Commissie voor de milieueffectrapportage

SEA and water management

Guidance document on SEA for Watershed Management Planning in Macedonia

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Pre-amble

This document intends to provide generic guidance for SEA for water management planning in Macedonia. It presents practical insights on this topic as put together by the Netherlands Commission for Environmental Assessment in the course of 2010 and 2011. The guidance cannot be taken as legal advice nor should it substitute case specific advice by the relevant Macedonian authorities. Note that there is also guidance on "Integrated River Basin Management Planning" prepared by the UNDP/GEF Project: Integrated Ecosystem Management in the Prespa Lakes Basin.

This guidance has been developed in the course of a co-operation project on Strategic Environmental Assessment between the Macedonian Ministry for Environmental protection and Physical Planning and the Netherlands Commission for Environmental Assessment. The co-operation was funded by the Dutch Ministry for Infrastructure and Environment, and administered by Agentschap NL, the Agency for the Dutch Ministry of Economic Affairs, Agriculture and Innovation.

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1 General introduction

1.1 Introduction on this document

This document presents practical guidance on how to carry out strategic environmental assessment (SEA) of Macedonian water(shed) management planning[1]. The document describes the following key steps in the SEA-process:

1. Setting the context
2. Scoping stage
3. Assessment stage
4. Participation and consultation

The next chapters describe generic guidance and points of attention for water(shed) management planning specifically (in colored frames). The *Prespa Lake Watershed Management Plan* developed in 2010-2011 is often used as an example (in colored boxes), as this has been a benchmark SEA for Macedonia practice.

1.2 Planning- and SEA-process

Table 1: Links between planning process and SEA process (with reference to relevant sections in guidance)

Planning process	SEA process	Consultation
Baseline document	Setting the context for the SEA ▪ identify framework (2.1) ▪ baseline and trends (2.2) ▪ problem definition (2.3)	Consultation on information (sources, uncertainties)
Scoping document	Scoping stage ▪ plan objectives (3.1) ▪ assessment framework (3.2) ▪ alternatives (3.3)	Consultation on scoping (issues and options to be covered in SEA)
	Assessment stage ▪ effects (4.1, 4.2) ▪ mitigation (4.3)	Consultation on assessment criteria and mitigation measures
Draft plan	Draft SEA report	Review and consultation on draft SEA and draft plan
Final plan	Final SEA	
Implement plan	Monitoring	

[1] Preparation of Watershed Management Plans or River Basin Management Plans (RBMP's) is a requirement of the Water Framework Directive (WFD), see paragraph 2.1.1. This means the plan should at least meet with the objectives of the WFD. However, a water management plan can have a broader focus than this. This guidance will address possibilities for this. That is why this guidance will refer to "Water management plans" rather than RBMP's.

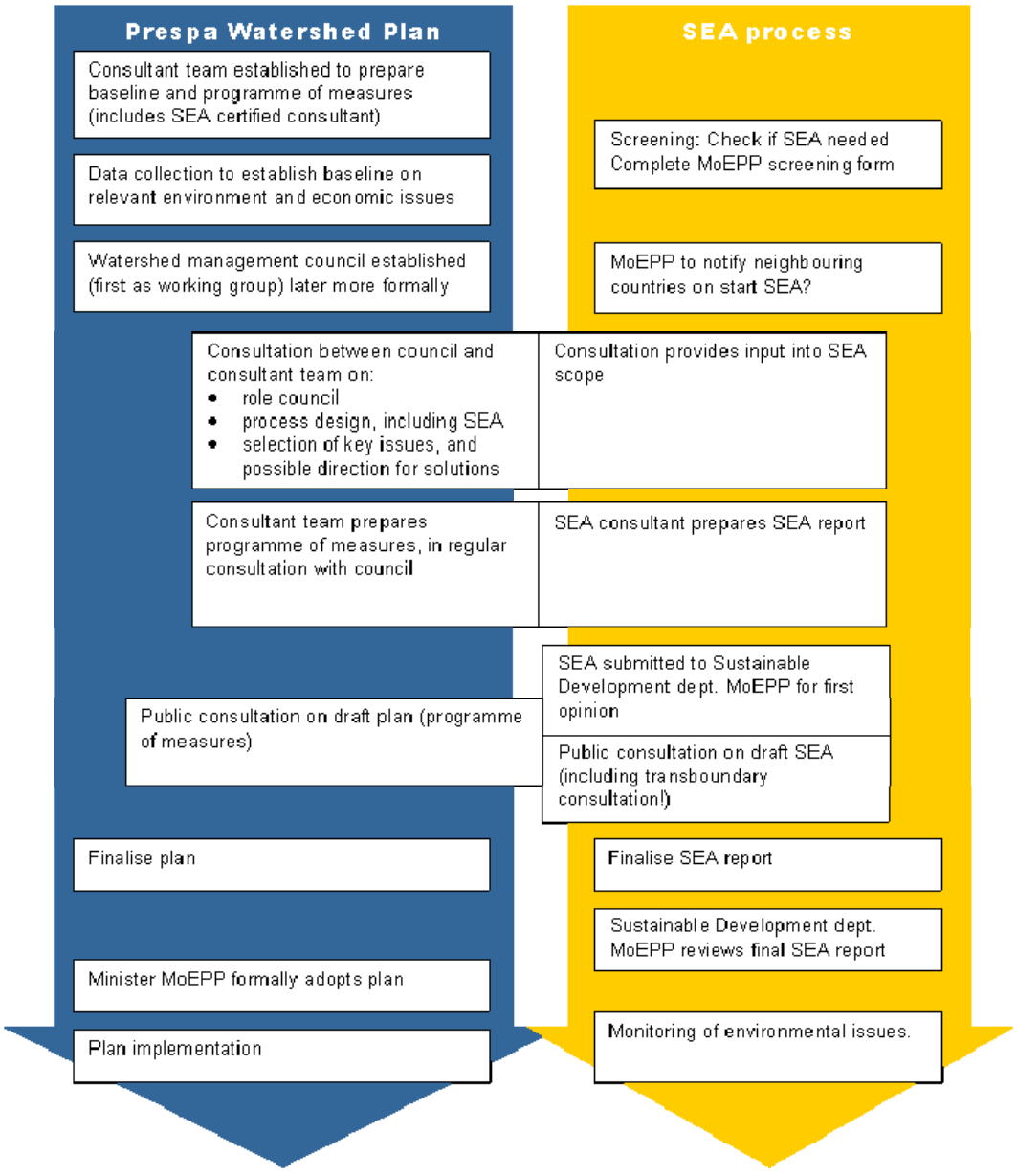
SEA practice has shown SEA to be most effective if it is fully integrated into the plan-making process. SEA is also more efficient when integrated, since several of the planning process and SEA activities overlap and interact. Collecting baseline information, for example, informs both the SEA and plan development. Similarly, scoping of the environmental effects is likely to influence the generation of plan alternatives in the planning process. Table 1 shows the relationships between the SEA and the planning process. Table 1 concentrates on the key activities in both planning and SEA. However, it is also important to bear in mind that there are certain *procedural* requirements for both planning and SEA that have to be met, according to Macedonian regulation. For instance, the Macedonian SEA regulation requires a formal screening decision to be made, on whether or not an SEA is required for a specific plan or programme. A screening form has been developed for this purpose. More information on the regulatory requirements can be found on the SEA portal (www.sea-info.mk) of the Ministry of Environment and Physical Planning (MoEPP).

