondents were of the opinion that the Belgian coast is overdeveloped and over commercialized as opposed to that in the Netherlands and they considered the lack of natural areas a serious drawback. The problems mentioned and solutions offered by the different groups were very similar although some problems and solutions mentioned were characteristic of specific groups. The desire for an immediate stop to construction in the dunes was almost unanimous, as was the need for conserving whatever open space/nature was left in the coastal zone. Furthermore, a structural plan with legal power for the entire coast and strict application of structural plans and rules was deemed essential by all groups. Mass tourism and all its consequences, especially traffic congestion and parking problems, was also considered as one of the 10 most pressing problems by all five groups. Overall, respondents felt that nature conservation had improved over the last 3 years since AMINAL had created a separate section 'Nature' for coastal conservation (formerly under the forestry section 'Bos & Groen') and appointed a separate officer who could concentrate on this immense task. Most felt that more still had to be done for preserving the natural areas that still exist.

Apart from the similarities between groups, problems and solutions characteristic for specific groups emerged. Especially politicians and naturalists were aware of the lack of communication, coordination and cooperation between different authorities, both vertically and horizontally. They disapproved of too much power in the hands of the municipalities, suggested the protection of the polders behind the dune strip and were more aware of the problem of dune water extraction. Coastal entrepreneurs wanted more investment into tourism and renovation of coastal cities by the government and the private sector. Especially inhabitants wanted more security and recreational variation for the youth throughout the year. Naturalists suggested more

governmental support for nature conservation in the form of personnel and finances. The majority also desired recovery of functional ecosystems at site where coastal defense would not be endangered, i.e. at the Zwin and Westhoek reserves and the Ijzer estuary. This would entail actively creating larger nature reserves to integrate and reconstitute continuity from the sea, across beach, dunes and polder areas to allow natural processes to occur (Provoost & Hoffmann, 1996). Achieving this aim would require some of the following actions:

- a) Demolishing buildings on dunes,
- b) Narrowing or interrupting the Koninklijke baan and transforming it into a cycle path,
- c) Interrupting the dikes at certain localities to constitute dune transgression, i.e. allow the sea to breach at certain places,
- d) Buying large sections of privately owned dunes in key positions for coastal defense and proper management and force owners to manage their dunes properly,
- e) Restoring the salt marsh at the Ijzer estuary and
- f) Creating more coastal and beach reserves where coastal birds can breed.

Some of these actions are very difficult to put into practice and require dramatic intervention, good communication and considerable funds. Furthermore, coordinated multidisciplinary research, finding the causal relationships between abiotic and biotic factors, is essential for integrated nature management in the future, based on sound scientific knowledge (Provoost & Hoffmann, 1996).

Like in many countries, lack of integration in coastal management policies between authorities on different levels (OECD, 1993) and between municipalities seems to lie at the base of the Belgian coastal problems. There exists no long term integrated structural plan for the entire 65 km stretch of Belgian coast with duplication of facilities and mismanagement of the coast and dunes as result. Another stumbling block is limited application of the few existing management policies, even the ones with legal power such as the Dunes decree. There are several instances where these policies are actively transgressed without penalty or prosecution. Hence, not only do 87% of respondents hold past governments responsible for the over development of the Belgian coast but even the present authorities enjoy little of the public's trust to improve the situation, as is clear from the widespread skepticism about the application of the Dune decree, for instance.

The role of nature in tourism is receiving increasing attention worldwide. The Flemish Community has realized this and has changed its priorities from maximum touristic development in the 80's to sustainable development of the touristic sector along the

coast with emphasis on nature development and protection since 1990 (Kelchtermans, 1990; Toerisme Vlaanderen, 1995). Education of the public plays a big role in the current program aiming to harmonize tourism and nature conservation. Some respondents felt, however, that tourists are refractory to education, especially one-day tourists. The aim of the touristic sector is to increase the percentage of primary holidays, i.e. more-day tourism, on the Belgian coast (Toerisme Vlaanderen, 1995). Modernization of coastal cities and increase of quality of recreational facilities combined with directed promotion of the Belgian coast are essential to combat the increasing competition from international holiday destinations. To this aim renovation of old unused buildings for accommodation and beautification and greening of the old city centres is done.

