Protected marine species, prevention of species introduction and the national environmental agencies of Mediterranean countries: professionalism or amateurishness?

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PROTECTED MARINE SPECIES, PREVENTION OF SPECIES INTRODUCTION AND THE NATIONAL ENVIRONMENTAL AGENCIES OF MEDITERRANEAN COUNTRIES: PROFESSIONALISM OR AMATEURISHNESS?

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ABSTRACT
Until recently, the legal protection of species (banning of destruction, capture, transportation, sale, purchase, etc., living or dead) mainly concerned continental species. The only protected marine species in the Mediterranean were the marine mammals, marine turtles and marine birds, to the exclusion of groups such as the fishes, molluscs, echinoderms, crustaceans and plants.

Between the end of the 1970s and the beginning of the 1990s, about ten marine species other than mammals, turtles or birds were protected in a few Mediterranean countries (Croatia, Spain, France and Italy). These are in particular the seagrass Posidonia oceanica and the molluscs Lithophaga lithophaga, Patella ferruginea and Pinna nobilis. In 1996, 55 species of macrophytes, invertebrates and fishes were registered in Appendices I and II of the Conventions of Bern and Barcelona. With the exception of France and Spain (for some of these species), none of the Mediterranean countries that were signatories to these conventions have written the protection of them into their national laws.

Many international conventions (e.g. the Bonn Convention, the Bern Convention, the Barcelona Convention, the Montego Bay Convention, the Convention on Biological Diversity) recommend to the countries that have ratified them that they take steps to avoid the introduction of species, and, if such introductions should occur, to attempt to limit their spread and their impact. Although all the Mediterranean countries have ratified at least one of these conventions, most of them have not yet drafted a law to meet these recommendations. With regard to the introduction of species, most Mediterranean countries would thus appear to be positioned in a total juridical vacuum. The history of the spread of Caulerpa taxifolia in the Mediterranean illustrates the lack of consistency of practices within the national agencies responsible for the environment.

It is thus worth examining the causes of the considerable gap that would appear to exist between on the one hand the international conventions regarding the environment and the recommendations adopted during international meetings, and on the other hand their actual implementation at national level. Is it a matter of a lack of time among the civil servants responsible for the environment? The redundancy of certain of the conventions? Poor knowledge of law? The inadequate scientific knowledge of the civil servants who remain unconvinced of the utility of these conventions? The pressure of lobbies on the national agencies responsible for the environment? It is astonishing that in states subject to the rule of law, conventions signed by elected officials or laws voted by elected members of parliament should be flouted by the non-elected civil servants working in the agencies that are theoretically responsible for their implementation.

Threatened species
Many species have disappeared as the result of human pressure. The cause of their disappearance may be direct, when species are hunted for consumption, or destroyed because they are considered as competitors. Causes may also be indirect: destruction of a species' habitat, reduction of its food supply, competition with introduced species.
worldwide scale, introduced species constitute the second most important cause of the disappearance of species, after loss of habitat (Schmitz and Simberloff, 1997; Clout, 2002).

A greater number of species are considered as threatened, to varying degrees. There are several categories of threatened species (Anonymous, 1999). (i) Critically endangered species are those that are now only represented by a small number of individuals, and are thus on the brink of extinction. This is the case for the monk seal Monachusimonachus in the Mediterranean and in the neighbouring Atlantic. Whatever protection measures are taken, it is uncertain whether their extinction may be avoided. (ii) Endangered species are those that are in the process of extinction, that will disappear shortly if nothing is done, but that might well be saved if determined protective action is taken. This is the case in the Mediterranean for the giant limpet Patellaferruginea. (iii) Vulnerable species are those that have undergone a sharp decline, but whose populations are still sufficiently large for extinction to be unlikely within the foreseeable future. This is the case in the Mediterranean for the Chromobionta Cystoseira amentacea. (iv) Finally, rare species are those in which individuals are naturally not abundant. Individuals are either scattered over a more or less extensive range (for example, the diadema sea-urchin Centrostephanus longispinus in the Northwestern Mediterranean), or are concentrated in a small number of sites (for example, the Chromobionta Laminaria ochroleuca in the Western Mediterranean). Even if no decline has been observed to date, these species are likely to move rapidly into the endangered or critically endangered category as the result of coastal development works or the introduction of a new pollutant.

