

The Guiding Principle for the Wadden Sea: Advantages of a dynamic approach in a changing world

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Abstract

The management for the Wadden Sea has been successful in preventing a further deterioration of the overall condition of its nature during the last 20 years. This positive statement is true only if pros and cons are balanced, i.e. there are also issues where there have been deteriorations during the last decades. It must also be kept in mind that nature was already badly affected before.

The Guiding Principle for the Wadden Sea favours natural processes whenever possible. It is among the major achievements of the three countries for the protection of the area, providing an overall umbrella against which management decisions can and should be measured. The Guiding Principle is also fit for the future, in particular as the use of natural processes may become increasingly important when active management options are tested which allow the Wadden Sea to adapt to an accelerated sea level rise.

Recommendations for future scientific work focus on how to apply the Guiding Principle in practice, how to adapt management to the challenges arising from invasive alien species, and how to adapt management to the challenges arising from sea level rise.

1. Introduction

This paper is about the present and future management of the Wadden Sea as a worldwide unique and protected nature area in general terms. The goal is to discuss whether the Guiding Principle for Wadden Sea protection from 1991 is fit for the future.

Therefore, I briefly describe the present management of the Wadden Sea, the advantages and disadvantages of the Guiding Principle as the overall guideline of this management, and whether it seems realistic that the management can be adapted to tackle future challenges. Finally, I give three recommendations. They aim to reflect those issues which presently deserve the highest attention in the Wadden Sea's scientific community.

This paper is focussing mainly on the protected areas of the Wadden Sea, i.e. the area outside the

main dike line, including the more natural parts of the islands.

2. The present management of the Wadden Sea, its successes, and some predictions

The Wadden Sea and its management regime evolved over quite some time. Safeguarding of some seabird colonies began about 100 years ago. However, it was not until roughly 50 years ago that larger areas of the Wadden Sea became protected. The "Trilateral Cooperation" of the three Wadden Sea countries is about 30 years old, with the first "Joint Declaration on the Protection of the Wadden Sea" being decided upon on December 9th, 1982 by The Netherlands, Germany and Denmark. In parallel to this, the national Wadden Sea policies developed. In Germany three National Parks were designated from 1985 to 1990, with a total size of about 7,300 km² in 2009, covering almost the entire German Wadden Sea. The Dutch and Danish parts of the Wadden Sea also became protected, with Denmark deciding in 2008 that its Wadden Sea should also become a National Park soon. And at the time of writing this manuscript, it is just weeks until a decision by the UNESCO World Heritage Committee is expected on whether the Dutch-German part of the Wadden Sea will become a world heritage area (CWSS 2008).

All this sounds easy, but it was not. A great number of people worked very hard for the Wadden Sea and its protection for the past 100 years: local and non-local people, scientists and non-scientists, governmental and non-governmental organisations, professionals and amateurs. As of today, they form a kind of "Wadden Sea Network", finding expression e.g. in the regular trilateral governmental talks and decisions, nature organisations, visitor centres on almost every island and at many mainland sites, a trilateral Wadden Sea Secretariat and local administrations working for the protected areas. There are also a stakeholder forum (the "Wadden Sea Forum"), municipal organisations, advisory boards, and a trilateral environmental monitoring programme. And, not to

forget, more than 200 scientists who show up at events called the "International Scientific Wadden Sea Symposium"!

This work also resulted in a set of regulations and a management framework having been developed specifically for the Wadden Sea, a prerequisite in setting the scene for successful conservation. Of particular importance is the national nature legislation on the Wadden Sea in all three countries (e.g. the "Planologische Kernbeslissing" in The Netherlands or the National Park laws in Germany). This, however, is bound together by a kind of „soft law" being decided jointly upon by the three countries in the Trilateral Cooperation. Trilaterally there is a clear overall objective – the "Guiding Principle" (see 3.) – and a number of targets for the different habitats and some species groups (TWC 1991, TWC 1997). The national and the trilateral levels of policy making has always influenced each other and many issues have been solved jointly and in a compatible way. However, part of the management always remained country specific.

