

# Cruise report Oosterschelde

February 20-27, 2006

Ronnie van Overmeeren, TNO Built Environment and Geosciences

Ms. Schollebaar (LNV)

Crew: Cees Baaij, Toon de Munck

TNO: Ronnie van Overmeeren

## **Objectives of survey**

The acoustic survey formed part of a test to remove Japanese oysters (*Crassostrea gigas*) by intensive fishing of selected parts of oyster banks and to monitor afterwards the further development of the oyster banks. The present survey, conducted from 20-27 February 2006, was the 0-measurement, prior to the removal of the oysters.

## **Area and acoustic tracks**

The survey area is located in the eastern part of the Oosterschelde (Eastern Scheldt) estuary in the SW of the Netherlands (figure 1).

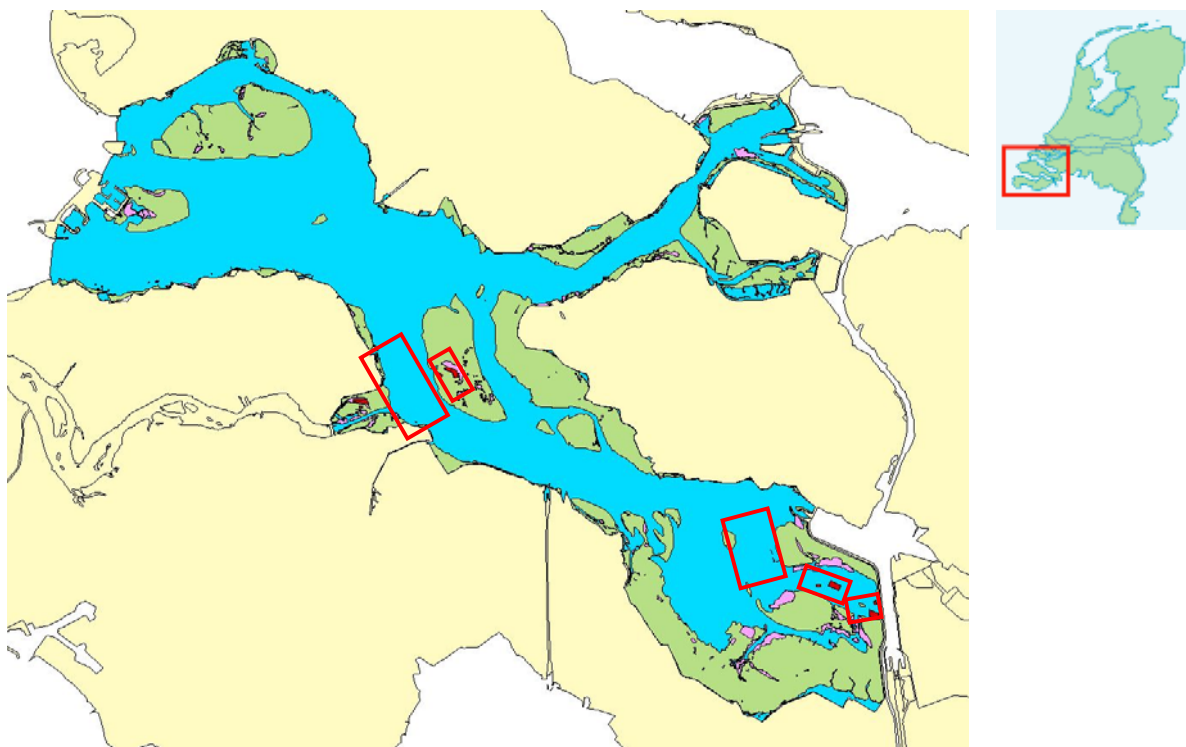


Figure 1 Oosterschelde with (in red) the location of oyster banks en de blocks where the acoustic survey was conducted; from West to East: Engels Vaarwater, Vondelingsplaat, Lodijksche Gat, Marollegat en Zilverput.

The 5 individual survey areas are limited by the lat-lon coordinates listed in table 1 and shown in more detail in figure 2.

