# Zebra mussel and makrophytes in Szczecin Lagoon

*ARTWEI workshop Szczecin, 23.6.2010*

*Adam Woźniczka, Norbert Wolnomiejski*
*Sea Fisheries Institute in Gdynia, Research Station in Świnoujście*

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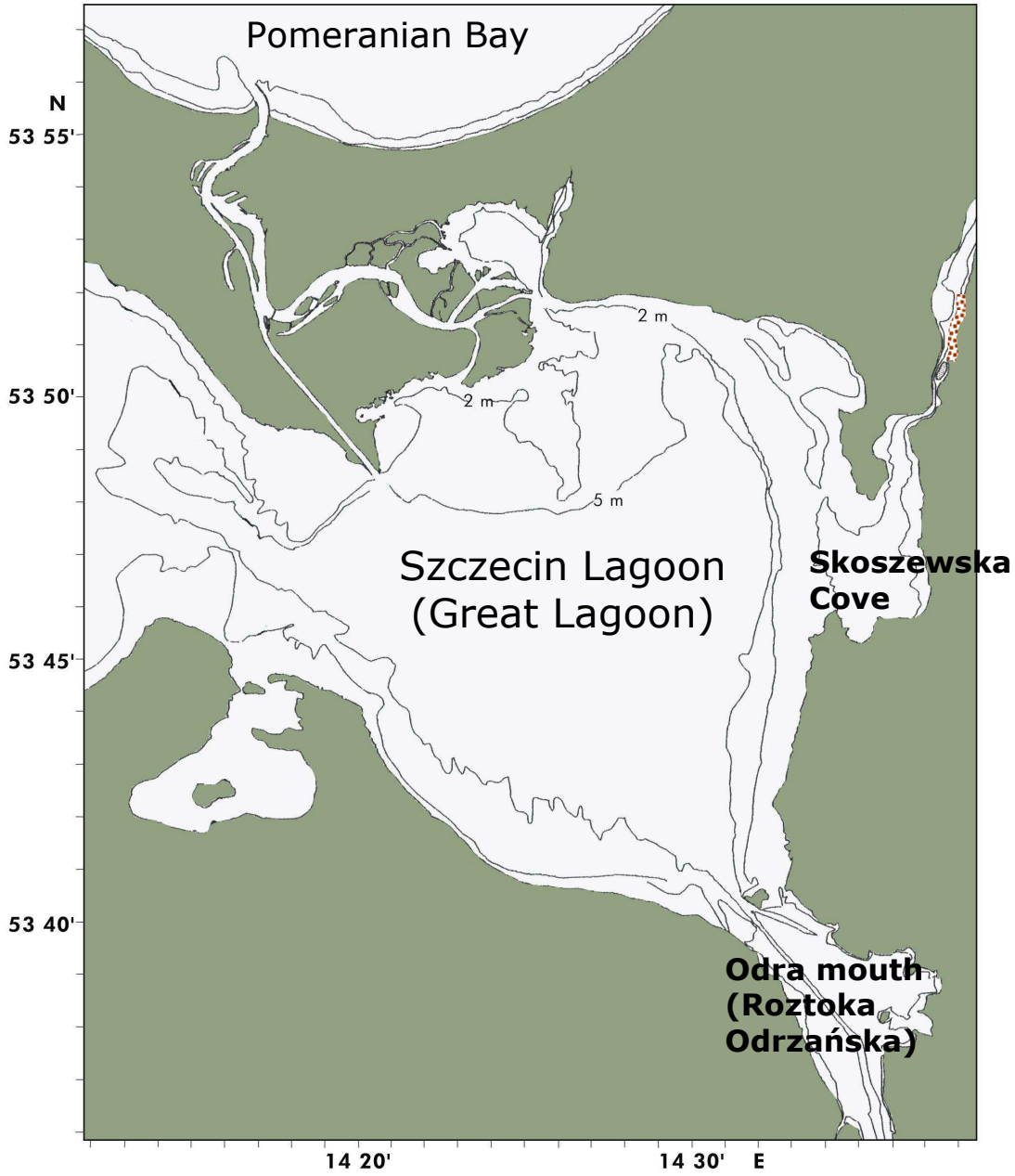
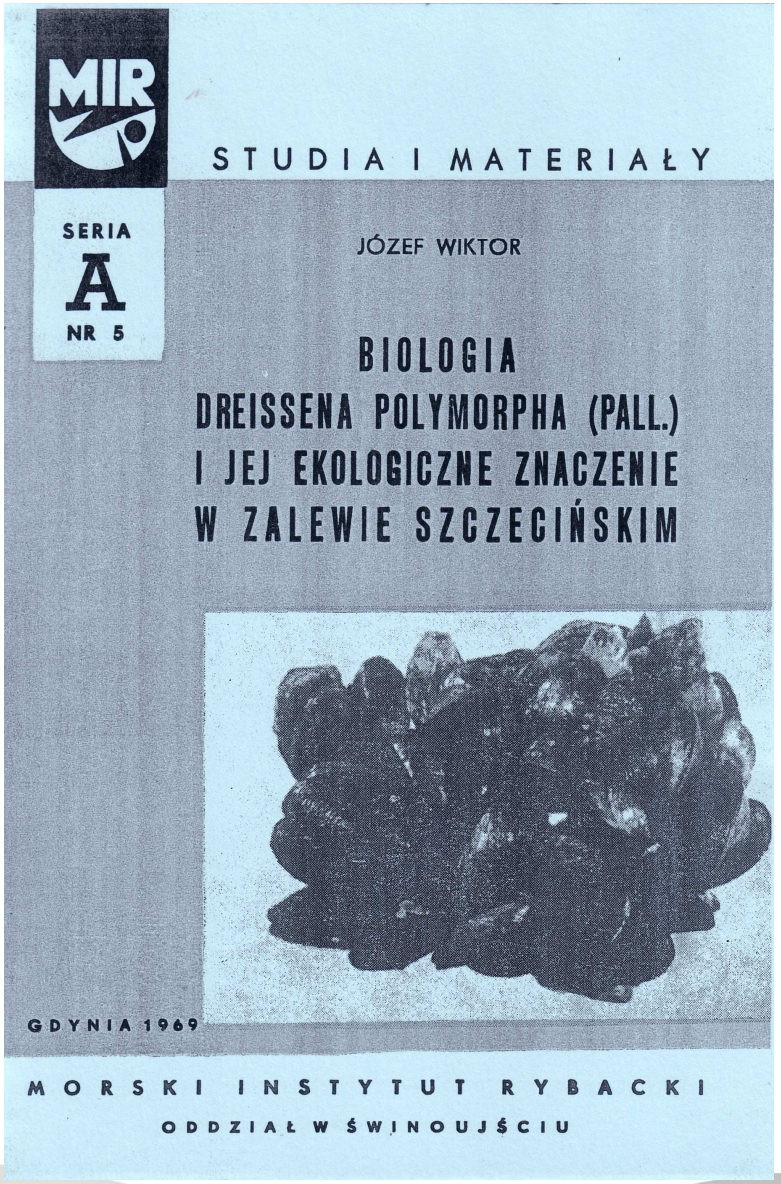