To achieve optimal integration of the SEA and plan processes, SEA should be started as soon as a new or revised plan is first considered, and should provide inputs at each stage of planning. It is also considered good practice to involve your decision-makers and stakeholders in the process as much as possible. Integration of SEA and planning is complex, however. SEA generates information that influences the planning process. During plan development new ideas continually emerge and ideas are being discarded and the SEA procedure should respond to these developments. Maintaining control of the developments in both the SEA and planning process, and ensuring that both processes use the same designs, plans, data, etc. is one of the biggest challenges of those responsible for the management of the plan development and SEA.

Workshop on the Prespa Watershed Management Plan and SEA, 2010

Example from the Prespa Lake Watershed Management Plan and SEA

In the early stages of the planning process, the Prespa SEA team, together with MoEPP SEA Staff, sat down to map out the steps in the planning and SEA processes. The resulting diagram helped to clarify how the different plan and SEA activities, as well as the procedural requirements, could best be co-ordinated.



2 Setting the context for the SEA

The purpose of SEA is to help (improve) policy making and decision making, by making environmental issues/effects clear. Key issues for the plan and SEA are **objectives** (what goals should be achieved with the plan) and **alternatives** (what are the possible solutions for achieving the objectives). The objectives and alternatives for the plan depend on the context of that plan:

- the legal and political 'conditions' for the plan;
- understanding the current and future situation, which will show the problems that the specific plan has to deal with.

The context of the plan determines the scope of the SEA: which issues are important, which objectives are realistic, which possible solutions the plan could provide and what information is needed to make the necessary choices (see Chapter 3).

2.1 Identifying the framework for the SEA

The plan may be influenced in various ways by other plans or programmes, or by external environmental protection objectives such as those laid down in policies or legislation. Knowing these relationships makes it possible to take advantage of potential synergies and to deal with any inconsistencies and constraints.

Examples which can be relevant for water(shed) management plans:

- European Directives, including the Habitats, Birds, Nitrates, **Water Framework Directive** and Waste Framework Directive
- National and transboundary policies and strategies on SEA, sustainable development, biodiversity, climate change etc
- Strategies and objectives for protected areas and nature reserves within the area that is influenced by the plan
- Land use or spatial plans for areas affected by the plan, at different levels (regional, local)
- Plans for specific sectors of the physical environment or types of activities (regional economic strategy, waste management plans, etc.)

What to do at this stage:

- **Identify all policies, legislation and other plans and programmes which may influence the water(shed) management plan. If the context is complex, it can be helpful to develop a table, matrix or scheme that represents relationships between policies, plans etc.**
- **Analyze the consequences of these for the water(shed) management plan. Other policies may be dictating certain objectives or limiting the possible solutions.**

The *Draft SEA-report on the Lake Prespa Watershed Management Plan (October 2011)* mentions a list of "preconditions". These are legal, political and economic measures that are planned, or in fact already in force, and are also – according to the authors of the plan and the SEA – necessary to address some of the key environmental

problems in the area. However, not all of these preconditions are within the competence of the plan, which means that lack of implementation or enforcement of such measures lies outside the influence of the Prespa Lake Watershed Management Plan itself. Moreover, the SEA team cannot easily address this in the SEA, since it might suggest problems in the functioning of certain government bodies, which is a sensitive issue. The SEA can, of course, present prognoses for trends in environmental issues, and can also point out that, despite the fact that measures have been adopted and are supposed to be carried out, the trends show certain environmental qualities getting worse. This topic can then be picked up in consultations and by decision-makers, who may request that the SEA also develops recommendations for improving the institutional setting of the plan. Another possibility is to develop different scenarios for the implementation of existing measures as part of the business-as-usual description of the plan area (see Chapter 3).

2.1.1 The Water Framework Directive

The implementation of the European Water Framework Directive (WFD) is often the most prominent reason to establish a Water management plan. The WFD requires the establishment of river basin districts, each of which must produce a River basin management plan (RBMP). The key aims of the WFD are:

- to extend the scope of water protection to all surface and groundwater
- to achieve 'good status' (as defined by the WFD) for most of Europe's waters by 2015
- to develop a combined approach of emission limit values and quality standards to manage water quality and quantity
- to facilitate the efficient economic valuation of water resources
- to enhance levels of consultation and public participation during water management.

There are different linkages between the WFD and the SEA Directive. The RBMP must identify the river basin's key characteristics, review impact of human activity on the status of water and estimate the effects of existing legislation on meeting the WFD's objectives. The SEA Directive states that these type of plans fall within the remit of the SEA Directive and should therefore be subject to an assessment. Each of the next procedures are requirements of both Directives, and must therefore be addressed in each case:

- collection of baseline data
- assessment of alternatives and options
- assessment of policies
- suggestion of mitigation measures
- development of monitoring procedures
- development of consultation and public participation procedures.

These linkages imply that a lot of data and information that is needed for the RBMP will also be needed for the SEA-report and vice versa. To avoid unnecessary duplication of effort, it is important to coordinate the collection of data and information. Note that there is also Macedonian guidance on "Integrated River Basin Management Planning" prepared by the UNDP/GEF Project: Integrated Ecosystem Management in the Prespa Lakes Basin.

2.2 Baseline information

To identify the environmental issues and trends that characterise the areas affected by the plan, sufficient information needs to be collected. The baseline and an indication of current trends will provide the information that is needed to:

- identify *problems* (which are relevant for the plan) and likely future development of those problems (see 2.3);

- establish the *reference situation* which will be used to compare alternatives on the level of achievement of objectives and environmental impact (see Chapter 4).

When collecting baseline information it is important that:

- the information is relevant and appropriate to the spatial scale of the plan;
- the information is:
    - sufficient to identify the (key) environmental issues for the plan;
    - focused on aspects on which the plan may have significant effect;
- the information is relevant to the objectives and indicators of the SEA (see Chapter 3).

2.2.1 Sources of information

There are many sources of environmental information on (inter)national, regional and local scale. Sources of information include:

- Information included in (preparation for) other strategies, plans or programmes;
- Service providers (e.g. Consultation Bodies, primary care trusts etc.), who may be able to provide environmental data as well as technical advice and information;
- Other consultees, including representative bodies and members of the public, who often have a wealth of knowledge and understanding of the strategy or plan area, e.g. local conservation groups.

It is important to explore all avenues before deciding that new information needs to be collected. On 17th/18th November 2010 the *Prespa Lake Watershed Management Council* was installed. The phase of *identifying major issues of the watershed management plan* had already been finished, which means that (most of the) baseline data had already been collected. The members of the council can be an important source of information, which in this case had not yet been taken into account.

What to do at this stage:

- **Together with stakeholders identify the information that needs to be collected and the possible sources of information.**
- **Link the collection of information to objectives and indicators (see Chapter 3).**

2.2.2 Uncertainties and gaps in information

Usually not all information that is needed is available immediately. This doesn't have to be a problem, because much information can be collected during the planning process. Furthermore: the choice of objectives and alternatives determine whether more information is needed, what kind of information and at what level of detail.

In case of gaps or uncertainties in the information, choices will need to be made on whether to avoid using the information, make use of it with an explanation of its limitations, or collect further information to remove uncertainty. This choice will depend on the nature and the extent of the uncertainties.

In the case of watershed management planning uncertainties may for instance be:

- current state and trends in water quality and water quantity of both surface water and groundwater bodies (lack of monitoring data)
- sources of pollution (unknown point sources, extent of diffuse pollution, polluted sediment)

- effects from pollutants in the water on nature, fisheries etcetera (which mechanisms are relevant?)

During the presentation of the *Phase II Report on the Prespa Lake Watershed Management Plan (October 2010)* it became clear that there were certain gaps in information, especially on the sources of pollution in Greece and Albania. Furthermore some results could not be explained because *mechanisms* are unclear (for instance: the very low pH-value in Prespa Lake). These uncertainties made it difficult to define the exact problems and causes for the problems, and can make it harder to reach consensus with members of the council on the measures to be taken. IN December 2010 the Prepar team prepared a "gap analysis" , which provided more information on the uncertainties, so the causes for problems and possible solutions became more clear.