Above these national and trilateral regulations reside a number of European Directives relevant for the management of the Wadden Sea, mainly the Birds and the Habitats Directives (both together as Natura 2000), and more recently the Water Framework Directive and the Marine Strategy Framework Directive. They set important conservation standards to be fulfilled even if and when they are sometimes considered uncomfortable from a local or national point of view. However, as positive as these European standards are, the implementation of these directives is quite a complex issue, because they differ in the area concerned, in their goals and in the time schedule within which the countries have to fulfil their duties.

Overall, the management of the Wadden Sea as it has developed certainly is one expression of "Integrated Coastal Zone Management" – though usually not named as such and with much potential for improvement.

All what has been mentioned up to this point was about people: their goals, their science, their organisations and their regulatory frameworks. Nothing has been said so far about the quality and the condition of the Wadden Sea's nature itself, on which all this is focussing. The best available overview on this can be found in the "Quality Status Reports" (QSR) for the Wadden Sea, the most recent one at the time of writing by Essink et al. (2005). The conclusion of the synthesis chapter in this report binds everything together: "The present

Wadden Sea is a particular habitat problem area and still deficient in a number of charismatic species which once lived in this region. This is mainly the result of various pressures exerted by human activities. Relevant issues for the future are also an increasing impact of introduced species, the consequences of sea level rise and an assumed trend towards sandier sediments. Precaution requires the further reduction of the release of technogenic toxic substances and the prevention of the release of new ones. The need for balancing the reduction of nutrient enrichment deserves to be critically assessed. Future management of the natural values of the European Wadden Sea should be better tuned to the apparent differences between sub-areas as well as taking into account the cross-boundary relationship between this system and the influences from large river catchment and offshore areas." (Reise et al., 2005).

This describes the situation very well. However, the QSR does not give a clear signal whether the condition of nature – as problematic as it still is – has improved or deteriorated since the time when bigger thinking began to have consequences for Wadden Sea protection, i.e. over the last 20 years. Only by answering this question we can assess how successful all the conservation efforts may have been. However, it may be quite difficult to get a scientifically sound answer on this. There would be so much artificial weighing of so many indicators involved, that different people doing this analysis might well come up with different answers. Looking at many of the pros and cons about what has improved and what has deteriorated (see also WWF & Schutzstation Wattenmeer 2005, WWF 2006), my hypothesis is that nature condition in the Wadden Sea has been reasonably stable during the last 20 years. Again, the terms "improved", "deteriorated" and "stable" as I understand them here are describing the condition of nature as such – not in terms of the quality of laws, management plans and other regulations.

Is this a success then? So many people's work, and then the condition of nature has only remained stable? Certainly Wadden Sea protection should and could have been more successful. But, compared to the alternative of no or fewer protection efforts, and compared to so many other places in the world, Wadden Sea protection has been quite successful. This certainly does not mean that there is no need for further and improved action, as I will show later. It means that all the efforts of so many people for so many years have not been for nothing and also not just for a little

bit, but that they really have achieved a lot and that their work was well invested!

Having described the present situation and the trend up to now, I would like to risk some predictions for the future. Certainly without being complete, Table 1 lists the major issues for conservation and management, both as they can be considered now and with an outlook to the future.

The latter is purely based on personal assumptions and what can be expected if one is more optimistic than pessimistic and if the Wadden Sea network is doing a good job. The result looks rather good for the Wadden Sea, with one exception: Sea level rise and other effects of climate change may become so dramatic that their effects cannot be fully compensated.

