

**Draft Minutes**  
**TMAP Salt Marsh Workshop**  
**Spiekeroog 14 – 16 May 2003**

## **1 Welcome and introduction to the workshop**

The chairman, Mr. Jan Bakker opened the meeting and welcomed the participants to the workshop. The meeting adopted the agenda as in **Annex 1**. A list of participants is in **Annex 2**. The Terms of Reference of the workshop are in **Annex 3**.

The secretary, Mr. Marencic gave a short introduction to the workshop and an overview about the overall contents and time schedule of the QSR update 2004.

## **2 Follow up activities of the last workshop (April 2002)**

### **Workshop Minutes (Action 19)**

The meeting adopted the minutes of the last workshop without amendments.

### **Transboundary cooperation (Action 2)**

The possibilities of coordinated aerial surveys of salt marshes in SH and DK were explored by Mr. F. Frikke and Mr. A. Voigt. For the time being, not financing could be found but may be possible at the next survey in 2005.

### **Remote sensing (Action 3 and 4)**

The meeting decided to exchange information on this issue (e.g. new methods and projects) but not to deal with the technical details of remote sensing methods.

### **Salt Marsh Report (Action 5)**

An outline of a trilateral salt marsh report has been prepared by the CWSS and was endorsed by the TMAG. The meeting decided to discuss the further work planning under agenda item 5 QSR Update.

### **Data delivery**

GIS data about zonation (6 classes) have been delivered to the CWSS by NL, Nds and SH. GIS data on grazing and drainage have not yet been completed. The products (harmonized GIS maps) were discussed under agenda item 4 salt marsh classification.

### **Information exchange**

The meeting agreed to send relevant salt marsh publications (including internal reports) to the secretariat for further distribution. A list of salt marsh reports should be prepared by the CWSS.

### **EU Subsidies**

Mr. Frikke introduced a document on EU salt marsh grazing subsidies in DK. He added that beside grazing also others uses (cutting) financed with an average of 100 EUR/ha/year. During the last years, grazing intensity have decreased slightly but cutting and grazing is still common practice. Progress has been made in banning fertilizers and pesticides. Currently, a discussion is ongoing reduce the grazing intensity and to replace cutting by low (to medium) rate grazing.

The meeting stressed that in the QSR 2004, the critical combination of EU subsidies and salt marsh management should be pointed out.

### **Synoptic table**

The synoptic tables and the TMAP classification has been further amended by the Dutch colleagues to be discussed under agenda item 3.

### **Field work**

Information exchange concerning the comparability of mapping method in FRG (SH and LS field surveys) would be carried out in the course of 2003/2004.

### 3 Presentations

The participants gave a short update on recent results and developments in salt marsh monitoring.

#### Lower Saxony

Mr. J. Bunje explained the current status of salt marsh management in Lower Saxony. Currently, about 66% of all salt marshes are unused, 23% are low/moderately used, and 11% are intensively used. Main use is cattle grazing on the East Frisian and Wurster coast salt marshes and mowing in Frisia (Jade Bight, Elisabeth Außengroden). Most of the intensively used salt marshes are located at the Wurster coast and are mainly in private ownership. The aim is to reduce the grazing intensity in future.

Furthermore, the quality of the artificial salt marshes have been assessed. The aim is here to reduce the extent of the artificial drainage system, e.g. no new drainage activities, reduction of maintenance work (only ditches at the dike foot) and active measures to reduce drainage.

A salt marsh management plan has been prepared by the National Park Administration together with the coastal protection agencies and NGOs which describes the single measures for each sub-area. Example for renaturation projects were given for the Leybucht and salt marshes in the east of Norderney.

Ms. S. Arens presented the investigation of the "NLÖ- Forschungsstelle Küste" which have been carried out during the last years, namely in the Leybucht (effects of dike construction and restoration on vegetation development), in the Jade bight and Elisabeth Außengrogen (clay pit projects) and the Wurster coast (sedimentation field, protection of salt marsh edges). A mapping of the mainland salt marshes was carried out in 2002.