If the uncertainties are considerable, the effectiveness of measures can not be predicted accurately. This means it is difficult to choose between possible measures and also to gain support for these measures. Additional information may need to be collected. However: information collection needs to focus on issues and scales relevant to the plan in question, to avoid the preparation of a generalised 'State of the Environment' report, which is not specifically targeted to the plan. Also, consider ways of improving the availability of information that can be included in the monitoring work once the plan or programme is being implemented.

What to do in this stage:

- **Discuss the uncertainties with stakeholders and agree on the way uncertainties are dealt with: collect more information or accept the limitations of the current information.**
- **In case of uncertainties, use scenario's or ranges which describe the boundaries of the current or future state or development. These ranges can be taken into account in considering the effects and choice of measures (see 4.5).**

2.2.3 Trends

Often available environmental information will record the state of the environment at a point or points in time, providing a historic record or a snapshot. According to the SEA-directive it is necessary to examine likely future trends under a 'no plan' or 'business as usual' scenario. This is the current situation, including autonomous development of activities within the area. "Autonomous development" means: the future development of the environment without implementing the plan (or any of the alternatives). Only current activities or activities on which a (formal) decision has been made should be taken into account. In case of (large) uncertainties in future developments, it is again advisable to use scenarios or ranges of developments.

The trend analysis can help to highlight existing and potential future environmental problems. The reference situation will be used to compare the alternatives in the SEA (see Chapter 4).

The *Phase II Report on the Prespa Lake Watershed Management Plan (October 2010)* contains information on current land use in the area. It is also important to consider what future developments of land use can be expected. 5% of the total area is used for apple growing, in some (sub) catchment areas this percentage is much higher. Will these percentages increase or decrease? 41% of the total area is "unused". What will happen to these unused areas in the future? Is increase of housing or tourism to be expected? How will these trends affect the environment?

2.3 Problem analysis and definition

Baseline information and trend analysis provide the information that is needed to identify problems and objectives. Analyzing and defining problems is not relevant in every case. Some plans are not initiated to solve problems, but to develop activities to achieve specific ambitions (for economic growth, housing, recreation facilities etc). For a watershed management plan, however, objectives will (at least partly) be derived from a problem analysis. The water management plan should contain measures to improve or maintain surface- and groundwater quality and/or quantity in a way that problems with these issues are solved. The SEA helps to make the right choices, that is the "best strategies and measures" according to selected criteria.

For the Water management plan relevant problems may be:

- Quality of surface water
- Quantity of surface water, including water safety, flooding and water shortage
- Quality and quantity of groundwater
- Indirect development associated with water quality or quantity, for example, in nature conservation, fisheries, recreation, public health and other uses of water (drinking water, agriculture, industry etc)

The *Phase II Report on the Prespa Lake Watershed Management Plan (October 2010)* describes the main problems for the Prespa Lake watershed and the main causes of these problems:

Main problems		Main causes
Water quality: Prespa Lake and most other water bodies (rivers) don't meet the WFD-criteria	▪ high nutrient concentrations (N, PO4, SO4) ▪ heavy metals in rivers (Mn, Fe, Al) and in Prespa Lake (Zn, Cu and toxic metals like Hg) ▪ priority substances (pesticides) ▪ ecological status partly moderate/poor/bad	Point sources: ▪ domestic wastewater ▪ industrial pollution (poultry enterprise, metal processing, food processing, etc) Diffuse sources: ▪ fertilizers (no efficient techniques) ▪ pesticides (preparation, application, washing, waste dump) ▪ organic waste (apples, pesticide package)
Groundwater quality	contamination with pesticides and bacteria	▪ pesticides from landfill ▪ large amount of extraction wells
Water quantity	Level of Prespa Lake has dropped significantly in the last 25 years	▪ karstic outflow ▪ evaporation ▪ water extraction for irrigation and water supply

This analysis of problems and causes forms an important basis for setting objectives and indicators and selecting measures/alternatives. However, the **indirect effects** of water quality and quantity on nature (different protected areas and nature reserves surrounding the lake), fisheries, public health etc have not been fully identified yet. This can be important, because these indirect effects can determine the extent of the problems and the urgency of the need to solve them. Priorities can be based on questions like:

- Is pollution causing a risk for public health, through the use of water for drinking water or irrigation?
- Is pollution or a decrease in water level causing irriversable damage to protected areas or to certain habitats or species (fish)?
- Is pollution or water level affecting economic activities like fisheries, tourism or agriculture in the Prespa area or maybe even in the Ohrid area (through karstic outflow)?
- Could the improvement of water quality lead to significant benefits for nature, fisheries, tourism etc?

What to do in this stage:

- Analyze problems that are relevant for the water(shed) management plan and define their urgency;
- Identify the sources and mechanisms which cause these problems and describe uncertainties;
- Discuss the problems, sources and uncertainties with stakeholders and together determine the context of the plan (and the SEA). This is the starting point for the focus of the work at the scoping stage: defining objectives and developing alternatives.

Example from the Netherlands: Room for the Rivers

The river Rhine has a maximum capacity of 15.000 m^3/s at Lobith (the location where the Rhine enters the Netherlands from neighbouring Germany). In the future, higher discharges can be expected, due to climate change. A discharge of 16.000 m^3/s is likely, but future discharges as high as 18.000 m^3/s are possible. The starting point for the SEA for the flood management plan Room for the Rivers was a discharge of 16.000 m^3/s. The alternatives developed had to meet this discharge objective by 2015. However, in the SEA the alternatives were also tested against the long term scenario, with higher discharges: do measures fit into this scenario, in which case they can be seen as "no-regret" measures that help future-proof the region, beyond the plan implementation period?

3 Scoping stage

3.1 Objectives and indicators

An objective is a statement of what is intended, specifying a desired direction of change. There can be two types of objectives:

- The objectives of the plan in question[2]. These are devised to test the effects of the plan and to compare the effects of alternatives.
- External objectives: other objectives to which Responsible Authorities need to have regard independently from the SEA process. They may include environmental protection objectives, but they can also be economic or social. They may also include objectives in neighbouring countries.

Objectives can be expressed in a way that make them measurable (e.g. an objective to 'improve surface water quality' could be expressed as "good water quality status (WFD) for waterbody X in 2015"). The achievement of objectives is normally assessed by using **indicators**.

Objectives can often be derived from environmental protection objectives identified in other plans and programmes or from a review of baseline information and environmental problems (see Chapter 2). The development of SEA objectives and indicators and the collection of baseline information inform each other. As the objectives become clearer, they will help to focus the collection of baseline information, whilst the baseline information helps to identify which SEA objectives are of most concern for a particular plan or programme.

Water management plans objectives will probably be (partly) derived from the WFD. According to the WFD, "reference conditions" on both chemical and ecological water quality have to be identified for each type of water body (including groundwater bodies). These reference conditions will be the long term objectives, but usually they are not realistic objectives for the 6-year plan for each water body. Therefore it is advisable to determine objectives for each 6-year period (derived from the reference conditions), for instance: reaching moderate or good status for specific water bodies and/or for specific criteria.

Even if the WFD- objectives are leading, it is important to keep in mind that they are not the only basis for plan or programme objectives! Achieving the objectives for a Water management plan will depend on different stakeholders: national and local governments, associations of water users and agricultural producers, industries, ngo's etc. **Therefore it is essential to reach agreement with Consultation Bodies and other stakeholders about the objectives (including the indicators) and priorities for the watershed management plan at an early stage in the SEA.**

[2] Government policies and guidance increasingly require these to be based on sustainability considerations, and the development of SEA objectives may help to promote ideas for making them more environmentally friendly and sustainable.