Table 1: Coordinates of the corner boundaries of the 5 survey areas

Survey area	Corner boundaries	X coord (longitude)	Y coord (latitude)
1	Engels Vaarwater	3.918291646	51.574595705
1	Engels Vaarwater	3.942573653	51.551902360
1	Engels Vaarwater	3.922086602	51.543736212
1	Engels Vaarwater	3.896489947	51.566309716
2	Vondelingsplaat	3.941943122	51.573074575
2	Vondelingsplaat	3.951502421	51.564130658
2	Vondelingsplaat	3.943426141	51.560920695
2	Vondelingsplaat	3.933348257	51.569812563
3	Loodijkse Gat	4.146008385	51.508609345
3	Loodijkse Gat	4.156358759	51.485993370
3	Loodijkse Gat	4.133745114	51.482094010
3	Loodijkse Gat	4.122596307	51.505076980
4	Marollengat	4.197171623	51.484061280
4	Marollengat	4.194799686	51.480072716
4	Marollengat	4.183613140	51.482807585
4	Marollengat	4.186483313	51.486981296
5	Zilverput	4.218241346	51.475994871
5	Zilverput	4.219668008	51.469761481
5	Zilverput	4.212239941	51.469246457
5	Zilverput	4.210643066	51.475343207

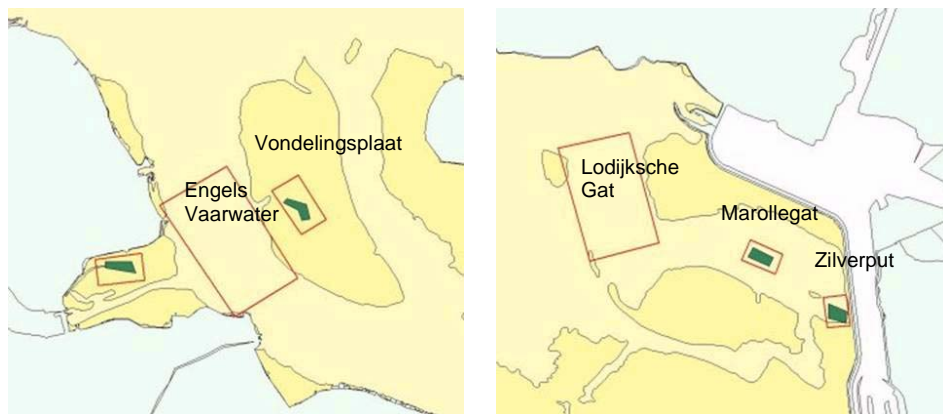


Figure 2 The 5 survey areas of the Oosterschelde shown in more detail. Green blocks are selected for later removal of oysters.

In all 5 areas sidescan sonar measurement were carried out. The tracks measured by sidescan sonar are shown in figure 3 and details are given in table 2. Additional dual frequency single echosounding was conducted in the Marollegat only, more or less along the same tracks as used for the sidescan sonar measurements.

The sidescan sonar recordings were made with two C-Max systems: the new CM2 system and the older CM800 system. The later was employed after the towfish of the first system was accidentally lost. Navigation speed during both the sidescan sonar and single beam echosounding measurements varied between 4 and 5 kts.



Figure 3 Sidescan sonar tracks recorded by the survey ship Schollevaar

Table 2: Details of the sidescan sonar tracks in the 5 survey areas

	Survey area	Number of tracks	Approximate length	Track interval (m)	System	Range (m)
1	Engels Vaarwater	12	2,5 km	150	CM800	75
2	Vondelingsplaat	8	1 km	100	CM800	75
3	Loodijkse Gat	9	2,5 km	150	CM2/CM800	50/75
4	Marollengat	9	500 m	100	CM2	50
5	Zilverput	6	700 m	100	CM2/CM800	50/75

### ***Equipment specifications***

- Sidescan sonar:
  - C-Max CM2, 325 kHz, towed
  - C-Max CM800, dual frequency, 325 kHz used, towed
- Single beam echo sounding
  - Knudsen dual frequency (320M), 12+200 kHz, hull-mounted
  - TNO data acquisition system for high frequency digital sampling of full signals.
- GPS
  - Del Norte 5012 GPS (positions in UTM zone 31, WGS84)

## **Data format and storage**

### *Sidescan sonar data*

C-Max sidescan sonars employ their own system format, in which the data are stored on magneto optical disks. This format is different for the older CM800 system than for the CM2 system. C-Max software (MaxRead) is used to convert the data in C-Max format to the more conventionally used QMIPS format. All sidescan sonar data collected during this survey was converted to QMIPS and stored on CD-ROM.