Present situation of conservation and management	Expectations and necessary actions	Chance for improvement
So many people work for the Wadden Sea, a great network . However, resources are still missing in many places and for many issues.	Improve quantity and efficiency on all levels (governmental and non-governmental). Stable Wadden Sea funds required in the entire region. Improve cross border cooperation on specific issues. Strengthen cooperation of visitor centres as well as cross border education.	+
A reasonable regulatory framework and a clear overall objective do exist. Some rules have too many detrimental exceptions and some could be made less complex.	The negative effects on the ecosystem caused by inappropriate regulations are not so serious that this could not be repaired, possibly with an update of the Wadden Sea Plan as one component, including a better integration of the EU directives. However, making things less complex must not mean less protection.	+
The whole Wadden Sea is a protected area . Recently DK decided upon a National Park and there is a good chance that the NL-DE-Wadden Sea will become a World Heritage Site soon.	Both National Parks and the World Heritage Site should become the joint tools for management and marketing in the entire Wadden Sea. All this is „insurance“ that society will take the protection of the Wadden Sea more seriously in the future.	+
Parts of the Wadden Sea are heavily influenced by industrial activities , with even plans for increase (e.g. oil and gas drilling, coal power plants, carbon storage, harbour developments, deepening of estuaries, cable routes).	Industrial pressure could grow to an extent that the Wadden Sea severely deteriorates. This is a risk that is not dealt with appropriately yet. Strong action is needed to stop certain activities, and to truly compensate for the others.	±
Fishery is not yet managed well enough, both within the Wadden Sea and in the North Sea (with the latter also affecting fish populations in the Wadden Sea).	Improvement is possible and probable by better management, and by complying with the protection goals. This should result in a fishery still safeguarding local jobs, but leaving large parts of the protected area untouched.	+
Invasive alien species are found everywhere, some already with severe effects on the ecosystem. Management has largely ignored the issue so far.	The effects on nature will increase, and more species will invade, which in most cases is irreversible. The Wadden Sea could globalize too much while the natural biodiversity becomes less visible. New regulations must stop further introductions through both with water and aquaculture. Furthermore it may be possible to find measures to reduce effects of already introduced species, particularly in some terrestrial habitats.	±
Tourism – including its infrastructure – has a severe influence on nature. However, the zoning system, visitor centres, guided tours and an increasing number of stakeholders behaving responsibly help a lot in mitigating the impacts. Positive also is an increasing cooperation between tourism and conservation.	Rising temperatures in the South could increase tourism in the Wadden Sea to unsustainable levels. Also new fashion sports may bring problems. However, an overlap of interests between tourism and conservation about keeping the Wadden Sea as a beautiful landscape makes it probable that problems can be coped with in the future.	±
Coastal defence – in the past the largest impact on the ecosystem – and conservation are still not integrated enough. However, there are the first examples where conflicts of the past have been replaced by cooperation.	With a view on the effects of an accelerated sea level rise, an alliance between coastal defence and conservation is required, with coastal engineers aiming for both safety for the people and nature protection. This should be possible to achieve.	+
As of today the measurable effects of climate change and acceleration in sea level rise are still rather minor.	Sea level rise and other effects of climate change will be so dramatic that it may not be possible to fully compensate. There is hope that we can adapt to an extent, which would still allow the Wadden Sea to continue to exist and remain beautiful. However, to achieve this much needs to be done.	-
People love the Wadden Sea – both locals and tourists.	It can be assumed that people continue to love the Wadden Sea. This is among the major reasons why it is probable that the future challenges may be coped with!	+

Table 1: Major conservation and management issues in the Wadden Sea (not complete), expectations from an optimistic viewpoint and necessary actions, and chances for improvement (+), stability (±), or deterioration (-) in the long term.

3. The Guiding Principle as the management umbrella for the Wadden Sea

Three industrialized countries cooperating for a large and unique nature region – obviously there must be a guideline as an umbrella for the management. Such a guideline should fit the overall picture we would like to see in the landscape and safeguard a rich variety of all typical species and habitats. Therefore, at the Trilateral Wadden Sea Conference in Esbjerg in 1991 the three governments decided (TWC 1991): „*The guiding principle of the trilateral Wadden Sea policy is to achieve, as far as possible, a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way.*”

This decision made clear what the focus of conservation should be in the future: Nature should simply take its course to the extent possible. By this the Guiding Principle provided rather objective criteria for management. Therefore, there is no need to decide on more or less artificial goals such as specific population sizes for certain species or how to develop favourable habitats just because we like them more than others. Also, a clear goal like this is easy to communicate and to understand for everybody. The Guiding Principle also helps to save money: The alternative – a much more active management – usually costs more.