Examples of objectives and indicators for watermanagement plans can be:

Objective	Indicators
% of water bodies with good ecological status in 2015	▪ algae ▪ zoobenthos
% of water bodies with good chemical status in 2015	▪ Nutrients ▪ Heavy metals ▪ Priority subtances
Conservation and development of protected habitats	▪ improvement of water quality (expert judgement) ▪ area of new or improved habitats (hectares)

At this stage it is important:

- **to discuss the proposed objectives with stakeholders, determine if there should be any other objectives, and reach consensus over shared objectives and priorities (rough ranking of objectives or highlighting the most important ones);**
- **to make objectives and indicators measurable (if possible), so the level of achievement of objectives of the alternatives can be assessed as part of the SEA.**

3.2 Defining the assessment framework

Comparing plan or programme alternatives by assessing their effects is central to an SEA. For this an "assessment framework" is needed: which (environmental) issues and criteria are relevant and which indicators can be used to assess the effects against those criteria. To understand the results of the assessment it is necessary to explain in the SEA-report the issues that were considered and the criteria and indicators that have been used to "score" alternatives on those issues.

Scoping should ensure that only significant environmental impacts will be extensively investigated in the SEA report. Those responsible for scoping often find difficulties in defining what is "significant". A useful simple check is to ask whether the effect is one that can be considered to have an influence on the plan. The following list of questions may be helpful.

- Will there be a large change in environmental conditions?
- Will new features be out-of-scale with the existing environment?
- Will the effect be unusual in the area or particularly complex?
- Will the effect extend over a large area?
- Will there be any potential for transboundary impact?
- Will many people be affected?
- Will many receptors of different types (fauna and flora, businesses, facilities) be affected?
- Will valuable or scarce features or resources be affected?
- Is there a risk that environmental standards will be breached?
- Is there a risk that protected sites, areas, features will be affected?
- Is there a high probability of the effect occurring?
- Will the effect continue for a long time?
- Will the effect be permanent rather than temporary?
- Will the impact be continuous rather than intermittent?
- If it is intermittent will it be frequent rather than rare?
- Will the impact be irreversible?
- Will it be difficult to avoid, or reduce or repair or compensate for the effect?

In case of a water(shed) management plan, the purpose of the plan will usually be focused on positive environmental effects, associated with improvement of water quality and quantity. The SEA should provide information on optimizing those positive effects (achievement of targets) and preventing negative effects.

In establishing the assessment framework the following questions can be helpful:

- Which environmental issues are relevant: nature, landscape, cultural history, energy consumption, public health, ….
- Which other (social or economical) issues are relevant and should be part of the SEA: for example, effect on different functions (fisheries, agriculture, industry, tourism), ….
- Which (measurable) indicators can be used? Criteria and level of detail could depend on:
  - difference between alternatives (on which effects are alternatives distinctive)
  - effects which could present important risks (show stoppers or deal breakers)
  - level of detail of the plan: what is the level of decision making? Will measures be elaborated in later stages?

  which determine the assessment methods)
- Which (measurable) indicators will be used to determine the **achievement of objectives** (see 3.1), for instance:
  - improvement of chemical water quality (different parameters) per water body
  - improvement of ecological water quality (different parameters) per water body
  - effects on water balance (outflow)

The indicators that are chosen to compare alternatives on environmental effects and on the achievement of objectives will determine the assessment methods. Sometimes expert judgement is enough to "score" alternatives, sometimes quantitative methods (modelling) will be necessary. See Chapter 4.

Table 2: Example of assessment framework: Room for the Rivers "Munnikenland" (extract), 2008

Theme	Criteria	Indicator
Hydrology	▪ decrease in waterlevel (objective!) ▪ accretion in the channel ▪ safety for shipping ▪ future proof	▪ qualitative, based on modelling (cm) ▪ best professional judgement (in later stage: modelling) ▪ expert judgement on cross currents ▪ expert judgement (flexibility, room for other functions
Soil	▪ change of surface ▪ amount of soil to be removed	▪ area polluted soil after redevelopment (m^2/ quality class) ▪ quantities of polluted soil (m^3)
Nature	▪ restoration of processes and cohesion ▪ loss, conservation or development of protected habitats ▪ disturbance of fauna	▪ restoration of hydro- and morphodynamics ▪ qualitative, based on area (hectares) and (inter)national qualifications ▪ noise (dB(A)) and visual (qualitative)

Table 3: Example of assessment framework: Provincial Waterplan "Zuid-Holland" (2009)		
Principle of sustainable development	**Theme**	**Aspect**
Planet (ecological)	Soil	▪ Soil subsidence ▪ Soil quality
	Water	▪ Surface water o quality (chemical, ecological, salinification, warming) o quantity (shortage, room for water storage) o safety (risk of flooding) ▪ Ground water o quality o quantity (abstraction, water logging)
	Nature	▪ Protected areas ▪ Special areas with nature depending on water ▪ Biodiversity
People (social cultural)	Cultural heritage	▪ Landscape (urban, rural) ▪ Cultural heritage ▪ Archaeology
Profit (economical)	Functions	▪ Impact on recreation/tourism ▪ Impact on (drinking)water supply ▪ Impact on agriculture ▪ Impact on greenhouse cultivation ▪ Impact on buildings ▪ Impact on infrastructure

The tables above show examples of an assessment framework as used in different SEA-reports in the Netherlands. The first example (Room for the Rivers Munnikenland) comes from a combined EIA/SEA-report on a local measure (washland excavation and dyke relocation) in the Rhine river basin. For this plan relatively detailed criteria and indicators were necessary, to make the differences between alternatives clear. The second example (Provincial Waterplan "Zuid-Holland") comes from a strategic water management plan covering all aspects of watermanagement in a provincial area. Because the level of choices to be made in this plan was more strategic, indicators for assessing the effects could be more general, and defined in less detail.

3.3 Measures and alternatives

As mentioned earlier, comparing alternatives is a key to an SEA. The idea of alternatives is that there are different ways of achieving the plans objectives, and the SEA should support both public debate and decision-making on these different options. The alternatives put forward should be reasonable, realistic, relevant and in line with the requirements of national policies and environmental standards. Alternatives should also be sufficiently distinct in order to highlight the different environmental implications of each, so that meaningful comparisons can be made at a strategic level.

If problems and objectives are identified, the next step will be a broad exploration of possible solutions or strategies. Based on different criteria, the list of possibilities can be reduced to a selection of "realistic"

solutions. It is essential to describe in the SEA report the process which has lead to the selection of possible solutions and to explain the choices that have been made along the way:

- Which options/measures were left out of the list and why?
- Who has formulated the measures and who else has been involved in this process?
- What considerations were used in choosing the measure itself, the scope or size of the measure etc.?
- Are all existing policies, programmes and measures that are already planned, on (inter)national, regional and local scale, included in the process of defining solutions?

The effects of alternatives are usually compared to the *reference situation*, also known as 'no plan or programme' or 'business as usual' scenario (see 2.2.3). The comparison of alternatives to the reference situation gives a clear insight of environmental impact and level of achievement of objectives.

In the *Draft SEA on the Lake Prespa Watershed Management Plan (October 2011)* alternatives were compared to a so called "zero-alternative", which in this case was defined as the situation in which no action would be taken at all. However, some measures will have to be taken apart from the WMP, because they are obligatory by law (for instance in protected or highly sensitive areas). These measures should be part of the business as usual scenario. In the Water Framework Directive (WFD) this scenario is referred to as the "baseline".