The low scores for industrial and economic development on the coast despite the high unemployment level there, and the high values that concepts such as 'sustainable development of coastal resources', 'increase of biodiversity of flora and fauna' and 'maintaining the carrying capacity of the coastal environment' received reflects the environmental and ecological awareness of most respondents. They are also aware of the drawbacks of mass tourism and its consequences. The lack of natural areas was widely perceived and the current coastal nature conservation policy was generally expected to have a positive effect in the ecological, social, touristic and even in the economic sense.

Politicians on all levels, but especially the coastal municipalities of the past, are held responsible for the over development of the Belgian coast and consequent problems. Many respondents feel that the slack policy and uninterested attitude of past higher authorities was responsible for the misuse of power and corruption by coastal municipalities. In their opinion, the coordination and integration of all levels of authority and strict application of a long term structural plan for the coast in the past would have avoided the current problems. The perceived failure of strict application of rules and structural plans along the Belgian coast even today is reflected in the immense skepticism of respondents as to the future actualization and positive effect of the Dune decree or the current structural plan.

Eleven percent of respondents felt that everybody was responsible for the over development of the Belgian coast and that it was a natural evolution after the Second World War. It has to be taken into consideration that the 10 million Belgian inhabitants (not including the several thousand Dutch and German tourists) only have 65 km coastline to their disposal, which calculates to more than 153 800

inhabitants/km. This is very high compared to e.g. 16 300 inhabitants/km coast in France (56 million French with a coastline of 3 427 km), about 8 000 inhabitants/km in Spain (40 million Spanish for 4 964 km coast) and 4 580 inhabitants/km in the United Kingdom (57 million English for 12 429 km coast (Miller & Auyong, 1991)). Similar stretches of overdeveloped coastline exist in these countries, but because the touristic pressure is less concentrated on their relatively longer coastlines, more natural parts still remain. Furthermore, assuming that the coast is the most popular recreational site in Belgium, as in countries like Australia (Houghton, 1989) and South Africa, (Moffet & De Ruyck, 1995) and many others in Europe (Gubbay, 1994), the immense pressure on the Belgian coast can be understood. Although the greater part of several countries' populations live in the coastal zone, e.g. 60% in Greece, >50% in Ireland, 75% Norway (Gubbay, 1994) and >90% in Australia (Houghton, 1989), this is fortunately not the case in Belgium or the coastal problems would be even more severe.

Recreational variation for all weather conditions and nature recreation was mentioned frequently by all groups except tourists. It is clear that the majority of tourists visit the coast mainly for the sea, beach and exciting recreational facilities and activities and to a lesser extent for enjoying nature (De Ruyck *et al.*, 1995 and 1997). Nevertheless, like the other groups, tourists also felt that even more has to be done in terms of nature conservation along the coast. This attitude, together with the lack of need for nature recreation are therefore surprising and contradicting.

It is clear that scientific information about the coast is neither sufficiently available nor understandable to the lay man. To obtain the public's cooperation and respect for nature and appreciation for the efforts of the authorities towards nature conservation, it is crucial that tourists are educated. Since this is more difficult with one-day tourists, education has to be done in innovative ways to attract attention and make permanent impressions. To this end, excellent use could be made of television programs and other media to reach potential tourists, preferably before they even reach the coast. Foreign tourists should be educated by information boards, education centres and even pamphlets deposited in their holiday accommodation. It is important that authorities realize that sufficient funds should be made available for tourist education since no integrated management policy will have satisfactory results as long as the cooperation of tourists is lacking.

Coastal municipalities are held most responsible for the mismanagement and over development of the Belgian coast. Many respondents also blame higher authorities

for lack of control and supervision over the municipalities in the past to ensure an integrated development of the coastal zone. These two points should serve as warning for developing countries, such as South Africa, where the need for development of the tourist sector is a strong driving force for possible over development of their coast. Furthermore, where there is the tendency to delegate a considerable amount of power and decision making to the local authorities, as is the case in South Africa, the danger becomes even greater if there is no vertical and horizontal coordination between authorities or an overriding body supervising these decisions. The most efficient system would be one managing body with an advising committee of ecologists, geologists, and other scientists plus representatives of municipalities and other groups. Especially in the case of coastal development, developing countries should learn from the mistakes made and problems experienced by developed countries.