The protection of threatened species involves the legal protection of the species themselves and the protection of their habitat. The legal protection of a species generally includes the banning of their destruction, capture, transportation, sale or purchase, etc., whether the individual is alive or dead, and whether it involves the whole individual or part of it (shell, bones, etc.).

The legal protection of species: long restricted to continental species

Until recently, the legal protection of species mainly concerned continental species. The only marine species protected in the Mediterranean were marine mammals (such as the monk seal Monachus monachus and the common dolphin Delphinus delphis), marine turtles (such as the green turtle Chelonia mydas and the loggerhead turtle Caretta caretta) and marine birds. In a way, this was simply an extension to the sea of the continental protection "culture". It should be pointed out that the criteria that led to the protection of these species are not always very discriminatory: abundant species, for which there is nothing to suggest that their numbers are in decline, such as the striped dolphin Stenella coeruleoalba, are protected in the same way as rare or distinctly declining species, such as the harbour porpoise Phocoena phocoena and Audouin's Gull Larus audouinii. In fact, for mammals, turtles and sea birds, protection would appear to be a 'natural right', so that all species are protected, apart from a few exceptions (Boudouresque, 1996).

The situation regarding species belonging to taxonomic groups that come more specifically within the domain of the marine scientific tradition is quite different: the fishes, molluscs, echinodermns, crustaceans and plants. The only protected species were the fishes that spent part of their lives in fresh water, such as the sea lamprey Petromyzon marinus, the river lamprey Lampetra fluviatilis, the Allis shad Alosa alosa and the Twaites shad Alosa fallax.

Legal protection extended to the marine environment

Croatia was the first Mediterranean country to afford legal protection to a few marine species other than mammals, turtles and birds. These were the molluscs Pinna nobilis (noble pen shell or fan shell; since 1977), Charonia tritonis (triton), Tonna gatea (helmet ton; since 1979) and Mitra zonata (zoned miter; since 1981) (Zavodnik et al., 1981; Boudouresque, 1995).
In France, the Magnoliophyta Posidonia oceanica (Neptune grass) and Cymodocea nodosa were protected in 1988. Two other Magnoliophyta, Zostera marina (eel grass) and Nanozostera noltii (= Zostera noltii; dwarf eel grass) have been protected in the Provence-Côte d’Azur region since 1994. These four species have been protected in Catalonia since 1991 and in the Comunitat Valenciana (Spain) since 1992 (Boudouresque, 1995).

Following an international congress on the protection of marine species (Boudouresque et al., 1991), 6 species of invertebrates have been protected in France in 1992: the sea urchin Centrostephanus longispinus (diadema sea-urchin), the molluscs Lithophaga lithophaga (date mussel), Patella ferruginea, Pinna nobilis and P. permula (= P. rudis; rough pen shell) and the crustacean Scyllarides latus (locust lobster) (Boudouresque, 1995). In Italy, the harvesting, possession and marketing of two molluscs, Lithophaga lithophaga and Pholus dactylus (common piddock), has been banned since 1988 by decrees that are renewed every two years but are poorly observed (Fanelli et al., 1994). And that was about all, for the Mediterranean as a whole, at least until the end of the 1990s.

**The protection of species and the international Conventions**

In 1992, the European Union (EU) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (hereafter "Habitats Directive") includes 622 species in its Appendix II ("animal and plant species of community interest whose conservation requires the designation of special areas of conservation"). With the exception of the mammals, turtles and birds, the only marine species are the fishes that also frequent freshwater (Acipenser naccarii, A. sturio, Alosa alosa, Alosa fallax, Lamprocritus fluviatilis, Lethenteron zanandrei and Petromyzon marinus) or that live in brackish water (Aphanopus fasciatus, A. iberus, Pomatoschistus canestrini and Valencia hispanica). Appendix IV ("animal and plant species of community interest in need of strict protection") again cites three of these species (Acipenser naccarii, A. sturio and Valencia hispanica) and adds 4 species that are protected in France (Centrostephanus longispinus, Lithophaga lithophaga, Patella ferruginea, Pinna nobilis). No marine plant appears in either of these Appendices.

