

Partial restoration of tides, Veerse Meer - NL

1. Policy Objective & Theme

- ADAPTATION TO RISK: Managing impacts of climate change and safeguarding resilience of coasts/coastal systems
- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space
- SUSTAINABLE ECONOMIC GROWTH: Balancing economic, social, cultural development whilst enhancing environment

2. Key Approaches

- Integration
- Participation
- Ecosystems based approach
- Technical

3. Experiences that can be exchanged

Large scale technical measures of flood defence can have a profound effect on natural and socio-economic values. With carefully considered management measures, such effects can be largely reversed.

4. Overview of the case

In the southwest Netherlands, a tidal, delta saltwater arm was cut off by human intervention from the sea in 1961 resulting in a brackish water, non-tidal lake. Following decades of ecological and water quality deterioration, efforts have begun, with success, to restore the salt water character of the water body by partially opening one of the dams and altering the water level of the lake in winter to create a limited ebb and flood tide.

5. Context and Objectives

a) Context

The Veerse Meer (or Lake) exists because of the flood defence measures that were taken following the 1953 flooding of the country. The coastline of southwest Netherlands was strengthened and the delta island of North Beveland was “joined” to the southern deltaic arm of Walcheren and South Beveland by dams, cutting off the sea and creating the lake in 1961. It became brackish with no tidal flows and the water level was artificially maintained. In summer, the water level was held 70cm higher than in winter to aid farmers (water drainage). Socio-economic changes occurred with fishing replaced by recreation. The lack of salt and the unnatural water levels effected the water quality adversely and changed the ecosystems: the mudflats and salt marshes dried out, 70 bottom-dwelling species were reduced to 20, fish species were reduced from 35 to 18 whilst bird species increased from 17 to 69. The area is now most known for its recreation although problems remain. The deeper parts of the lake have little or no oxygen in the summer causing death of plants and animals. In the shallow regions in summer, sea lettuce grows in abundance, rots and smells whilst other species regularly cause algal blooms.

The deterioration of the water quality led to a negative spiral with respect to tourism and the economy of the area. In 1989, a report had shown that partially opening one of the dams would be likely to lead to an improvement in the ecology of the lake. This was eventually realised in 2004 when one of the dams was partially opened by a lock to allow brackish water to enter the lake. This had a positive effect on both water quality and nature development. Now, up to 40m³/s water is exchanged on each ebb and flood tide producing a limited tidal difference of 12cm. Nonetheless, the water exchange is still not optimal and vegetation is still poor in the drier areas of the banks and there is no stable bottom life. In winter, recreation is limited. In 2000,

in order to still further improve the situation of the Lake, the Province of Zeeland, the regional government, undertook an integrated planning and vision venture (Rondom het Veerse Meer/Around the Veerse Lake). This took into account the whole functional area around the lake involving parts of four local administrations and including recreation and tourism, traffic and transport, water management, agriculture, nature and landscape, environment and spatial planning.

b) Objectives

To improve the water quality of the lake and give a socio-economic impulse into the area.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

The responsibility for the integrated venture is the Province of Zeeland. The State Forestry Authority and the Zeeland Water Board are responsible for managing the islands and nature and recreation areas along the coastline. The project has a Steering Committee of national, regional and local government representatives as well as other relevant stakeholders developing vision, partner agreements and monitoring the progress of the work.

b) ICZM tools

Further planning started in 2005 to determine the necessary water levels that were required to improve both the ecological and recreational values. An Environmental Impact Assessment was conducted – mandatory by law if the water level is to change by more than 16 cm. Four alternatives were looked at, all of them maintaining a summer level of –0.1m mean sea level (MSL) but with winter levels of:- (a) –0.6m or no change option; (b) –0.1m, or the nature and recreation option; (c) 0.1m but with an emergency level of –0.5m or the water management option; and (d) –0.3m but with an emergency level of –0.3m or the agricultural option. A cost and benefit analysis was conducted and all three alternatives requiring change showed a €3.3-3.9 m surplus over a 30 year period. The Most Environmentally Friendly alternative was considered to be alternative (c). The decision finally fell for alternative (d) in 2007. The summer level will be allowed to vary between zero and –0.1m MSL and the winter levels between –0.2m and –0.4m MSL. Implementation of the measures need to be completed by 2015 with no more than 0.1m change per year to allow for the vegetation to acclimatise. An evaluation is to follow in 2015. The planning for the future measures is as follows:-

- At the end of October 2009, the measures to ensure the winter water level is 40cm under mean sea level will take place;
- Spring 2010, the measures to ensure the summer water level is 5cm under mean sea level will take place;
- At the end of October 2010, the measures to ensure the new winter water level is 30cm under mean sea level will take place. This will be the last measure taken.

The expectation is that, in future, only 200 ha. will dry out benefitting both shallow dwelling animals and plants. The additional depth will benefit water recreation. The Province is continuously monitoring the water levels and researching the effects of the changed water levels on the biotic life. Ground water levels are expected to remain as they have been.

Simultaneously, the Province began the integrated venture in close discussion with the responsible government Ministry. This was a framework plan that was to have a fifteen year implementation period. Not everything was concretely written into the plan to allow for flexibility in the future (adaptive management). It does present a total plan of the problems that need to be solved with the direction of the solutions outlined. The implementation of some of the smaller aspects of the project began in the same year and a number of them have already been concluded e.g. nine ha. of agricultural land has been converted to a naturalised area with a new bicycle path running parallel to the road.

7. Cost and resources

The implementation of the measures to change the water level is expected to cost €12 million between 2008-12, including the costs of monitoring and the improvements that need to be made by private parties.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

Already by 2005, the opening of the dam had caused a measurable improvement in the water quality of the lake. The water is no longer brackish but saltwater and more species have colonised the lake (polyps, snails, saltwater fish) including, for the first time in many years, jellyfish. There is less sea lettuce and the water is clear and odourless. Young mussels develop in the shallow parts of the lake although they still die in the Autumn as the water level drops.

9. Success and Fail factors

There has been extensive involvement with the stakeholders (farmers, fishermen, marinas etc.) with information evenings organised. A twice yearly informative newsletter is also printed. The changes in the lake have been extensively studied over a long period of time so there is a good reliable, data base on which to build.

10. Unforeseen outcomes

None so far.

11. Prepared by

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12. Verified by

It has not been possible to verify this case.

13. Sources

- Effecten van een hoger winterpeil MER Peilbesluit Veerse Meer (2007) Projectgroep MER
- Gebiedsprogramma Rondom Het Veerse Meer. Evaluatie en Vervolg (2008) Stuurgroep Rondom Het Veerse Meer
- Peilbesluit Veerse Meer (2007) Ministerie van Verkeer en Waterstaat
- Gebiedsvisie Rondom het Veerse Meer (2004) Stuurgroep Rondom Het Veerse Meer
- www.delta-wateren.nl/
- www.rijkswaterstaat.nl/



Effecten van een hoger winterpeil - MER peilbesluit veerse meer (4.73 MB) 

Gebieds programma rondom het veerse meer - evaluatie en vervolg (643.95 KB) 

Gebiedsprogramma rondom het veerse meer (6.21 MB) 

Peilbesluit Veerse Meer (145.09 KB) 