## 6. CONCLUSIONS

Most Belgians agree that their coastline is overdeveloped and generally feel the lack of natural areas as a disadvantage. Lack of integration in coastal management policies between authorities on different levels and between different municipalities seem to be of greatest concern. A long term integrated structural plan for the entire 65 km stretch of Belgian coast, with legal power, will rule out duplication of facilities and mismanagement of the coast and dunes. It is essential that management policies, such as the Dunes decree should be strictly applied with severe penalty for transgressions. Without the above 4 prerequisites (coordination and communication between all authorities involved, a long term structural plan integrating the entire coast, with legal power to enforce, and strict application of rules and policies) no integrated coastal zone management plan for the Belgian coast will have any positive effect, neither stem the disintegration of the coastal environment under the immense pressures exerted. Mass tourism and its consequences is recognized by many as another destructive force in the coastal zone. Therefore, vigorous and innovative measures have to be taken to educate tourists and create a love and respect for nature. Last, but not least, coordinated multidisciplinary research is critical for integrated nature management based on sound scientific knowledge.

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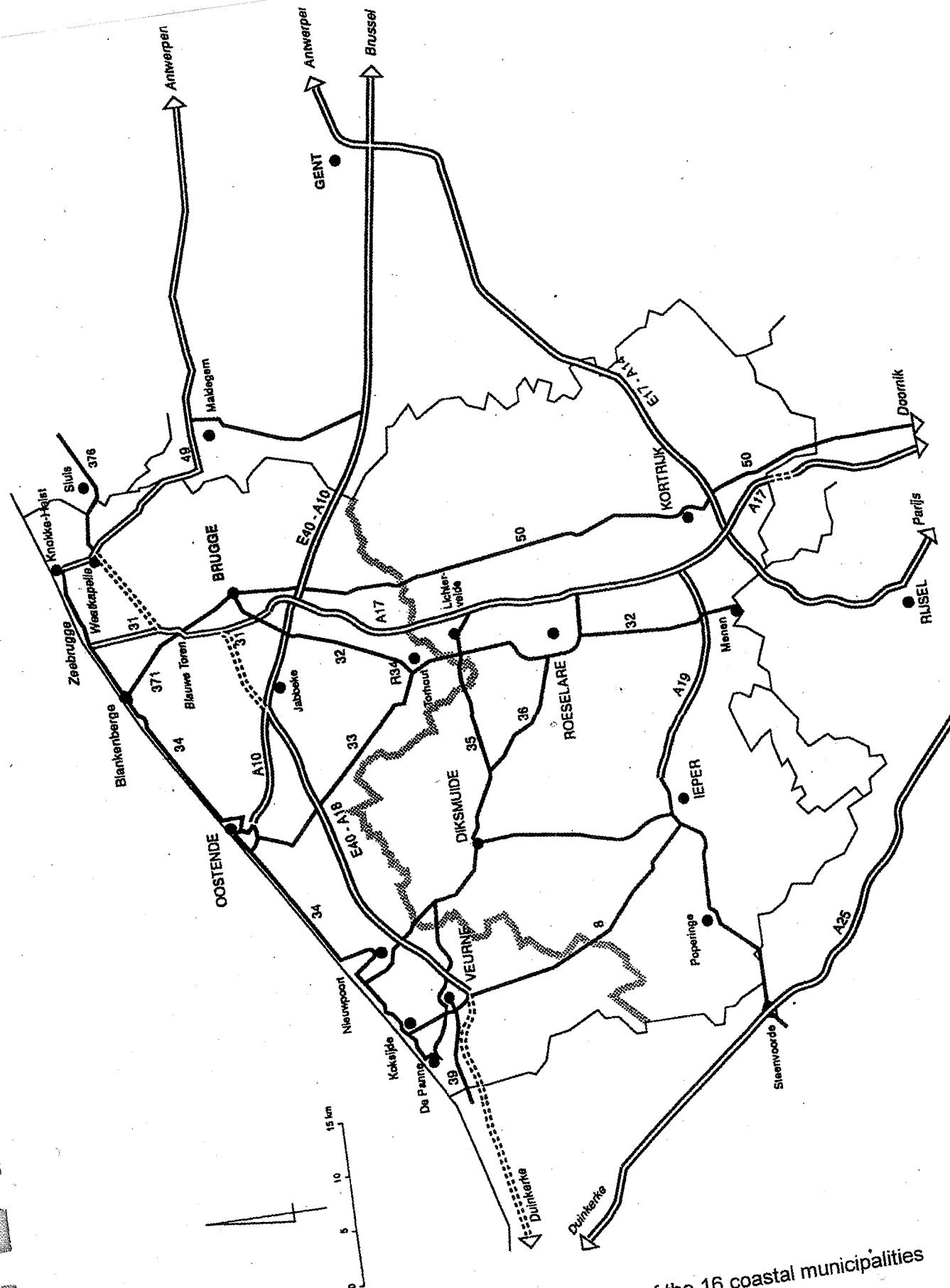