Mr. N. Hecker presented the biotope type mapping carried out in 2002, the third one after 1991 and 1997. Instead of aerial color-infrared photographs, the survey was carried out with a new technique (high resolution stereo camera, HRSC-AC) which delivered the following products:

- True Orthophoto Mosaics blue, green, red,
- Colour infrared True Orthophoto Mosaics,
- Panchromatical True Orthophoto Mosaics,
- Digital surface models (DOM).

The main advantages of these method were the automatic availability of georeferenced digital photos within the GIS, uniform properties of data as contrast, brightness and ground resolution of pixels,

- High uniform precision of position and location,
- Possibility of an automated data analysis and evaluation.

Additionally, the digital surface model can be combined with the vegetation map.

During the discussion it was pointed out that an artificial gully system is very consistent and restoration into a more natural drainage system requires a lot of ground work as experiences from two studies on the Dutch mainland coast have demonstrated. Also examples from the island of Trischen showed that the artificial drainage system was still intact even 25 years after cessation of the maintenance work.

Furthermore, the connection between the vegetation mapping (field work and selection permanent plots) and the biotope type mapping was not clear enough and should be improved in future.

It was also proposed to use the high resolution data of the HRSC flights for a classification on the level of vegetation types instead of biotope types.

#### Schleswig-Holstein

Mr. M. Stock reported on the progress of the third salt marsh vegetation mapping in the National Park which includes also the islands. A field survey was carried out in 2001/2002 by the University of Kiel. The digitizing of the data were still going on, for certain areas, zonation maps have already been produced. The "Vorland" monitoring together with the coastal protection agencies were continued and the financing is safeguarded. Several research projects started in cooperation with the University of Kiel and Oldenburg concerning sedimentation (bar measurements, using the Dutch method) and vegetation mapping (Hamburg Hallig, Sönke-Nissen Koog). On the Halligen, an analysis of changes in land use and vegetation is carried out by the University of Hannover using 25 years old vegetation maps.

## Netherlands

Mr. K. Dijkema presented the results of the salt marsh monitoring on the Dutch mainland coast. During the last 30 years, major changes in management have occurred: less groynes, reduction of drainage and maintenance work, partly to zero, to a more natural management. This resulted in more natural dynamic in pioneer zone (correlation with high tide level in winter) and a stable salt marsh area at lower costs for maintenance.

Due to natural sedimentation the salt marsh vegetation reached a climax stadium and younger successional stages get lost resulting in a decreased biodiversity. A salt marsh with a low to medium rate grazing has more vegetation types and a higher biodiversity. Long-term studies revealed that from a mean height of 30 to 40 cm only heavy grazing prevents domination of *Elymus arthericus* and *Atriplex prostrata*. Therefore, future monitoring should focus more on the quality (biodiversity) of salt marshes instead of the extent.

Because complete cessation of drainage some areas is a new development it has to be monitored during the next 10 years whether a more natural salt marsh development is initialized, what are the effects on erosion/accretion and how to prevent a succession to a climax, e.g. in combination with grazing.

## Denmark

Mr. J. Frikke informed the meeting that a salt marsh monitoring will be established in the Danish Wadden Sea from 2004 onwards in the framework of the new national monitoring program NOVANA to fulfill the requirements of the EU Habitat Directive. At least 3 salt marsh zones (plus estuaries) would be distinguished which would fit into the TMAP zonation. In the Ribe county, about 20 permanent plots will then be established in the salt marshes.

Currently, a salt marsh registration report is under preparation (covering Ribe and Sønderjyllands Amt) and will probably be finalized by end of 2003. An aerial survey is planned for 2005.

An assessment of the data on yearly registration of grazing animals on all salt marshes will also be carried out this year and will be available for the QSR.

The Danish Salt Marsh Management Plan is still under preparation and it is still unclear when it can be expected.

## 4 Salt marsh classification

Mr. B. Kers presented the amended TMAP typology covering all types salt marshes, brackish island marsh and estuaries/fresh water tidal marshes. The complete list entails 57 vegetation types based on the definition of the last TMAP workshop on Mandø, Schamineé typology the Dutch SALT 97 code.