The underlying assumption for the Guiding Principle as the right way to go was the following: the Wadden Sea is large enough that if we leave it rather alone and restore it where necessary it is very likely that all naturally occurring species and habitats will occur.

The Guiding Principle's message is limited by the term "as far as possible". A typical example for this limitation is when coastal defence measures – which often restrict natural processes considerably – are needed for reasons of public safety. Also, with quite a fixed border between the land and the Wadden Sea and also at the mouths of many small and large estuaries, it is obvious that important components of natural processes occur on a very limited basis only. However, the term "as far as possible" may also apply to certain exceptions concerning conservation purposes. There seems to be three cases where a more active management would comply with the Guiding Principle:

1. If the underlying assumption that all habitats and species can be conserved or restored under the Guiding Principle was violated and if the active management required for compensation would occur on a local scale only. This could be

the case e.g. with endangered species requiring special protection measures according to the Natura 2000 Directives. An example could be the help for Sandwich tern (*Sterna sandvicensis*), which – because too few islands are left undisturbed as breeding sites – are breeding at so few sites that some species management might be justified.

2. If there is a human impact anyway, then those techniques or measures should be used which support best the natural dynamics. This would then by definition become the „Best Environmental Practise" for the Wadden Sea.
3. If large scale human impacts affect the natural processes to an extent relevant for the overall natural patterns, then the impact of a compensatory active management lowering the overall impact could be acceptable. Possible examples could be related to the fixation of the border to the land or the estuaries, to invasive alien species which were introduced by man, or to the consequences of the accelerated sea level rise.

The national policies in all Wadden Sea countries seem to have incorporated the content of the trilateral Guiding Principle. Examples are the National Parks in Germany: In their aims they are close to following the international definition of such high level nature protection areas, i.e. large undisturbed landscapes where natural processes are allowed to proceed.

Is the Guiding Principle realistic?

However, there are also doubts whether the Guiding Principle provides the right management umbrella:

There are so many impacts such as extractive uses, fisheries, tourism, pollutants, nutrients, alien species, shipping, fixed coastline, devastated estuaries – to mention just a few. And, above all, there is climate change with an accelerated sea level rise, which could have consequences up to destruction of the Wadden Sea. Arguing pessimistically, this seems to make undisturbed natural processes unlikely. Arguing optimistically, just go out in the Wadden Sea and you will see almost undisturbed natural processes in action – far from being perfect, but probably the best we have in Western Europe. Also, the Guiding Principle should be understood both as guideline and a goal, not as a description of the present situation. We certainly have to focus also on how nature could be restored in some areas where natural processes do not prevail at present.

Does the Guiding Principle comply with European rules and regulations?

The Natura 2000 Directives are setting clear goals for species and habitats, but not so obviously for natural processes and beautiful landscapes¹. However, as argued above, priority for natural processes in a very large and rather natural area like the Wadden Sea will usually provide room for all species and habitats to be protected there. In the details of management this can be quite complicated, particularly as several directives apply to the same area and need to be handled in an integrative manner. The idea of a more regional approach provided by a Wadden Sea Management Plan and accepted by the EU could be helpful both for the right decisions in nature conservation and for user interests. However, finding the right balance for this is difficult, as a run for the "lowest protection level" may not be allowed and the conservation standards set by the EU directives must be kept. A solution for a more regional approach might in fact be provided by the Guiding Principle: With the priority of natural dynamics it sets an objective standard which may be violated only in defined cases such as those mentioned above.

Is the Guiding Principle still relevant considering the challenges arising from climate change?

It could be argued that a focus on natural processes in the future seems luxurious when it comes to survival for both people and ecosystems with a changing climate and all its side effects, among them an accelerated sea level rise. However, natural and large ecosystems will in many cases cope best – and with fewest management costs – also with climate change. This might be particularly true in the Wadden Sea: Even the adaptation to the coming sea level might work best if it is based on measures using natural processes to the largest possible extent, e.g. sand nourishments at the sandy islands. Beside this, it is also quite probable that the generations to come also would like to see nature at its most beautiful. We should keep this option for them.