FIGURE 1. Map of the Belgian coast showing seven of the 16 coastal municipalities and the main roads to the coast.

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Table 1. Average score ( $\pm$  SD) allocated by respondents on their personal knowledge and the clarity of information given by different groups active in the coastal zone. (scale from 1 - 5 with 1 = very poor, 3 = average and 5 = very good)

Respondent groups	Personal knowledge of the Coastal zone	Information conveyed by scientists	Information conveyed by media	Information from interest groups	Information from local authorities
1. Politicians	2.02 $\pm$ 1.16	3.85 $\pm$ 0.71	2.90 $\pm$ 1.02	2.80 $\pm$ 0.89	3.20 $\pm$ 1.01
2. Entrepreneurs	3.23 $\pm$ 1.3	3.33 $\pm$ 1.28	2.25 $\pm$ 1.21	3.55 $\pm$ 1.05	3.55 $\pm$ 1.05
3. Naturalists	1.78 $\pm$ 0.87	4.20 $\pm$ 0.89	2.95 $\pm$ 1.31	2.68 $\pm$ 1.30	3.40 $\pm$ 1.23
4. Inhabitants	2.90 $\pm$ .099	2.62 $\pm$ 1.02	1.86 $\pm$ 0.91	3.00 $\pm$ 1.0	2.64 $\pm$ 1.41
5. Tourists	2.13 $\pm$ 1.29	2.78 $\pm$ 1.06	1.9 $\pm$ 1.09	3.25 $\pm$ 0.91	2.5 $\pm$ 1.12
All combined	2.42 $\pm$ 1.24	3.34 $\pm$ 1.16	2.36 $\pm$ 1.19	3.05 $\pm$ 1.07	3.05 $\pm$ 1.22
Kruskal-Wallis results	H = 18.23, p = 0.00 df = 4, N = 101	H = 7.54, p = 0.1 df = 4, N = 101	H = 10.05, p = 0.04 df = 4, N = 101	H = 21.0, p = 0.00 df = 4, N = 100	H = 28.17, p = 0.00 df = 4, N = 101
Tukey HSD test	1 + 3 > 2 > 4 + 5	Info Media + Interest groups > Info Scientists + Local authorities			
ANOVA results	F = 6.02, p = 0.00 df = 4,94	F = 9.14, p = 0.00 df = 4,97	F = 4.57, p = 0.002 df = 4,97	F = 2.28, p = 0.07 df = 4,96	F = 3.22, p = 0.016 df = 4,97

Table 2. List of general problems along the Belgian coast. Percentage of 20 respondents in each of 5 groups that shared the same opinion.