Pomeranian Bay
N
53 55'
53 50'
53 45'
53 40'
2 m
2 m
5 m
Szczecin Lagoon
(Great Lagoon)
Skoszewska
Cove
Odra mouth
(Roztoka
Odrzańska)
14 20'
14 30'
E

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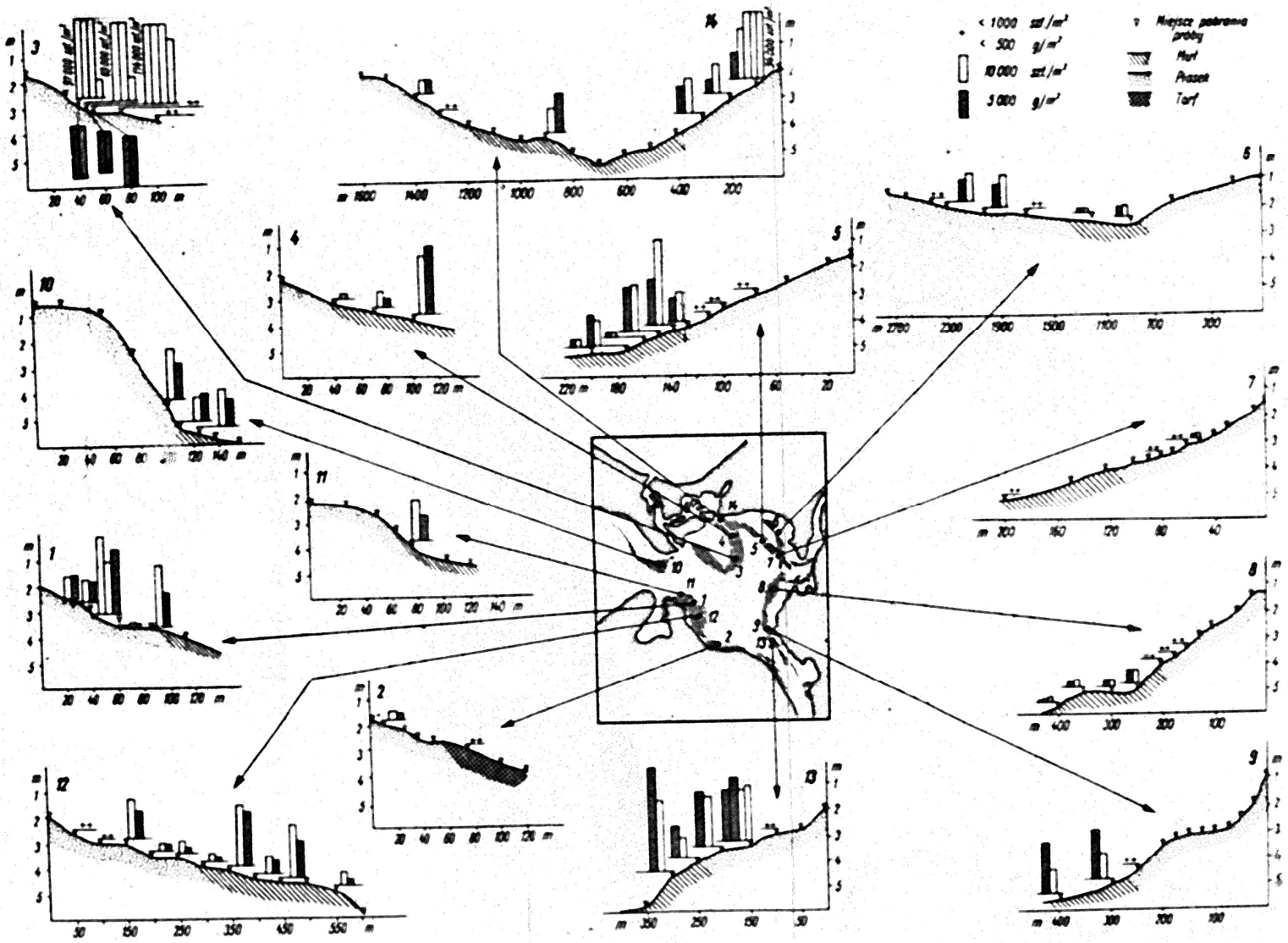
**Zebra mussel standing stock:**

**91 000 Tons in „mussel beds”**

**+ 20 000 Tons estimated outside „mussel beds”**

**= <u>110 000 Tons</u>**



Rys. 1. Pionowa i pozioma lokalizacja zespołów Dreissena polymorpha /Pall./

# Zebra mussel (*Dreissena polymorpha* Pall.) in the River Odra estuary: the current status

Adam Woźniczka, Norbert Wolnomiejski
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Research Station in Świnoujście, Poland

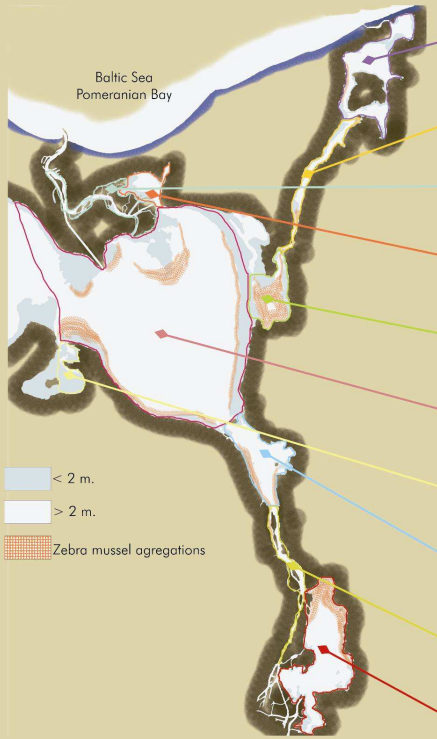
The study attempted to estimate the standing stock of the zebra mussel in the Polish part of the Odra estuary and to assess the species' present status there. The assessment was made with reference to the first comprehensive study on the zebra mussel in the area, carried out in the 1950s by Wiktor (1969) who estimated the total biomass to amount to 11 thou. Tons. After a reduction in its size, reported in the 1980s, the zebra mussel population is observed to be on the rebound, which is confirmed by this study.

Wiktor J., 1969, The biology of Dreissena polymorpha (Pall.) and its ecological importance in the Szczecin Lagoon. Stud. Mat. MIR Gdynia, A, 5, 1-88 [in Polish]

The study was based in samples collected in 2001-2004 at more than 700 sites in the Polish part of the Odra estuary. The samples were collected with an 0.1 $m^2$ vanVeen grab, an 0.0225 $m^2$ Ekman-Birge grab, and with a 24 $cm^2$ hand-held sediment-collecting device. On the basis of biomass calculations for individual depth zones (at 0.5 m intervals in the Great Lagoon), the zebra mussel biomass in and its partitioning between individual parts of the Odra estuary were estimated.