In 1996, 55 marine species (other than mammals, turtles and birds) were included in Appendices I (plants) and II (animals) of the Conventions of Bern (for the Mediterranean alone) and Barcelona: the Plantae Caulerpa olivieri, Cymodocea nodosa, Nanozostera noltii, Posidonia oceanica and Zostera marina, the Chromobionta Cystoseira amentacea, C. mediterranea, C. sedoides, C. spinosa, C. zosteroides, Laminaria ochroleuca and L. rigida, the Rhodiobionta Goniolithon byssoides, Lithophyllum byssoides (= L. ichnoides), Ptiliphora mediterranea and Schimmelmannia ornata, the Porifera Asbestopluma hypogaea, Aplysina cavernicola, Axinella polyoides and Petrobionia massiliensis, the Crnidaria Astroides calycularis and Gerardia savaglia, the Echinodermata Asterina panderi, Centrostephanus longispinus and Ophidiaster ophidians, the Mollusca Charonia lampas, C. tritonis, Dendropoma petraeum, Erosaria spurca, Gibbula nivosa, Lithophaga lithophaga, Luria lurida, Mitra zonata, Patella ferruginea, P. nigra, Pholus dactylus, Pinna nobilis, P. percula, Ranella olearia, Schilderia achaitidea, Tonna galea and Zonaria pyrum, the Crustaceae Ocypode cursor and Pachyasma gigantea, the fishes Acipenser sturio, Aphanopus fasciatus, A. iberus, Carcharodon carcharias, Cetorhinus maximus, Hippocampus hippocampus, H. ramulosus, Huso huso, Lethenteron zanandrei, Pomatoschistus canestrini and P. tortonesei (Boudouresque et al., 1996).

In France, the species included in Appendix I (flora) and II (fauna) of these conventions have been protected by decree since 1999.

In Spain, the list of species included in Appendices II and IV of the European Union Habitats Directive was published in 1995 in the Boletín Oficial del Estado (BOE). The list of species included in Appendices I and II of the Barcelona Convention was published in 1999 in the BOE. The texts do not indicate that these species are protected but "threatened". The prot-
ection is indirect, since it stems from a referral to Article 26.4 of the law of 4/1989, which states that it is prohibited to kill, injure, harass, capture, possess, buy, sell etc. wild animals included in the list of threatened species. The law of 4/1989 specifies in addition that exemptions to these prohibitions are possible (Ramón Álvarez, pers. comm.). Nevertheless, the harvesting and marketing of the date mussel Lithophaga lithophaga continue in Spain (Alvarez and Altaba, 1999). This harvesting is explicitly authorised by the Ministry of Agriculture, Fisheries and Food (Ramón Álvarez, pers. comm.). This example is illustrative of the complexity of applying international conventions at national level and of the necessity for clear texts in national law.

Most of the 18 other Mediterranean countries (besides Spain and France) that have ratified the Bern and or Barcelona conventions have not confirmed in national law the protection that should be afforded to the 55 marine species that are included in Appendices I and II. In the absence of clear national legislative texts, the value of these appendices in the national law of most of these countries is of uncertain value, since they were adopted long after (1996) ratification of the Barcelona and Bern conventions (the first ratification dates from 1977 and 1982, respectively). The necessity for the transcription of these Appendices into national law has been pointed out by RAC-SPA (1999).

**Introduced species**

An introduced species is defined as a species which fulfils the four following criteria (Carlton, 1985; Ribera and Boudouresque, 1995; Boudouresque and Verlaque, 2002). (i) It colonizes a new area where it was not previously present. (ii) The extension of its range is linked, directly or indirectly, to human activity. (iii) There is a geographical discontinuity between its native area and the new area (remote dispersal). This means that the occasional advance of a species at the frontiers of its native range (marginal dispersal) is not taken into consideration. Such fluctuations (advances or withdrawals) may be linked to climatic episodes. (iv) Finally, new generations of the non-native species are born in situ without human assistance, thus constituting self-sustaining populations: the species is established, i.e. naturalized. Based on this definition, the corn Zea mais in European terrestrial environments, and the sea mammal Dugong dugon, which has been observed only once along the Israeli coast and probably represents an isolated individual having entered the Mediterranean through the Suez canal (Por, 1978), are not introduced species.

More than 400 species can be considered as having been probably introduced to the Mediterranean Sea; this represents 4-5% of its known flora and fauna. The Mediterranean has a higher level of introduced species than any other major sea. Since the early 20th century, their number has more or less doubled every 20 years. Most of these species are of Lessepsian origin (i.e. entered the Mediterranean through the Suez canal). Aquaculture is the second route of introduction to the Mediterranean: the escape of aquaculture species and especially accidental introduction of species accompanying aquaculture species. The other vectors include fouling and clinging (transportation on ships' hulls), ballast waters and escape from aquaria (Zibrowius, 1991; Verlaque, 1994; Boudouresque, 1999a, 1999b; Boudouresque and Verlaque, 2002).