In the annexes of the Prespa report, the zero alternative is presented as one of the alternatives, which is compared to the current situation and both alternatives 1 and 2. This means that the **current situation is in fact used as reference situation**. Comparing alternatives to the zero alternative and the current situation can be useful, as it clearly shows the need for action. However, the alternatives should also be compared to the reference situation as described above.

It is important to involve stakeholders in the generation and assessment of both strategic and more detailed alternatives. Demonstrating that there are choices to be made is an effective way of engaging stakeholders in the process. The alternatives considered throughout the process must be documented and reasons given on why they are or are not taken forward.

To keep the big issues clear, alternatives considered at this early stage need not be elaborated in too much detail. Only the main differences between the alternatives need to be considered and documented.

In the process of generating alternatives for an assessment, it can be helpful to discuss:

- Are the alternatives distinct and clearly presented?
- Are alternatives easily comparable?
- Are they likely to have any adverse effects? Can these be prevented, reduced or offset?
- Can positive effects be enhanced?
- Can any of the effects be quantified in a meaningful way?
- Who are likely to be the 'winners', and 'losers' for each alternative (e.g. rural versus urban dwellers; future versus current generations, etc.)?
- Are any effects of the alternatives unclear or ambiguous? Is any further analysis appropriate?
- Are the effects likely to be variable over the short, medium and long-term?

For a watershed management plan alternatives will often consist of different measures to reach the objectives of the plan. For each objective, different measures can be identified. It is advisable to define different strategies, which lead to strategic packages of measures. The measures will have to be taken by (or in consultation with) different stakeholders. **Therefore it is essential to involve stakeholders in the generation of alternatives**.

When composing alternatives it is important to link measures with gaps in information and uncertainties (see 2.2). If sources of pollution or mechanisms are partly unclear, the effects of measures will be uncertain as well.

Alternatives can be/consist of:

- different kinds of measures (which measures will/won't be taken; measures aiming at sources or effects)
- different locations (concentrating activities on certain locations, for instance agricultural, industrial or touristic activities, fisheries, emission points for waste water)
- different scale or size of measures (which % of companies can reduce use of pesticides by which %?)
- different phasing of measures (this could mean going for "quick wins" first: which measures are cheap, easy to establish, will have support from all or most of the stakeholders, **and** will have the most positive effects, permanent effects, so can be seen as 'no-regret-options')

Combinations of alternatives can be strategic packages consisting of a combination of measures with the same objectives. Alternative packages could have:

- different focus, for instance "maximum nature protection", "best option for public health", "minimum costs", etc
- different ambitions, for instance: reaching "good water quality" level for water body "X" in 2016 or 2020; 10% or 20% reduction of water demand, 10% or 20% reduction of priority substances load etc.

Example of alternative development: Solway Tweed RBMP (UK)

The SEA of the Solway Tweed RBMP considered the effects of the following groups of measures (see table below):

- Reference/Baseline – existing measures, planned changes (e.g. agreed investments programmes) and changes in-the-pipeline (where policy is in place for other drivers that should support implementation of the first RBMP);
- Draft RBMP – includes priority actions with a reasonable degree of certainty of being implemented in the first round of river management. It assumes there is no need for significant new mandates or funding mechanisms outside those already in place or in the process of being introduced; and
- Continued Improvement – includes all the measures in the Draft RBMP, plus potential additional measures that are worthwhile exploring in terms of local outcomes for the District. These additional measures have the potential to move the water environment towards the desired objectives even if there is some uncertainty about their implementation

The Reference/Baseline case contains the measures that are existing or planned for reasons unrelated to the WFD. The measures in the other two options act together with the Reference/Baseline measures. Thus, the measures in the Draft RBMP can be added to the Reference/Baseline measures while the measures in the Continued Improvement option are in turn added to those of the Draft RBMP and the Reference/Baseline measures.

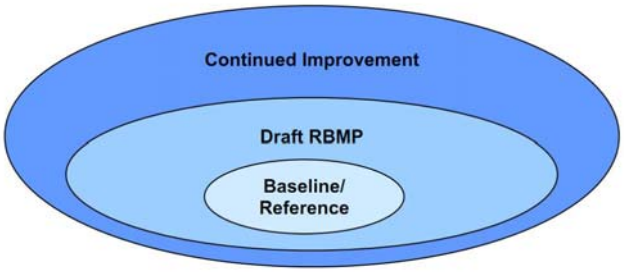
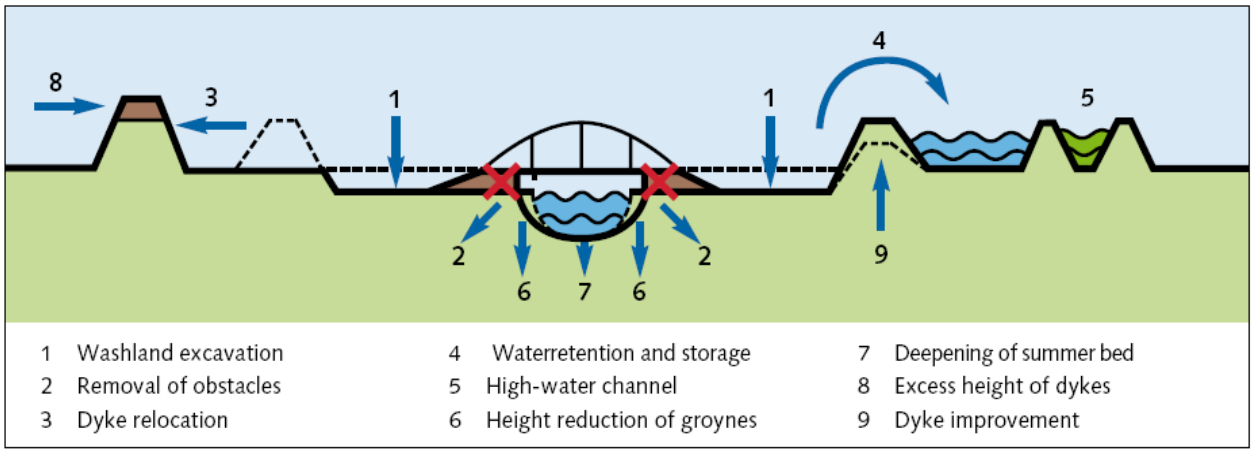


Table 6 Number of national measures assessed for the Solway Tweed draft RBMP listed by pressure and by option

Pressure	Reference/Baseline	Draft RBMP	Continued Improvement
Diffuse pollution	44	6	1
Point source pollution	42	12	1
Abstraction and flow regulation	17	20	0
Changes to morphology	25	8	8
Invasive non-native species	6	6	3
Total	**136**	**52**	**13**

Example of alternative development: Room for the Rivers (Netherlands)

The objectives for the of Room for the rivers flood management plan were: higher outlet capacity, providing extra space for future higher discharges and improving environmental (spatial) quality. First, different types of measures were established (see figure). Next, alternative strategies were defined with a different focus. Alternative 1 focusing mainly on technical measures, alternative 2 focusing more on the combination of safety and environmental quality (see below). (For more information see: SEA for flood protection in The Netherlands – A Case Study, In views and Experiences 2009, on www.eia.nl)



Alternative 1 (extract of measures)

- 13 washland excavations
- 4 obstacle removements
- 4 dyke reallocations
- 82 km deepening of summer bed
- 194 km of dyke improvement

Alternative 2(extract of measures)

- 34 washland excavations
- 16 obstacle removements
- 5 dyke reallocations
- 52 km deepening of summer bed
- 66 km of dyke improvement

What to do in this stage:

- **Identify 'significant' environmental effects and (measurable) indicators, taking different functions and stakeholders in the area into account.**
- **Discuss possible measures and (strategic) alternatives with stakeholders, making clear that choices have to be made based on the assessment of these alternatives. Document the reasons why alternatives will and will not be taken forward.**

In the *Draft SEA on the Lake Prespa Watershed Management Plan (October 2011)* one of the proposed measures is "constructing a dam and reservoir on the Chesinska River". This is a far-reaching measure, which will be dominant in the assessment of effects of the alternative(s) that this measure is part of. This means that:

- it is particularly important to explain the need for this measure and to explain how other options that address the issue of availability of clean water have been taken into account in the process of generating measures;
- it is advisable to distinguish this measure separately, so the need for and impact (both positive and negative) of this measure can be taken into account separately;
- it is important to discuss the location, size and timing of this measure and to identify possible synergetic measures, that may influence the need, size, location, timing (in this SEA or during further plan development or implementation of the plan).