The meeting agreed on main criteria for the definition of common TMAP vegetation types which are the practical feasibility and the information need for trilateral purpose. The meeting underlined that for assessment of local and regional development, a more detailed vegetation mapping is required. This concerns also the scientific foundation of the typology.

The trilateral vegetation typology focus on the dominant key species although some more detailed information - which is available on regional level - may get lost through this harmonization process. The meeting agreed that the main objective is to get a harmonized minimum program for monitoring of salt marsh changes on a trilateral scale.

The meeting discussed the proposal in detail and **decided** to simplify the number of vegetation types to a "short TMAP typology" covering 6 zones and 25 vegetation types (see **Annex 4- separate excel.**). Two levels of details should be obtained trilaterally (Table 1):

1. zonation (6 zones),
2. vegetation types with dominant species (25 types).

The meeting also discussed how to handle problematic cases like vegetation complexes (e.g. in Schleswig-Holstein) or how to split *Atriplex* into low and middle marsh. It was agreed to assess in these specific cases whether an assignment to an existing types can be done without losing too much information or whether a new type has to be added.

**Table 1:** Six salt marsh zones (bold) and 25 TMAP vegetation types (draft version May 2003) (details are in Annex 4 [Excel file, to be included]).

#### **1. Pioneer Zone**

- 1.1 *Spartina*
- 1.2 *Salicornia* / *Suaeda* / *Bassia*

#### **2. Low Marsh**

- 2.1 *Puccinellia* spec.
- 2.2 *Limonium*, (Puccinellion)
- 2.3 *Aster*, (Puccinellion)
- 2.4 *Atriplex portulacoides* / *Puccinellia maritima* type

#### **3. Middle + high marsh**

- 3.1 *Limonium vulgare* / *Juncus gerardi* type
- 3.2 *Juncus gerardi* (incl. *Glaux*) type
- 3.3 *Festuca rubra* type
- 3.4 *Atriplex portulacoides* / *Artemisia* type
- 3.5 *Artemisia maritima* / *Festuca rubra* type
- 3.6 *Juncus maritimus* / *Festuca rubra* type
- 3.7 *Elymus athericus* type
- 3.8 *Carex extensa* type
- 3.9 *Atriplex prostrata* + *A. littoralis* type
- 3.10 *Agrostis*, *Trifolium fragiferum* type
- 3.11 *Sagina* spec. / *Armeria* / *Centaureum littorale*, *Parapholis*
- 3.12 *Ononis spinosa* / *Carex distans* type
- 3.13 *Elymus repens* type

#### **4. Green beach**

- 4.1 *Elytrigia juncea* / *Glaux* / *Agrostis* type

#### **5. Reedbeds & brackish marsh**

- 5.1 *Bolboschoenus* + *Schoenoplectus* type
- 5.2 *Phragmites australis* type
- 5.3 *Blysmus rufus* / *Agrostis* / *Cotula* / *Festuca arundinacea* / *Eleocharis uniglumis* type
- 5.4 *Juncus maritimus* / *Oenanthe lachenalii* type

#### **6. Fresh (anthropogenic) grassland**

- 6.1 Fresh grassland (*Lolium* etc.)

### **GIS based maps**

Mr. G. Lürßen presented trilateral GIS-based maps on salt marsh zonation and grazing (only NL) prepared by the CWSS. GIS data on drainage have not yet been compiled because of missing data. For the first time, a common salt marsh zonation map could be prepared based on available GIS data and covering the whole Wadden Sea except Denmark (Danish data are expected to be available in 2004). Data compilation and harmonizing the GIS data could be carried by the CWSS out without major technical difficulties.

The meeting **agreed** to further update the maps on zonation, grazing and drainage. Data from the Hamburg Wadden Sea should also be included. It was further agreed that classification of drainage (frequency of maintenance work) and grazing/mowing (canopy height) should be carried out according to the agreements made at the Mandø workshops (TMAP guidelines).