### *Knudsen data (single beam echosounding)*

The Knudsen data are digitally sampled by a special, high-frequency A/D card, interfaced by TNO developed software. The data are recorded in standard SEG Y format on CD-ROM or DVD.

## **Logbook (time in UTC; local time is UTC+1)**

### *Monday 20 February 2006*

NE 5/6 Bft; height of waves 0.5 m

08:20 Arrival Yerseke

10:40 Departure harbour Yerseke

13:26 Start SSS survey Lodijsche Gat; measuring tracks LG0607, LG0606, LG0605 and LG0608.

15:00 End of SSS measurements; return to Yerseke.

### *Tuesday 21 February 2006*

NE 5 Bft; height of waves 0.5 - 1 m

06:55 Departure harbour Yerseke

07:30 Arrival survey area Marollegat

07:37 Start SSS survey Marollegat; measuring tracks MG0601 t/m MG0609.

08:30 End of SSS measurements Marollegat; departure for survey area Zilverput.

08:37 Start SSS survey Zilverput; measuring tracks ZP0601 t/m ZP0603.

08:56 End of SSS measurements Zilverput (abandon site because of low tide; departure for survey area Zilverput.

09:18 Start SSS survey Lodijsche Gat; measuring tracks LG0609 and LG0602. Lots of rolling along axis of towfish because of rough sea.

10:10 Start SSS tracks LG0603; at 10:17 loss of CM2 towfish (cable off winch) near buoy LG8. Until approx. 12:00 hours dredging without success.

13:00 Return in harbour Yerseke; departure for Utrecht to pick up CM800 sidescan sonar system.

17:30 Return in Yerseke/Goes.

### *Wednesday 22 February 2006*

NE 6 Bft; height of waves 1 – 1.5 m

06:55 Installation CM800 system

08:15 Departure harbour Yerseke

09:04 Start CM800 survey of area around buoy LG8 for detecting lost towfish. Towfish not spotted on the images.

13:34 Continuation SSS survey Lodijsche Gat (with CM800); measuring tracks LG0603 and LG0604. Rough sea.

14:33 End of SSS measurements; return to Yerseke.

*Thursday 23 February 2006*

NE 2/3 Bft; height of waves <0.5 m

- 06:45 Departure harbour Yerseke
- 08:29 Continuation SSS survey Lodijksche Gat; measuring track LG0601.
- 08:49 End of SSS survey Lodijksche Gat; departure for survey area Zilverput.
- 09:22 Continuation SSS survey Zilverput; measuring tracks ZP0604 t/m ZP0606.
- 09:43 End of SSS survey Zilverput; departure for survey area Marollegat. Installation Knudsen echosounding system
- 10:59 Start Knudsen measurements Marollegat, measuring tracks MG0601 t/m MG0609.
- 12:56 End of Knudsen survey Marollegat; departure for survey area Engels Vaarwater.
- 13:32 Start SSS survey Engels Vaarwater; measuring tracks EV0609, EV0608, EV0607, EV0605, EV0606 and EV0604.
- 16:03 End of SSS measurements; return to Yerseke.

*Friday 24 February 2006*

NE 4/5 Bft; height of waves 1 -1.5 m

- 06:50 Departure harbour Yerseke
- 08:11 Continuation SSS survey Engels Vaarwater; measuring tracks EV0603, EV0602, EV0601, EV0610, EV0611 and EV0612. Increasing problems with connection towfish; fall out of transmission of signals. Seems to be a problem in the connector, but repairs failed.
- 12:15 End of SSS measurements; return to Yerseke.

*Monday 27 February 2006*

NNE 3/5 Bft; height of waves 0.5 -1.5 m

- 08:10 Departure harbour Yerseke
- 11:09 Start with renewed trials along and parallel to track LG0603 to spot the lost towfish in the neighbourhood of buoy LG8. No luck. Departure for survey area Vondelingsplaat.
- 12:56 At high tide SSS measurements over the Vondelingsplaat, a littoral sandbank: VP0603, VP0604, VP0605, VP0606, VP0607, VP0608, VP0602 and VP0601. Increasing storm and waves, impeding good measurements of the last tracks. Continuous problems with the cable connector.
- 14:50 End of SSS measurements; return to Yerseke.

*Epilogue*

On 9 March 2006 the CM2 towfish was recovered from a depth of 20 m by divers of the Subcom company from Zierikzee.