4 Assessment stage

4.1 Assessment of effects

In earlier stages the key environmental impacts for an SEA have already been identified. At the assessment stage the environmental effects of the plan/alternatives are further analysed and evaluated. Where adverse effects seem likely, possibilities for mitigation have to be considered. Prediction of effects involves:

- Identifying the changes to the environmental baseline (reference situation) which are predicted to arise from the plan, and from the plan alternatives.
- Describing these changes in terms of their magnitude, their geographical scale, the time period over which they will occur, whether they are permanent or temporary, positive or negative, probable or improbable, frequent or rare, and whether or not there are cumulative effects (see 4.2)

The range of effects that could be considered is very broad. The SEA should be limited to those effects that are likely and significant, and those effects that are crucial to the public debate and decision-makers. During the scoping stage distinction should have been made between effects that need to be elaborated further, and effects that are expected to be insignificant, and do not need to be addressed at this stage (see 3.2).

A variety of SEA methods are available for the assessment of effects of the plan and its alternatives. Before deciding on a method it is helpful to consider the methods available, and select the methods most suited to the range of effects expected, the plan process and the resources available. It is important to be alert to the resource implications of an over-complex method and the consequent risk of causing delay in the plan preparation. When selecting methods for a strategic assessment, the following criteria are helpful.

SEA methods should be:

- Straight forward;
- Adaptable/flexible, capable of evolving as the planning process unfolds;
- Efficient and economical.

The application of methods in SEA should be:

- **Systematic**, meaning it is thorough and rigorous in its assessment of all aspects of the plan, in an even-handed way;
- Internally **consistent**, there should be strong links between the assessment and the plan process;
- **Objective**, so that bias and subjectivity in the assessment are minimised;
- **Transparent and clearly presented**, so that the users of the assessment can easily understand how the assessment results were arrived at.

Some points of attention on considering the effects of a plan in SEA:

- Where a plan or programme includes proposals for individual projects, these should be assessed in sufficient level to enable significant environmental effects to be broadly predicted. If EIA is needed later for the project, it is likely to be informed by the findings of the SEA, but it will not usually be appropriate or even possible to provide the level of detail needed for EIA in the context of the plan or programme.
- The effects do not always have to be expressed in quantitative terms. Quantification is not always practicable, and qualitative, broad-brush methods can be equally valid for a strategic assessment study. However,

qualitative should not mean "guessed". The assessment conclusions should be supported by evidence, such as the results of studies undertaken, discussions or consultation.

- Effects may be expressed in easily understood terms such as "getting better or worse" or a scale from ++ (very positive) to – – (very negative). But the predictions could also be more detailed and quantitative, e.g. a measurable effect would be: "20% reduction of input of nitrogen"
- When using symbols or other ways of presenting information regarding the likely effects (e.g. positive, negative, uncertain, not significant), always explain and justify the choice of symbol with reference to the baseline situation relevant to the SEA objective.
- Consider whether the effect is likely to be permanent or temporary, and the timescale over which the effect is likely to be observed. The timescales themselves will also vary depending on the type of plan or programme and the alternatives being considered.
- Consider the effects of displacement of environmental problems to other areas as a result of the plan or programme (for instance in the Prespa case: could pollution reach Ohrid Lake through karstic outflow?)
- If there are risks or uncertainties attached to the assessment, these should be clearly stated. If effects are uncertain, it is advisable to work with effect ranges (see 4.5).

In water management planning a lot of information will be derived from the analysis of baseline and trends. The current situation for water quality will usually be known through monitoring. The effects of the plan will not usually be immediately measurable. Therefore the effects should be determined based on expert judgement or modelling. The assessment methods will depend on the indicators which are used and the information that is needed for describing the effects.

Assessment results: Effects on objectives of the plan (example 1)

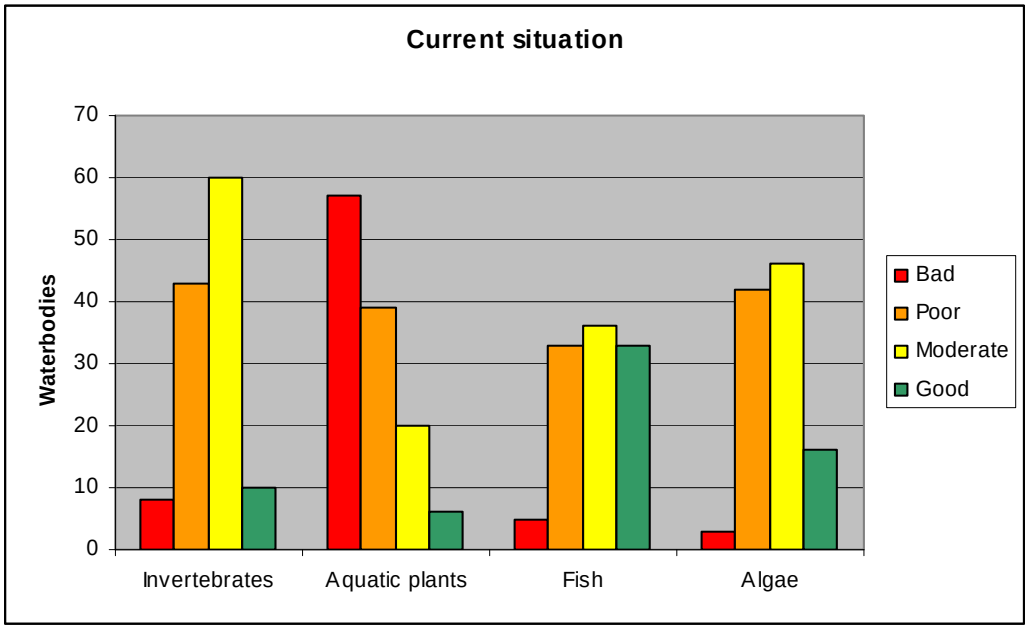
If the objective of the plan is to reach good water quality status (WFD-targets) in all water bodies, the effects of alternatives can be compared on the degree to which they contribute to these objectives per water body, as shown in the table below.