The meeting **agreed**:

- To deliver the missing national GIS data on drainage and grazing (including the necessary meta data) to the CWSS by 1<sup>st</sup> October 2003,
- To use the grazing/mowing data of the time period around 2000 (plus/minus 2 years) as a starting point,
- To update the national GIS data on zonation according to the modified trilateral vegetation typology and send them to the CWSS by 1<sup>st</sup> October 2003,
- To prepare new trilateral maps on zonation, grazing and drainage by the CWSS by 1<sup>st</sup> November 2003.

## 5 QSR 2004

- Preparation of the assessment work in 2003 (authors, chapters, time schedule, data compilation, assessment procedure) as contribution to the QSR chapter on salt marshes.
- Specification of salt marsh data flow to the TMAP data units.

The meeting discussed the preparation of the QSR chapter on salt marshes based on an outline presented by the CWSS.

Mr. W. Wiersinga presented major policy questions to be answered by the QSR. Issues were:

1. Natural development versus biodiversity: spatial distribution of grazing/mowing and drainage in the whole Wadden Sea area (quantity/quality).
2. Aging/grazing issue: comparison of young natural salt marshes, old salt marshes on Halligen with extensive use, old (coastal) salt marshes without use
3. Agricultural use: declining interests, EU subsidies (e.g. DK), other uses
4. Sea level rise/coastal protection: no maintenance (erosion/sedimentation, aging), maintenance (how?), de-embankment of (summer)polders (sediment enough?).

The QSR should analyze the spatial development of pioneer salt marshes in the last decades, the effects of grazing, drainage and coastal protection measures on the vegetation, and the most important processes (e.g. succession/aging, erosion, sedimentation).

It should also identify gaps of knowledge on the most important issues and processes and define what is necessary to know and should be continued, e.g. at long-term study sites. Also methodological aspects like remote sensing should be addressed.

Mr. M. Stock suggested to address new ideas in protection of salt marsh edges against erosion. Instead of concrete or stone walls other material like clay and sand would be more appropriate. Another item to be addressed is the fact that sedimentation in salt marshes directly adjacent to the dike foot (e.g. the grazed "150-m strip" in Schleswig-Holstein) is reduced because of a wall which separated the grazed area from the ungrazed ones. This will probably lead to future problems with regard to drainage of the dike foot. Comparable development were reported from the Dutch coast.

The meeting also discussed other important topics to be addressed by the QSR namely renaturation (or revitalization) of artificial salt marshes and consequences of seal level rise (coastal protection measures, clay digging, dike reinforcement).

The meeting **endorsed** the draft outline of the salt marsh chapter as attached in Annex 5 and **agreed**

- **To prepare a first text based on that outline by Jan Bakker/Kees Dijkema to be send around to the Danish and German colleagues for amendments by 15 June 2003.**
- **To send the amendments and comments to the first outline to the lead author, Jan Bakker, by 15 September 2003 at the latest.**
- **To discuss a first draft of the QSR chapter prepared by Jan Bakker at the next meeting in the beginning of October 2003.**

### Long-term study sites

The workshop concluded that in addition to a vegetation monitoring for the complete area (based on aerial photographs, ground truth mapping, about every 5-6 years), there is a need for long-term small-scale studies at selected salt marsh sites. The studies should document the effects of management measures (e.g. cessation of grazing, revitalization of salt marshes, de-embankment), natural succession (e.g. aging), coastal protection and sea-level rise (sedimentation processes).

The meeting strongly **recommended** to continue the existing permanent plots which address different issues and to also use the results on a Wadden-Sea-wide scale.

An overview is given in Annex 6 [to be included].

## **Salt Marsh Report**

The meeting discussed the possibility to publish a comprehensive trilateral salt marsh report (Salt Marsh Book) as proposed at the last workshop. Target group, contents and publisher of such a book were also discussed.

The meeting **agreed** that such a trilateral salt marsh book should focus on the broad public and not only science as target group and should be structured like the "Umweltatlas Wattenmeer". Further inquiries concerning the finances (and publisher) are necessary and should be carried out by Jörn Kohlus and Bas Kers together with the CWSS to be further discussed at the next meeting.