Problems in the Belgian coastal zone	Politicians	Entrepre- neurs	Naturalists	Inhabitants	Tourists	All
Lack of nature/no nature protection	85	75	100	70	80	82
Overbuilt ribbon development	75	55	95	85	90	80
No strict application of rules or plans	80	75	90	45	40	66
Dune speculation/construction on dunes	60	45	75	50	75	61
Lack of structural planning/ structural chaos	70	70	90	40	25	59
Frittering of nature or dunes	50	35	65	50	80	56
Too much traffic/coast too accessible by car	45	60	30	75	70	56
Environmental degradation due to tourism (noise, trampling, waste, vandalism)	50	30	90	60	45	55
Mass weekend/summer tourism/ one day tourism	60	20	65	50	45	48
Structural plans (Ruimtelijke ordening) and Dune Decree not legally binding	65	30	60	25	20	40
Too much power to the local authorities	45	30	60	5	0	28
Polder-dune transition degradation	50	0	45	0	40	27
Too much emphasis on tourism and industry or economy	40	5	40	30	15	26
Conflict between different interests	35	30	35	10	5	23
Fragmentation or overlap of authority in the coastal zone	35	30	40	5	0	22
Pollution of air by traffic/sea water	15	10	10	30	40	21
Aging or deradation of coastal cities	25	55	15	0	10	21
Lack of money for buying privately owned dunes	40	5	55	5	0	21
Dune water exploitation	25	0	60	5	5	19
Lack of communication between local authorities and the public	20	25	25	15	0	17
Low touristic quality	10	55	5	10	0	16
Slow and illogical or corrupt political processes	20	25	25	10	0	16
Too little investment into tourism by government and private sector	5	55	0	10	0	14
Dune trampling	40	0	20	5	5	14

Table 2 (continued). List of general problems along the Belgian coast. Percentage of 20 respondents in each of 5 groups that shared the same opinion.

Problems in the Belgian coastal zone (continued)	Politicians	Entrepre- neurs	Naturalists	Inhabitants	Tourists	All
Illegal campings on dunes	35	0	20	0	0	11
Lack of information - ecological or from authority	5	35	10	0	5	11
Tourist competition with Southern countries	5	25	0	15	0	9
Dog excreta	0	0	5	5	25	7
Agricultural intensification/greenhouses	15	0	20	0	0	7
Coast expensive	5	0	0	10	15	6
Unemployment	0	5	5	20	0	6
Duplication of facilities in each town/lack of coordination between coastal towns	5	20	0	0	0	5
Sand collection on sand banks	15	5	5	0	0	5
Tourist education does not help	15	5	5	0	0	5
Beach erosion	5	5	5	0	5	4
Dunes owned by Vlaams Gewest badly managed	10	0	10	0	0	4
Local inhabitants ignored/badly treated	0	0	0	10	5	3
Vlaams Gewest does not recognise coast separately.	0	0	10	0	0	2
Satisfied	0	0	0	5	5	2

Table 3. The ten general problems in the Belgian coastal zone mentioned most frequently by respondents in 5 different groups (extracted from Table 2). Percentage of respondents in each group mentioning a problem are shown. Empty cells mean frequencies too low for being considered amongst the 10 most important.

Most mentioned problems in the Belgian coastal zone	%Politicians	%Entrepreneurs	%Naturalists	%Inhabitant	%Tourists	%All
Lack of nature/no nature protection	85	75	100	70	80	82
Overbuilt ribbon development	75	55	95	85	90	80
No strict application of rules or plans	80	75	90	45	40	66
Dune speculation/construction on dunes	60	45	75	50	75	61
Lack of structural planning/ structural chaos	70	70	90			59
Too much traffic/coast too accessible by car		60		75	70	56
Frittering of nature or dunes	50	35	65	50	80	56
Environmental degradation due to tourism (noise, waste, vandalism)	50		90	60	45	55
Mass weekend/summer tourism/ one day tourism	60		65	50	45	48
Structural plans (Ruimtelijke ordening) and Dune Decree not legally binding	65		60			40
Too much power to the local authorities			60			28
Polder-dune transition degradation	50				40	27
Too much emphasis on tourism and industry or economy				30		26
Pollution of air by traffic/sea water				30	40	21
Aging or degradation of coastal cities	55					21
Dune water exploitation			60			19
Low touristic quality	55					16
Too little investment into tourism by government and private sector	55					14
Lack of information - ecological or from authority	35					11

Table 4. Solutions for the Belgian coastal problems suggested by respondents from 5 different groups.