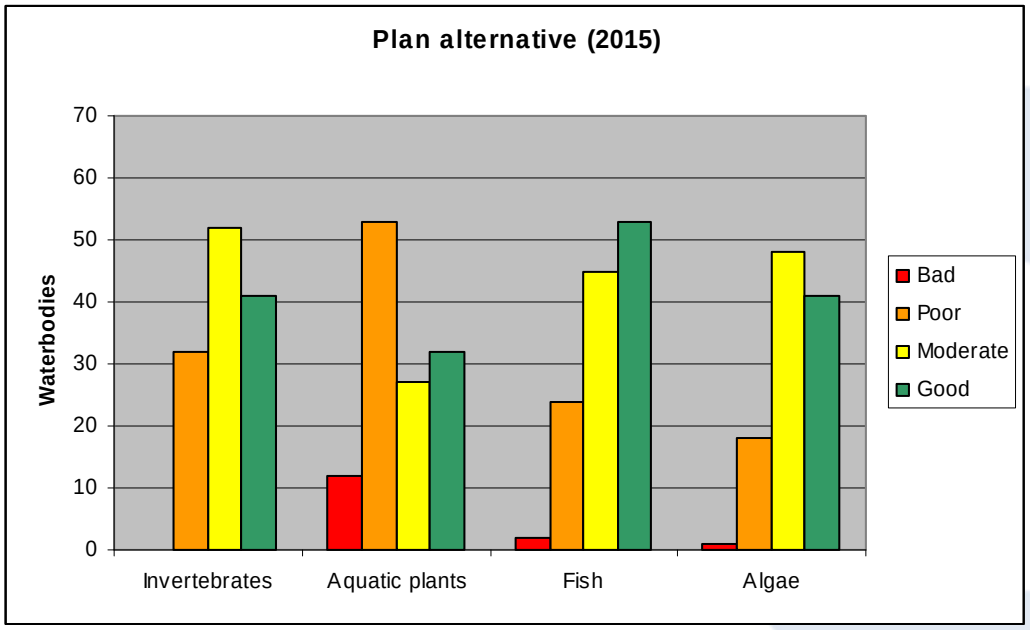
Name Water Body	Objectives (long term)		Current status	Reference situation	Alternative 1		Alternative 2	
	Rivers	HMWB & AWB			Variant a	Variant b	Variant a	Variant b
1	Good		Good	Moderate	Good	Good	Good	Good
2	Good		Bad	Bad	Poor	Poor	Moderate	Poor
3	Good		Poor	Poor	Moderate	Good	Moderate	Good
4	Good		Good	Good	Good	Good	Good	Good
5	Good		Moderate	Good	Good	Good	Good	Good
6	Good		Moderate	Moderate	Moderate	Good	Moderate	Good
7	Good		Moderate	Poor	Moderate	Moderate	Moderate	Good
8	Good		Moderate	Poor	Moderate	Good	Moderate	Good
9		Good potential	Bad	Bad	Poor	Moderate	Moderate	Good

This table gives a quick overview of the results of an assessment, based on expert judgement or modelling different indicators (for ecological and chemical water quality). More detailed tables or others methods of presentation can be used if this is necessary for decision making, for instance if alternatives are only distinct on a more detailed or local level. See next example.

Assessment results: Effects on targets/objectives of the plan (example 2)

For the Regional Watermanagement Plan "Zuid-Holland" the effects of measures for improving water quality were identified based on expert judgement. The SEA showed that the percentage of water bodies for which the WFD-targets will be met is relatively small (< 20%). This could lead to the conclusion that measures are not efficient. However, the WFD applies the principle of "one out, all out", which means the condition of a water body will only be "good" if it meets the target on all parameters. The figures below show that in fact significant improvement on all parameters is accomplished. This illustrates that there are different ways of presenting effects.





4.2 Secondary, cumulative and synergistic effects

Many environmental problems result from the accumulation of multiple small and often indirect effects, rather than a few large and obvious ones. Examples include loss of tranquillity, changes in the landscape, loss of heathland and wetland, and climate change. It is at the SEA level that those effects are most effectively identified and addressed. The SEA Directive requires that the assessment of effects include secondary, cumulative and synergistic effects. Often the term cumulative effects is taken to include secondary and synergistic effects.

- **Secondary or indirect effects** are effects that are not a direct result of the plan, but occur away from the original effect or as a result of a complex pathway.
- **Cumulative effects** arise, for instance, where several developments each have insignificant effects but together have a significant effect; or where several individual effects of the plan have a combined effect.
- **Synergistic effects** interact to produce a total effect greater than the sum of the individual effects. Synergistic effects often happen as habitats, resources or human communities get close to capacity.

4.3 Mitigation of adverse effects

The SEA-directive requires that the SEA Report include a description of measures to prevent, reduce and eliminate as fully as possible any significant adverse effects that implementing the plan is expected to have on the environment. Exploration of such mitigation measures is ongoing throughout the SEA process. Often mitigation options are integral to the development of plan alternatives. These measures can include proactive avoidance of adverse effects as well as actions taken after effects are noticed.

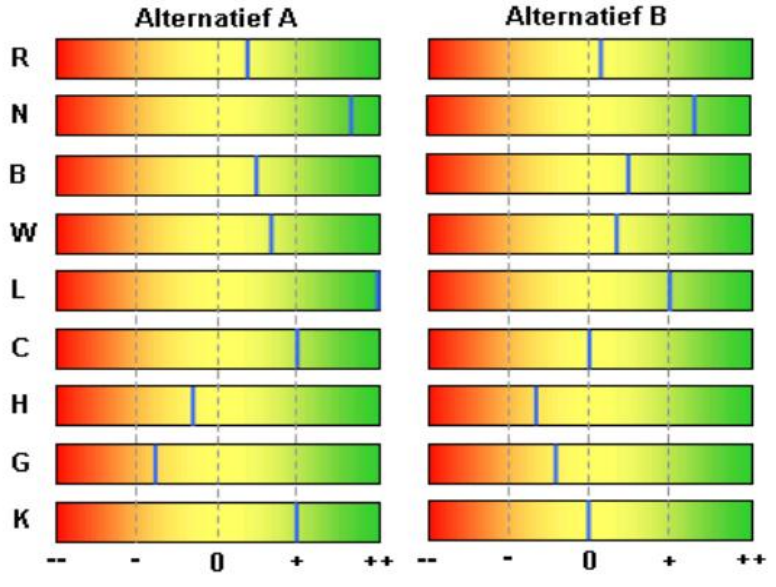
In the case of watershed management plans, measures will usually be focused on positive environmental effects (improving water quality etc). That often means that mitigation of adverse effects is integral to the development of the plan, and not a separate step undertaken later in the SEA process.

4.4 Comparing alternatives

In the SEA report the predicted effects are not merely described, they are also evaluated. It is important for consultation and also for decision-making on the plan, that the report shows which effects will be most serious, and how the effects differ across the alternatives. The environmental objectives that have been defined earlier in the SEA and plan process, provide a useful tool for evaluation of effects and cross-comparison. Each alternative can be **weighed against the objectives** to see whether it does, or does not, contribute to the realisation of the objectives.

There is not one “correct” comparison of effects and alternatives: different comparisons will reveal different aspects, and more than one may be useful. In SEA, **matrices and tables** are commonly used to aid comparisons. As an input to a decision about preferred alternatives, it may be useful to summarise the assessment results for the different alternatives in one table. This can help to identify the most appropriate alternative overall. The *reference situation* should be included in this comparison.

Table 4: Effect scoring, example 1				
Theme	**Criteria**	**Ref**	**Alt. A**	**Alt. B**
Hydrology	decrease in waterlevel (objective=10 cm)	-- (-10 cm)	0 (+0,7 cm)	0 (+2,3 cm)
	accretion in the channel	0	0/-	0/-
	safety for shipping	0	0	0
	future proof	0	++	+
Soil	change of surface	0	+ (17,4 ha)	+ (17,4 ha)
	amount of soil to be removed (m^3)	0	0/- (100.000)	0/- (125.000)
Nature	restoration of processes and cohesion	0	+++	++
	loss, conservation or development of protected habitats	0	++	++
	disturbance of fauna	0	0/-	-

Table 5: Comparing alternatives, example 1	
Criteria	**Overall assessment**
	
Hydrology	
Nature	
Soil	
Water	
Landscape	
Cultural heritage	
Annoyance (noise, airqual.)	
Functions (agriculture)	
Costs	

As mentioned before, it is very important to explain and account for the "scoring" of the alternatives along the selected criteria. This means that a table with comparison results should always be accompanied by a clear explanation of the effects and the differences between the alternatives.