## **6 Closing**

The next meeting of the salt marsh group was scheduled for the beginning of October 2003 (3-day-meeting), on the island of Neuwerk, Germany. The main agenda items will be:

- finalization of the first draft of the QSR chapter,
- results of the salt marsh classification,
- finalization of the classification key (by Bas Kers)
- finalization of the overview on long-term monitoring sites
- planning Salt Marsh Book

The chairman closed the meeting by thanking all participants for their valuable input.

## **ANNEXES**

- Annex 1      Agenda
- Annex 2      List of participants
- Annex 3      Terms of Reference
- Annex 4      TMAP Vegetation typology (final draft version, 27 August 2003).
- Annex 5      Structure QSR chapter salt marshes
- Annex 6      Long-term study sites [*not yet included, a compilation is under preparation*]

## **ANNEX 1**

### **TMAP Salt Marsh Workshop, Spiekeroog, 14 –16 May 2003**

#### **Agenda**

**1 Welcome and introduction to the workshop**

**2 Follow up activities of last Workshop**

Outcome and status of the follow-up activities of the workshop in April 2002.

**3 Presentations**

Short presentation of recent results of the running monitoring programs in the Netherlands, Lower Saxony, Schleswig-Holstein and Denmark and relevant projects.

**4 Salt marsh classification**

- Assessment and quality assurance of the trilateral GIS based maps based on 6 salt marsh zones (trilateral inventory, preparatory work in 2002) and, if necessary, further amendments or modifications,
- Finalizing of the common vegetation classification (synoptic vegetation tables),

**5 QSR 2004**

- Preparation of the assessment work in 2003 (authors, chapters, time schedule, data compilation, assessment procedure) as contribution to the QSR chapter on salt marshes.
- Specification of salt marsh data flow to the TMAP data units.

**6 Follow up and Closing**

## Annex 2

### TMAP Salt Marsh Workshop, Spiekeroog, 14 –16 May 2003 List of participants

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## ANNEX 3

### TMAP Salt Marsh Workshop 2003 14 – 16 May 2003, Spiekeroog, Germany

#### Terms of Reference 1.11.2002

#### 1. Introduction

The two TMAP salt marsh workshops in Haren (28 – 29 November 2000) and on Mandö (22-23 May 2002) proposed a common zonation system which is already applicable in all countries by using the existing GIS data sets. It consists of 6 zones (pioneer zone, low marsh, mid/high marsh, dunes and beach ridges, reedbeds, grassland). The GIS data are compiled by the CWSS by end of 2002 to prepare harmonized GIS shape files. The workshops also agreed on a more detailed classification system based on vegetation types (about 16 types, e.g. Salicornia type, Artemisia type, Festuca type etc.) which should be applied in future.

The workshop in 2002 prepared an outline of a salt marsh status report (according to § 8, Esbjerg Declaration) which was approved by the TMAG in June 2002 (see Annex 1). The results of the status report will be part of the QSR update in 2004.

#### 2. Tasks

The salt marsh workshop 2003 should carry out the following tasks:

- Assessment and quality assurance of the trilateral GIS based maps based on 6 salt marsh zones (trilateral inventory, preparatory work in 2002) and, if necessary, further amendment or modifications,
- Finalizing of the common vegetation classification (synoptic vegetation tables),
- Preparation of the assessment work in 2003 (authors, chapters, time schedule, data compilation, assessment procedure) as outlined in **Annex 1**,
- Specification of salt marsh data flow to the TMAP data units.

#### 3. Participation

The workshop will be attended by persons who are in charge of the national salt marsh monitoring in organizational and technical aspects. The TMAG will nominate participants of the workshop and appoint a chairman. The CWSS will be responsible for the secretarial work.

#### 4. Mandate

The workshop will be held as a TMAP expert workshop under the responsibility of the TMAG to carry out the tasks given above. The workshop will report to the TMAG on the results.