Solutions for the Belgian coastal problems	%Politicians	%Entrepreneurs	%Naturalists	%Inhabitants	%Tourists	%All
Nature protection	95	80	100	70	85	86
Stop parceling out and building in dunes	70	55	70	65	90	70
Commitment and strict application of structural plans and rules	75	70	95	50	55	69
Long term structural planning integrating the entire coast	65	80	95	35	30	61
Traffic infrastructure improved and more parking	40	50	30	65	50	47
Recreational variation for all weather including nature recreation	40	50	40	30	0	38
Dune Decree: financial and personnel support/subsidies	45	15	80	15	5	32
Give information and educate tourists and public	50	0	60	40	10	32
Renovation of coastal cities	30	65	20	10	25	30
Nature restoration by active intervention i.e. natural integration of sea/beach/dune and polder	55	10	65	10	5	29
Integration and coordination between different levels of authority	50	30	35	5	0	24
Sustainable development of coast/harmony between tourism, nature, industry	30	30	35	25	0	24
Less power to the local authorities/municipalities	40	30	45	5	0	24
Control touristic access into dunes or nature	40	5	40	10	5	20
Improve touristic quality	15	60	0	15	5	19
Pollution control or monitor by e.g. fines	25	5	5	25	35	19
Protect polder-dune transition	45	0	45	0	5	19
Zoning for different purposes	35	25	30	5	0	19
Use alternative water sources	30	0	50	10	0	18
Promotion of coastal tourism (after renovation)	5	45	5	15	0	14
More public transport into and between coastal cities	5	25	15	15	0	12
Investment into tourism by government and private sector.	5	40	0	10	0	11
Dune owners agreement- duty to protect dunes or expropriate	20	5	25	0	0	10
Spread tourism over the whole year	15	20	5	10	0	10
Guided recreation in nature	35	0	0	0	10	9
Interrupt the Koninklijke Baan (make into bicycle path)	15	5	20	0	0	8
Remove illegal campings on foredunes	40	0	0	0	0	8
Security and recreation for youths and children	0	0	0	15	10	5

\* Restore Yser salt marsh, allowing sea transgressions, demolition of buildings in dunes, expropriation of dunes, etc. & i.e KustPlan 1, Dune decree

Table 5. Could the coastal problems have been avoided and how? Opinion of different groups of respondents.

Could the coastal problems have been avoided?	Politicians %	Entrepreneurs %	Naturalists %	Inhabitants %	Tourists %	Total %
Yes	75	75	95	80	65	78
No	5	25	5	20	20	15
Don't know	10	0	0	5	20	7
How??						
Better long term structural planning & strict application	70	65	70	55	40	60
More appreciation of nature	5	0	5	0	10	4
Better pollution control	0	0	5	10	0	3

Table 6. Opinion of different respondents on the current state of nature conservation along the Belgian coast

Opinion on current state of Nature Conservation	Politicians %	Entrepreneurs %	Naturalists %	Inhabitants %	Tourists %	Total %
Has improved over last 3 years	70	65	50	10	0	39
Good, but more necessary	25	30	25	60	80	44
Sufficient	0	0	0	30	15	9
Bad	5	15	25	0	0	9
Lacks coordination	20	10	5	5	0	8
Need active nature restoration*	5	0	30	10	0	9
Apply structural plans&	20	5	5	5	0	7
Need more financial and personnel support	15	0	5	5	0	5
Government slack	10	0	15	0	0	5
Don't know	5	5	0	5	0	3

\* Restore Yser salt marsh, allowing sea transgressions, demolition of buildings in dunes, expropriation of dunes, etc.  
& i.e KustPlan 1, Dune decree

Table 7. The effects that the current nature conservation policy is expected to have in various fields in the coastal zone, as expressed by 5 groups of respondents. \*\* means significant difference at  $p = 0.05$