Table 6: Comparing alternatives, example 2				
Theme	Criteria	Ref	Alt. A	Alt. B
Nature	Terrestrial habitats	0	+	-
	Rare plants and species	0	++	0
	Preservation of forest areas	0	+	-
Human beings	Reduction of waste volumes	0	0	0
	Protection of drinking water	0	0	++
	Protection of tourist areas	0	+	-
Cultural heritage	Change in landscape	0	0	--
	Protection of archaeology	0	-	-
Soil	Priority substances	0	0	+

4.5 Gaps in knowledge and uncertainties

If any difficulties have been encountered in the assessment (such as technical deficiencies or lack of know-how), these should be documented in the SEA Report. Being clear about the limitations of the SEA report will improve the credibility of the report. Attempts to reveal such limitations can backfire. People quickly lose trust in the SEA document and the authority responsible for it, when purposefully hidden shortcomings are revealed in the review stage. For the same reasons, **assumptions**, for instance about underlying trends or details of projects to be developed under the plan, should also be clearly stated.

The limitations in the SEA information also need to be clear so that the competent authority can adequately respond to them. A distinction can be made in three different categories of gaps in knowledge:

- Crucial for decision making: a decision can not be made without this knowledge;
- Relevant for decision making: extra investigation, requirements or monitoring actions are needed;
- Not relevant for decision making on this level (the information is not needed at this strategic level and can be collected in later stages).

In case of (significant) uncertainties in effects it is advisable to present in the SEA report:

- ranges in size and seriousness of effects;
- significance of differences between alternatives;
- to what extent the (possible) effects are manageable and/or reversible.

To deal with the uncertainties in decision-making it can be useful to define “no-regret options” and back-up measures that are not taken straight away, but may be deployed if ongoing monitoring shows a decline in environmental quality. When defining such back-up measures, it is important to be clear how and when it is decided that the back-up measure is needed, and who is responsible for taking the measure.

What to do at this stage:

- **Present the results of the assessment to stakeholders, including effects, achievement of objectives, mitigation and gaps in information and uncertainties.**
- **Use figures, matrices and tables to illustrate the composition of alternatives and to aid comparisons. Summarise the assessment results for the different alternatives in one table.**

5 Participation and consultation

Consultation involves communication with the Ministry of Environmental Protection and Physical Planning, relevant institutions, as well as the public. The public is defined as one or more natural or legal persons and their associations, organisations or groups. It includes, but is not limited to, the public affected or likely to be affected by, or having interest in the plan. The public could be represented by individuals, as well as by organisations, such as NGOs and business councils, that stand for certain interests. There are several reasons why it is important that the public be consulted in the SEA process:

- local inhabitants and organisations may provide local expertise and knowledge;
- public participation may help to identify important issues or concerns;
- local inhabitants and interest groups may propose additional alternatives for consideration;
- public participation can help to avoid possible conflicts further down the line;
- public participation ensures openness of the SEA process and plan process, which in turn improves the credibility of SEA decision-making and public support for the plan.

In the Prespa case the *Prespa Lake Watershed Management Council* has been especially established for plan development and implementation. The members of the council represent all important interests related to the plan, such as municipalities, Natural Parks institutions, NGOs, Ministry of Environment And Physical Planning staff, water users (associations) and research/academic institutes.

In case of transboundary plans (plans which might affect other countries or plans in which effects from other countries could be relevant) it is also necessary to consult with neighbouring countries on objectives and alternatives (measures).

Ideally, consultation with the public is not limited to the provision of information by the competent authority, but also gives public parties an opportunity to have an input in the SEA process. Key stages for consultation of stakeholders in the planning and SEA-process are mentioned throughout this guidance document:

- identify the needs for and sources of baseline information (§ 2.1)
- discuss uncertainties in information and the way these are dealt with (§ 2.2)
- discuss problems and causes and determine the context of the plan (§ 2.3)
- reach consensus on objectives, priorities and indicators for measuring the effects of the plan (§ 3.1 and 3.2)
- discuss possible measures and (strategic) alternatives to assess (§ 3.3)
- present the results of the assessment, including effects, achievement of objectives, mitigation and gaps in information and uncertainties (Ch 4).

The last bullet in the series above represents the consultation step that is a regulatory requirement according to the Macedonian SEA procedure. However, it is advisable to go beyond this obligatory consultation, and to consult stakeholders in all of these stages described. This is especially important for gaining support for the plan implementation.

6 Next steps

The next steps in the SEA process are outlined below. For more details other guidance is available (for instance: ODPM publication "A practical guide to the SEA Directive", September 2005).

Preparing SEA-report and draft watershed management plan

The assessment and evaluation of effects is documented in the SEA report. This report should reflect and support the draft plan on which formal public consultation is carried out. While the SEA Report does not need to be issued as a document separate from the draft plan, it must be clearly distinguishable from it.

In deciding the length and the level of detail to be provided in a SEA Report, the competent authority should bear in mind its purpose as a public consultation document. It is important to be selective about the information in the report. Certainly include information that is essential for understanding the SEA process and results that are crucial for the plan itself. Background information – for more "advanced" readers – can be presented in annexes or separate reports. The SEA report is likely to be of interest to a wide variety of readers, including decision-makers, other plan/programme-making authorities, authorities with environmental responsibilities, NGOs, and members of the public. It should be written and prepared with this range of users in mind, and must include a **non-technical summary**.

The non-technical summary is a very important part of the SEA-report, because this is the part that is most often read by the public ánd by decision-makers. Consequently, this summary should be easy to understand for non-experts and should contain the most important information and conclusions from the report, about objectives, alternatives and effects, using clear language and matrices, tables and illustrations to provide a good overview.

Review and consultation on SEA and draft plan

To ensure that the SEA is of good quality, two mechanisms for quality control have been built into the SEA process in Macedonia. The first is review of the SEA report in the public consultation process. Participation provides interested individuals and organisations with an opportunity to scrutinise the SEA information and provide comments. A full draft of the SEA Report has to be made available for consultation at the same time as the draft plan, so that consultation on both documents can be integrated.

The second quality control mechanism is the review by the Department of Sustainable Development of the Ministry of Environment and Physical Planning (MoEP&PP). The SEA report has to be submitted to this department for a "first opinion" at the same time that it is released for public consultation. After consulting the public, the competent authority finalises the draft SEA Report, keeping the departments first opinion in mind, and again submits it to the MoEP&PP for review. The Ministry reviews the SEA with two key questions in mind:

- Is the information in the SEA report sufficient and adequate for decision-making on the plan?
- Was the SEA process followed properly?

Decision making

The EU SEA Directive requires that the information in the SEA Report and the responses to consultation to be taken into account during the preparation of the plan and before the final decision is taken to adopt the plan. The Authority responsible for making the decision on the plan has to publish this decision

according to the Macedonian. With this decision a summary of how the SEA and consultation findings have been taken into account can be published.

Monitoring and evaluation

Monitoring allows the actual significant environmental effects of implementing the plan to be tested against those predicted. It thus helps to ensure that any problems which arise during implementation, whether or not they were foreseen, are identified and future predictions made more accurately. Monitoring can be integral to compiling baseline information for future plans, and to preparing information which will be needed for EIAs of projects. Monitoring and evaluation of progress towards objectives and targets can form a crucial part of planning feedback mechanisms. Feedback from the monitoring process helps to provide more relevant information that can be used to pinpoint specific performance issues and significant effects, and ultimately lead to more informed decision-making.

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