Introduced species constitute a major threat to both native species and ecosystem diversity (Schmitz and Simberloff, 1997). The end result of this worldwide extension of species' geographical ranges could be a world homogenisation of biota, at least at a given latitude (Clout, 1998). Harmful consequences of species introduction may also affect several sectors of human activity, including fisheries, aquaculture, public health and tourism (Boudouresque, 2001, 2002).

**Introductions of species and international conventions**

Many international conventions (e.g. Bonn Convention, Bern Convention, Barcelona Convention, Convention on Biological Diversity, Montego Bay Convention) recommend that
countries that have ratified them should take measures to avoid the introduction of species and, if introductions should occur, to attempt to limit their spread and their impact.

The Bonn Convention of 1979 (Convention on the conservation of migratory species of wild animals) states that Agreements concluded under the Convention for the conservation of individual species or of groups of species should provide for "the protection of (the) habitats (of migratory species) from disturbances, including strict control of the introduction of, or control of already introduced, exotic species detrimental to the migratory species". The Bern Convention of 1979 (Convention on the conservation of European wildlife and natural habitats) provides that "each Contracting Party undertakes (...) to strictly control the introduction of non-native species". The Protocol to the Barcelona Convention concerning Mediterranean Specially Protected Areas (Geneva Protocol of 1982) obliges Parties to take measures progressively to protect these areas. These may include the prohibition of the introduction of exotic species, as well as "the regulation of the introduction of indigenous zoological or botanical species" in protected areas. The EU Habitats Directive of 1992 requires member States to "ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction". The Convention on Biological Diversity of 1992 requires its Contracting Parties, as far as possible and appropriate (article 8h), "to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species" and "to strictly control the introduction of non-native species" (De Klemm, 1994, 1995; Glowka and De Klemm, 1996; Mooney, 1996).

The United Nation Convention on the Law of the Sea (Montego Bay Convention), in force since 1994, states that (article 196.1) "States shall take all measures necessary to prevent, reduce and control (...) the intentional or accidental introduction of species, alien or new 1, to a particular part of the marine environment, which may cause significant and harmful changes thereto" (De Klemm, 1994, 1995). It should be stressed that the Montego Bay Convention, unlike preceding conventions, is legally binding.

Introduction of species: national legislation

With regard to national legislation aimed at preventing and combating the introduction of species in the marine environment, 5 levels may be considered.

Level 0 corresponds to the absence of legal texts, whether specific or not. This is the case, in the Mediterranean, in Algeria, Cyprus, Greece, Monaco, Tunisia and Turkey (De Klemm, 1995).

Level 1 corresponds to the existence of texts designed for purposes other than the prevention of the introduction of species, but which might be sidetracked from their initial aim. In Italy, the Act of 1992 on the "Protection of warm-blooded fauna and taking in garret" is the only piece of legislation which deals with introduction at national level. However, the Act applies only to mammals and birds, and more especially to live game animals (De Klemm, 1995). It is worth noting that none of the species already introduced to the Mediterranean is a mammal or a bird, and that the probability of introduction of such species to the marine realm is low. In France, before the adoption of the 2 February 1995 Act "to strengthen the protection of the environment", legislation referred to introductions mainly in some regulations for freshwater fishing (De Klemm, 1995). In addition, Article 5 of the Act of 10 July 1976 on the Protection of Nature (now Article L-212-1 of the Rural Code) states that the introduction, from whatever source, of undomesticated animal species listed by decree, requires authorisation. However, no lists of species whose introduction is prohibited under

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1 *New species* referred here to Genetically Modified Organisms (GMO).
this Article has ever been published. It was only used once, in the marine realm, to prohibit the release into the sea, utilisation and trade of the already introduced Planta Caulerpa taxifolia, and to require permits for its collection and transport (ministerial order of 4 March 1993). As far as the Act of 2 February 1995 is concerned, Article L-211-3 provides that "in order not to damage the natural environment of wild fauna and flora, the introduction into the natural environment deliberately, negligently or imprudently of any specimen of undomesticated or non-cultivated animal or plant species which are not native to the territory of introduction" is prohibited. The administration may destroy, or arrange for the destruction of specimens introduced illegally. Any costs incurred may be charged to the person guilty of the offence (De Klemm, 1995). Unfortunately, the decree specifying the conditions for implementation of Article L.211-3 were never issued, and in 7 years, no explanation has ever been offered in response to the numerous requests addressed to the French ministry of the environment. The Article of the Act of 5 February 1995 dealing with the introduction of species is still not in force in France.