Effect of current nature conservation policy on:	Politician N=20	Entrepreneur (20)	Naturalist N=20	Inhabitant N=20	Tourist N=20	Total N =100
<b>ECONOMY</b>						
Neutral	3	2	11	15	12	43
Positive	8	7	5	1	1	22
Negative	3	7	0	3	7	20
Positive and negative	6	2	4	1	0	13
Neutral or negative	0	1	1	0	0	2
Chi-square test	$\chi^2 = 46.1, df = 16, p = 0.00**$					
<b>SOCIAL</b>						
Neutral	4	3	0	7	5	19
Positive	14	15	19	12	8	68
Negative	0	1	0	1	2	4
Positive and negative	2	0	1	0	0	3
Don't know	1	0	0	0	5	6
Chi-square test	$\chi^2 = 36.6, df = 20, p = 0.01**$					
<b>ECOLOGY &amp; ENVIRONMENT</b>						
Neutral	0	0	0	0	1	1
Positive	20	20	20	20	19	99
Chi-square test	$\chi^2 = 4.04, df = 4, p = 0.4$					
<b>TOURISM</b>						
Neutral	1	0	0	7	3	11
Positive	18	20	20	11	15	84
Negative	0	0	0	2	1	3
Positive and negative	1	0	0	0	0	1
Chi-square test	$\chi^2 = 28.4, df = 12, p = 0.0005**$					
<b>AGRICULTURE</b>						
Neutral	10	6	10	10	4	40
Positive	5	0	2	2	1	10
Negative	5	2	4	3	2	16
Don't know	0	12	4	5	13	34
Chi-square test	$\chi^2 = 31.2, df = 15, p = 0.008**$					

Table 8. Opinion of different respondents on the Provincial Structural Plan for the coast.

Opinion about Structural Plan	Politicians %	Entrepreneurs %	Naturalists %	Inhabitants %	Tourists %	Total %
Don't know the plan	5	25	10	45	35	24
Reasonably good	25	40	30	0	10	21
Not legally binding	25	15	20	10	0	14
Lacks nature/ open space	15	5	10	0	0	6
Excess industry/building						
Bad	0	5	0	0	10	3
Lacks detail	10	0	5	0	0	3
Needs better traffic and parking plan	5	0	5	5	0	3
Too late	0	10	5	5	0	4
Other	10	0	15	0	0	5

Table 9. Problems experienced personally (as opposed to general problems in Tables 2 & 3) by respondents active in the coastal zone.

Problems experienced personally along the coast	Politicians %	Entrepreneurs %	Naturalists %	Inhabitants %	Tourists %	Total %
Mass tourism @	15	15	15	30	35	22
Traffic & parking problems	0	5	0	45	30	16
Lack: finances & personnel	25	10	40	0	0	15
Slow political processes	25	25	10	5	0	13
Lack of communication & coordination of authority*	20	15	20	0	0	11
Lack of recreation for kids	0	0	0	25	10	7
Dog faeces	0	0	5	5	20	6
Pollution%	0	5	5	10	10	6
Building frenzy	10	0	5	0	10	5
Conflict of interests#	15	0	5	0	0	4
Bad nature conservation	0	0	15	0	0	3
No problems	0	20	5	20	20	13

@and all its consequences: environmental degradation, pollution, noise, vandalism, littering, trampling etc.

\* between different levels of authority (federal, provincial and local) & coastal towns

% contamination of air, sea water and environment

# nature vs industry vs tourism vs harbours etc

Table 10. Evaluation of the importance of several issues along the coastal zone. Percentage of respondents giving different scores (1 = not important 5 = very important).

Issues related to the coastal zone	SCORE					Differences between respondent groups in scores given ANOVA
	1	2	3	4	5	
Further economic and industrial expansion (controlled)*	52%	6%	28%	6%	8%	$F = 1.45, df = 4, 96; p = 0.22$
Maintenance of carrying capacity of coastal environment	0	0	3	10	87	$F = 2.29, df = 4, 94; p = 0.06$
Sustainable exploitation of coastal natural resources	0	1	3	8	88	$F = 1.34, df = 4, 96; p = 0.26$
High quality of living (esthetics, public health, pristine environment) in coastal zone	0	0	5	16	78	$F = 2.56, df = 4, 94; p = 0.04$ & Tourists lowest, inhabitants highest
Expansion of touristic industry (controlled, organised)	16	5	17	6	23	$F = 5.94, df = 4, 62; p = 0.00$ & Entrepreneurs highest score
More recreational variation (all weather) and nature recreation for tourists	0	0	6	3	27	$F = 0.85, df = 4, 31; p = 0.5$
Increased biodiversity of coastal plants and animals	1	1	6	8	84	$F = 1.39, df = 4, 96; p = 0.24$
Unpolluted streams, estuaries rivers, harbours	0	0	0	3	97	$F = 3.39, df = 4, 96; p = 0.01$ & Politicians lowest score