4. Recommendations

This is not a list of all recommendations necessary for the protection of the Wadden Sea. It is rather an attempt to highlight the issues which should

be much more in the focus of scientific research if we want to solve the problems that are arising at present or will arise in the foreseeable future.

Recommendation 1: There is a need for more research on how to apply the Guiding Principle

Some very important work areas arise from the Guiding Principle as the management umbrella for the Wadden Sea:

1. There is a lack of research leading to a deeper understanding of natural resilience and of the processes keeping the ecosystem running (and beautiful...).
2. There is a lack of research about the balance between active management on a local scale and when and how it may be required, and the general priority for natural processes.
3. There is a lack of research about how it can be achieved that human uses/impacts exert the lowest possible influence on the natural processes.
4. There is a lack of research supporting decisions on when active management on a larger scale might be required/justified, mainly with respect to compensation of large anthropogenic impacts.

Recommendation 2: There is a need for more research on how to adapt management to the challenges arising from invasive alien species

It is difficult in these days to visit the Wadden Sea without immediately being confronted with alien species, the most prominent example being the Pacific oyster. It is becoming clearer and clearer that the problems arising from this have been strongly underestimated in the past. Today the conflict with conservation goals is obvious, as the species composition is about to move in a direction similar to that occurring elsewhere in the world and thus to become less unique. Invasive alien species also bring risks for economics, and the EU has taken up the issue quite high on the agenda².

In principle there are two management measures to be used: Avoiding further import (e.g. with ballast water or for aquaculture) and eliminating invasive alien species at a time when this is still possible. For the Wadden Sea there is a need to study also the second option, e.g. whether it may be possible to eliminate alien plant species from certain islands and thus give natural dune vegetation a chance.

¹ But see also EU parliament resolution on Wilderness in Europe from February 2009 (www.europarl.europa.eu/oeil/FindByProcnum.do?lang=en&procnum=INI/2008/2210), which support Europe's last wilderness areas and calls both for coherence and for a special role and extra protection for wilderness zones inside Natura 2000 areas.

² See http://ec.europa.eu/environment/nature/invasivealien/index_en.htm

Recommendation 3: There is a need for more research on how to adapt management to the challenges arising from sea level rise

Tidal flats, saltmarshes and islands are threatened by erosion in a number of tidal basins where the natural speed of sedimentation cannot cope with the speed of sea level rise (CPSL 2001). If we do not want to lose the Wadden Sea due to a man-made accelerated sea level rise, we need to support an adaptation to a much higher sea level. Unlike the decisions required for climate protection, there might still be some time remaining for decisions on this adaptation – but early preparation may be cheaper and more successful.

The need for adaptation should already be reflected in the next Wadden Sea Plan targets: The size of saltmarshes, the tidal area, dunes and beaches should remain on the level of today, which should be defined as a reference level. It is important to set such an ambitious target, knowing that it will not be easy to achieve under the conditions of an accelerated sea level rise. It actually may imply active management of both the nature and of human behaviour to compensate for this enormous human impact:

- Using natural dynamics as much as possible to encourage the „Growing with the Sea“ (e.g. WWF 1996, Reise 2006).
- Import of sand from the North Sea into the system (e.g. Reise & Lackschewitz 2003, Reise 2007).
- Softening the border between land and sea (e.g. allowing sedimentation in low lying marshland, in some places – particularly in estuaries – possibly moving the border inland).
- Changing the way we build houses in unsafe areas, and also the places where houses are built.

There is a lot of research required concerning these issues, including large experiments and pilot projects on new and nature friendly methods. Actually, research will not be enough. It will be just as important that the objectives for coastal defence become broader: Both the safety of people and their property, and the care for the Wadden Sea nature and landscape must become the joint focus, resulting in an alliance between coastal engineering and nature conservation.

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