 Level 2 corresponds to the existence of specific texts on species introduction. However, these texts are naive in that they deal primarily with deliberate introduction in the natural environment and not with the importation and possession of exotic species (which may escape: "fugitives"), nor with measures for decontamination and quarantining to prevent the introduction of species that are not deliberately imported ("stowaways" and "hitch-hikers"). Yet, and this is the case in the marine environment, deliberate introduction is rare. The vast majority of introductions are accidental: species transported with ballast water, species accompanying aquaculture species, species attached to the hulls of ships ( fouling), species accompanying international trade (for instance, carried in containers), species escaping from aquariums, etc. In addition, if the public can own exotic species, it would be very naive to imagine that it would be possible to identify the author of an accidental introduction: one cannot place a policeman in front of every door (and besides, no one would wish to) (Boudouresque, 2001). The Spanish legislation, that is no doubt the most advanced in the Mediterranean, comes within this Level 2: the Act of 27 March 1989 and the decree of 8 September 1989 (De Klemm, 1995). France would be placed at a similar level if decree of application of the Act of 5 February 1995 had been issued.

 Level 3 corresponds to the drawing up of a black list (= "dirty list") of exotic species known elsewhere in the world, as having been introduced or as exhibiting invasive behaviour: a threat to native species and ecosystems and/or negative economic impact. The importation and possession, even on a private basis, of a species on the black list is prohibited. No Mediterranean country has legislation at this level, in contrast to Great Britain, for example.

 Level 4 corresponds to the drawing up of a white list (= "clean list"). Any importation of exotic plants or animals is prohibited in New Zealand, unless it figures on a list of authorised species, for which the risk of introduction is slight and where, should it occur, the damage to native species and natural habitats would probably be negligible (Animals Act of 1967, amended in 1990; Biosecurity Act of 1993). The same is true in Australia, where the Australian National Parks and Wildlife Service monitors the importation of all living organisms thanks to the Wildlife Protection (Regulation of Exports and Imports) Act of 1982 (Pollard and Hutchings, 1990; De Klemm, 1995).

 All Mediterranean countries have ratified at least one of the international conventions cited above, in some cases more than 20 years ago. Nevertheless, most of them have not yet drafted a single text of law to apply the recommendations that they make. With regard to the introduction of species, most of the Mediterranean countries would thus appear to be in a total juridical vacuum, in contrast to the countries of Northern Europe and above all the United States, Canada, New Zealand and Australia.
A case book study: the introduction of *Caulerpa taxifolia*

The way that the introduction and spread of *Caulerpa taxifolia* in the Mediterranean has been mismanaged is particularly instructive. As soon as this species was discovered on French Riviera (Meinesz and Hesse, 1991), it was seen by many scientists as a potential threat with regard to species diversity and ecdoversity. The precautionary principle of the Convention on Biological Diversity ("Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat") was only put into application by three Autonomous Communities in Spain (Catalonia, Balearic Islands and Comunitat Valenciana) and by the Port-Cros National Park and the Corsica Region in France: surveillance of zones where *C. taxifolia* was likely to arrive, and if sighted, eradication to prevent further spread (Riera et al., 1994; Grau et al., 1996; Robert, 1996; Pasqualini et al., 1998; Grau et al., 1999; Ballesteros et al., 2001; Aranda et al., 2001). In addition, *C. taxifolia* was prohibited (utilisation, trade, collection and transport) in France and in the 3 Autonomous Communities in Spain cited above.

Major research programmes, in particular two European "Life" programmes, involving thirty or so laboratories, have resulted in the accurate description of the spread of *C. taxifolia* and have made it into perhaps the best known marine introduced species in the world (Boudouresque et al., 1994; Ribera et al., 1996; Boudouresque et al., 1998; Gravez et al., 2001).

In 1995, the Permanent Committee of the Bern Convention (which included representatives of all the environment ministries of all the Contracting Parties, including Albania, Cyprus, France, Greece, Italy, Malta, Monaco, Spain and Turkey), adopted a recommendation (N°45, 21 March 1995) regarding the control of the spread of *C. taxifolia* in the Mediterranean. It was recommended, in particular, to eradicate isolated patches (100-200 m²) and to undertake concerted action between the countries concerned or likely to be concerned, with a view to adopting a common strategy. Once back in their respective ministries, not one of the representatives of the countries concerned ever implemented the recommendation that they had drafted.