\* 12% wanted economic rationalization, increased efficiency and better use of structures already present

& Significantly different at  $p = 0.05$

## 11. ADDENDUM

### VRAGENLIJST - BELGISCH KUSTBEHEER

- 1a) In welk discipline werkt u? Wat is uw beroep? \_\_\_\_\_
- b) Bij welk organisatie/instituut? \_\_\_\_\_
- 2) Welke functie heeft uw organisatie aan de kust? \_\_\_\_\_
3. Hoe goed, op een schaal van 1 - 5 ( 1 = zwak, 5 = zeer goed) bent u in uw opinie geïnformeerd over de problemen in verband met kustzonebeheer aan de Belgische kust en de mogelijke oplossingen?? \_\_\_\_\_
- 4) Hoe duidelijk (1 = niet duidelijk, 5 = zeer duidelijk) en beschikbaar (a = niet beschikbaar en e = zeer beschikbaar) vind u de informatie over de kustzone verstrekt door a) wetenschappers \_\_\_\_\_ b) media \_\_\_\_\_ c) belangengroepen \_\_\_\_\_ en d) gemeentebesturen \_\_\_\_\_?
- 5a) Wat denkt u van de huidige toestand van de Belgische kustzone? \_\_\_\_\_
- b) Wat is uw opinie over het (provinciaal) ruimtelijk structuurplan voor de kustzone? \_\_\_\_\_
- c) Wat verwacht u zal de invloed van het structuurplan op het kustzone beleid zijn? \_\_\_\_\_
- d) Wat denkt u over het natuurbeleid langs de Belgische kust? \_\_\_\_\_
- 6) Wat beschouwd u als de meest dringende en belangrijkste problemen langs de Belgische kust? \_\_\_\_\_
- 7) Wat moet ondernomen worden om deze problemen op te lossen? \_\_\_\_\_
- 8a) Konden deze problemen vermeden worden? Ja \_\_\_\_\_ Nee \_\_\_\_\_ Weet niet \_\_\_\_\_
- b) Indien ja, hoe? \_\_\_\_\_
9. Welke problemen/beperkingen/frustrasies ondervind uw bij het uitvoeren van uw activiteit aan de kust?? \_\_\_\_\_
- 10) Hoe gewenst, op een schaal van 1 - 5 (1 = niet en 5 is zeer gewenst) vind u de volgende criteria aan de kustzone?
  - a) Economische uitbreidung \_\_\_\_\_
  - b) Behoud van natuurlijke hulpbronnen \_\_\_\_\_
  - c) Hoge levenskwaliteit (milieukwaliteit, esthetiek, stilte, zuivere lucht, etc) \_\_\_\_\_
  - d) Behoud van de draagkracht van het milieu in de kustzone \_\_\_\_\_
  - e) Voortgezette touristische en recreatieve ontwikkeling \_\_\_\_\_
  - f) Behoud of toename van biodiversiteit van plant- en diersoorten \_\_\_\_\_
  - g) Beschikbaarheid van zuiver water \_\_\_\_\_

11) Heeft het huidig, meer natuurgericht kustbeheerbeleid naar uw mening voordelen (+), nadelen (-) of geen effect (0) op de volgende gebieden?

a) Economisch \_\_\_\_ b) Sociaal \_\_\_\_ c) Ecologisch \_\_\_\_ d) Milieu \_\_\_\_ e)  
Touristisch \_\_\_\_ en de Landbouw \_\_\_\_?

12) Wie of wat is naar uw mening het meest verantwoordelijk voor de overbebossing en de problemen aan de Belgische kust? \_\_\_\_\_

13) Wat is uw toekomst visie voor de Belgische kust?? \_\_\_\_\_

HARTELIJK BEDANKT VOOR UW TIJD EN GEDULD!!