## Annex 4

### TMAP Short Typology

(final draft version, 27 August 2003)

TMAP short typology	
TMAP-Code	Name
<b>0</b>	<b>No Information about vegetation typ</b>
<b>1</b>	<b>Pioneer Zone (cover &gt; 5%<sup>1)</sup>; P &gt; L + rest)</b>
1.0	Pionier Zone, unspecific
1.1	Spartina
1.2	Salicornia / Suaeda / Bassia
<b>2</b>	<b>Low Marsh (P &lt; L &gt; M + rest)</b>
2.0	Low Marsh, unspecific
2.1	Puccinellia spec.
2.2	Limonium, (Puccinellion)
2.3	Aster, (Puccinellion)
2.5	Atriplex portulacoides / Puccinellia maritima type
<b>3</b>	<b>Middle + high marsh (P + L &lt; M + H)</b>
3.0	Middle + High Marsh, unspecific
3.2	Limonium vulgare / Juncus gerardi type
3.3	Juncus gerardi (incl. Glaux) type
3.4	Festuca rubra type
3.5	Atriplex portulacoides / Artemisia type
3.6	Artemisia maritima / Festuca rubra type
3.7	Juncus maritimus / Festuca rubra type
3.8	Elytrigea atherica type
3.10	Carex extensa type
3.11	Atriplex prostrata + A. littoralis type
3.12	Agrostis, Trifolium fragiferum type
3.13	Sagina spec. / Armeria / Centaurium littorale, parapholis
3.14	Ononis spinosa / Carex distans type
3.16	Elytrigea repens type
<b>4</b>	<b>Green beach</b>
4.0	Green Beach, unspecific
4.2	Elytrigea juncea / Glaux / Agrostis type
<b>5</b>	<b>Reedbeds &amp; brackish marsh</b>

5.0	Reedbeds, unspecific
5.1	Bolboschoenus + Schoenoplectus type
5.2	Phragmites australis type
5.4	Blysmus rufus / Agrostis / Cotula / Festuaria / Eleocharis uniglumis type
5.5	Juncus maritimus / Oenanthe lachenalii type
<b>6</b>	<b>Fresh (anthropogenic) grassland</b>
<b>7</b>	<b>Dunes and Beach barriers</b>
<b>Total count: 25</b>	

### Remarks

- 1) in SH > 10 % cover
- 2) in SH Salicornia ramosissima = low marsh
- 3) in SH > 35 % cover
- 4) in SH > 5 % cover
- 5) in SH > 30 % cover

### Salt/brackish water species (W)

Zostera marina, Zostera noltii, Ruppia maritima, Ruppia cirrhosa, Zanichellia palustris s.l., Potamogeton pectinatus.

### Pioneer species (P)

Spartina anglica, Salicornia sp., Suaeda maritima.

### Species of the low marsh (L)

Puccinellia maritima, Atriplex portulacoides, Cochlearia anglica, Aster tripolium, Spergularia sp., Triglochin maritima, Limonium vulgare, Plantago maritima, Parapholis sp., Atriplex pedunculata.

### Species of the middle marsh (M)

Artemisia maritima, Armeria maritima, Juncus gerardii, Glaux maritima, Festuca maritima

### Species of the high marsh (H)

Potentilla anserina, Trifolium sp., Poa sp., Lolium sp., Elymus sp., Lotus corniculatus, Plantago coronopus

Vegetation complex:

- 1 zone: dominant type for the whole area
- 2 zones: 50/50% -> lowest zone type
- 3 zones: middle zone type

## **Annex 5**

### **Structure QSR Chapter Salt Marsches**

(5- 6 pages)

#### **1. Introduction (0.5 pages)**

(by CWSS)

- uses and function (e.g. birds, fauna)
- protection regimes

#### **2. Monitoring (0.5 pages)**

(by CWSS)

#### **3. Long-term developments**

(by Dijkema, Stock, Kers, CWSS)

- area
- vegetation
- grazing/cutting
- drainage

#### **4. Processes (selected sites)**

(by Dijkema, Bakker, Stock, Hecker/Bunje)

- natural development
- aging
- agricultural use/management
- sea level rise/coastal protection

#### **5. Conclusions and recommendations**