In 1999, the United Nations Environment Programme (Mediterranean Action Plan) organised a workshop on invasive species of the genus *Caulerpa* (UNEP, 1999), in which scientists designated by the Ministries of the Environment of the Mediterranean countries and civil servants from these ministries took part. Among the conclusions and recommendations, adopted unanimously, one may read the following: "The workshop agreed that the most serious risk from *Caulerpa taxifolia* (...) was the upsetting of the ecological balance"; it is recommended to all Mediterranean countries "to prohibit the sale and use of *Caulerpa taxifolia* and *C. racemosa* and to avoid the sale and use of the genus *Caulerpa* for aquaria (with the exception of the Mediterranean species *C. prolifera") and "to control, where possible the expansion (...) through the eradication of small colonies in (...) regions that are distant from strongly colonized areas". Once back in their ministries, not one of the representatives of the countries concerned ever implemented the recommendations they had drafted. Spain might appear to be an exception to the rule as regards the monitoring of small colonies, but this is a local initiative (Autonomous Community of the Balearic Islands), not a national one, and that dates from well before the 1999 workshop. In France, the only response to the recommendations of the workshop was ... to plunge headlong into scientific research, with the launch of a new research programme (Bentata, 1999).

Meanwhile, the steady spread of *Caulerpa taxifolia* continues (Table II; Meinesz et al., 2001).
Table II. Expansion of *Caulerpa taxifolia* in the Mediterranean Sea. md = missing data.

<table>
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<th>Year (December)</th>
<th>Number of localities</th>
<th>Concerned shoreline</th>
<th>Concerned surface area</th>
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<td>1 m</td>
<td>1 m²</td>
</tr>
<tr>
<td>1989</td>
<td>1</td>
<td>0.2 km</td>
<td>1 ha</td>
</tr>
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<td>4</td>
<td>md</td>
<td>3 ha</td>
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<tr>
<td>1992</td>
<td>24</td>
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<tr>
<td>1994</td>
<td>38</td>
<td>30.7 km</td>
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<tr>
<td>1996</td>
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<td>1997</td>
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<tr>
<td>2000</td>
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<td>191.3 km</td>
<td>13 053 ha</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

It is worth wondering about the considerable gap that may occur between the international conventions dealing with the environment, in particular the protection of threatened species, and the prevention of introductions of species, and their actual implementation at national level.

Similarly, it is difficult to understand why the civil servants from ministries responsible for the environment who have taken part in international meetings and in the drafting of recommendations, and have subsequently approved them, forget all about them a few days later as soon as they get home.

The signing of these conventions, and sometimes the annual working meetings they give rise to, are given intensive media coverage. Why then is their implementation so slight as to be sometimes non-existent?

There are several possible explanations for this inefficiency on the part of the technocratic administrative structures (i.e. the civil servants at the ministries of the environment). (i) The lack of time of the civil servants, who have to rush from one international convention meeting to another, and do not have the time to implement them. (ii) The at least partial redundancy between certain of these conventions, which can be confusing. (iii) The civil servants' poor knowledge of law. (iv) The poor level of scientific culture among certain civil servants, who may themselves be incapable of appreciating the value of certain articles of the international conventions, in particular those dealing with the protection of species and the introduction of species, and who are thus not highly motivated to implement them. (v) Pressure from lobbies on the national agencies responsible for the environment. These lobbies (e.g. aquarists, importers of exotic animals) may be the underlying reason for the reluctance of the national agencies to put into practice the prevention of species introduction, or, in the case of France, to issue the decree of application of Article L.211-3 of the Act of 2 February 1995. (vi) Finally, the lack of professionalism, or naively, of elected officials, who do not follow closely the work of the agencies (or ministries) for which they are responsible.

Whatever the case may be, these attitudes, whether they are deliberate or stem from a certain amateurishness, incompetence or irresponsibility (corruption may probably be ruled out), raise a real problem in terms of democratic procedures. In states subject to the rule of law, can it be considered normal that international conventions, signed and ratified by elected officials, that a law voted quasi-unanimously by elected members of parliament (for instance, in France the Act of 2 February 1995), be flouted by non-elected civil servants whose role is precisely to implement the decisions taken by the elected officials?
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