Stynka II

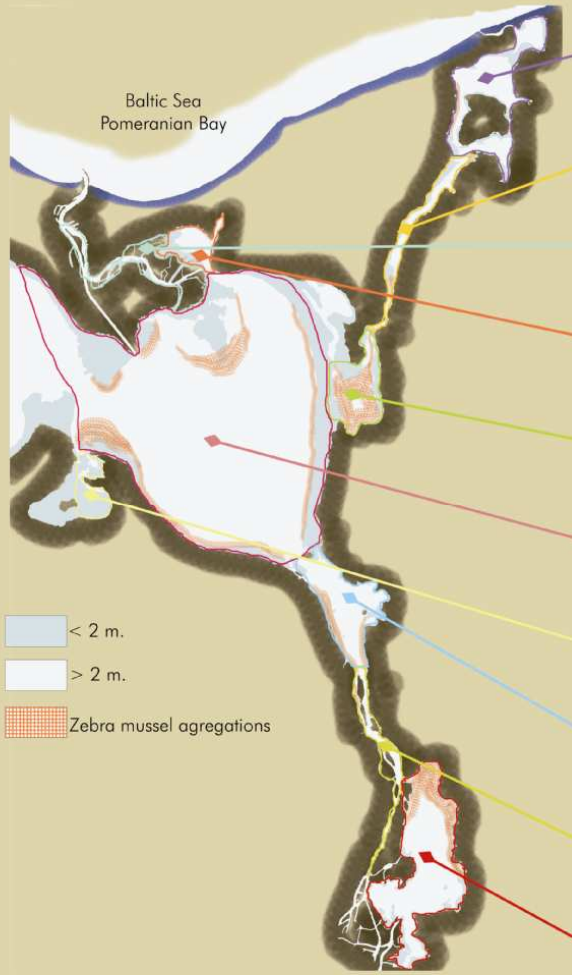
In the Odra estuary, the zebra mussel forms aggregations lying on the bottom, loosely attached to the sediment. The bivalve shows a clear preference to sandy bottoms and avoids muddy areas, hence the most abundant aggregations are found on slopes of near-shore shoals, from the boundary with the muddy bottom up to the depth of about 2 m. In more shallow areas, due to strong wave action, the zebra mussel is rather scarce, and it is on the stems of emergent vegetation (e.g., reeds) that denser clumps of the bivalve are found. Wherever it is abundant, the mussel occurs in dense (more than 1000 inds/$m^2$) beds covering the entire surface of the bottom.




| | Standing stock [Tons] |
|---|---|
| **Kamienski Lagoon and Lake Wrzosowskie**<br>Area: 30.64 $km^2$; zebra mussel average biomass: 364 $g/m^2$; depth range of highest abundance: 2-3 m, average biomass in the depth range of highest abundance: 571 $g/m^2$; maximum biomass: 4400 $g/m^2$. | **11 148** |
| **River Dziwna**<br>Area: 12.78 $km^2$; zebra mussel average biomass: 208 $g/m^2$; depth range of highest abundance: 1-2 m, average biomass in the depth range of highest abundance: 330 $g/m^2$; maximum biomass: 1300 $g/m^2$. | **2 660** |
| **River Swina, and Swina Storm Delta**<br>Area: 13.13 $km^2$; zebra mussel average biomass: 19 $g/m^2$; depth range of highest abundance: 0.5-2 m, average biomass in the depth range of highest abundance: 73 $g/m^2$; maximum biomass: 700 $g/m^2$. | **243** |
| **Lake Wicko**<br>Area: 13.02 $km^2$; zebra mussel average biomass: 56 $g/m^2$; depth range of highest abundance: 2-3 m, average biomass in the depth range of highest abundance: 79 $g/m^2$; maximum biomass: 1200 $g/m^2$. | **840** |
| **Skoszewska Cove**<br>Area: 20.75 $km^2$; zebra mussel average biomass: 1 070 $g/m^2$; depth range of highest abundance: 2-4 m, average biomass in the depth range of highest abundance: 1800 $g/m^2$; maximum biomass: 8700 $g/m^2$. | **22 197** |
| **Szczecin Lagoon (Great Lagoon)**<br>Area: 362.9 $km^2$; zebra mussel average biomass: 152 $g/m^2$; depth range of highest abundance: 3.5-5 m, average biomass in the depth range of highest abundance: 333 $g/m^2$; maximum biomass: 3800 $g/m^2$. | **60 000** |
| **Lake Nowowarpienskie**<br>Area: 8.86 $km^2$; zebra mussel average biomass: 17 $g/m^2$; depth range of highest abundance: 0.5-1 m, average biomass in the depth range of highest abundance: 122 $g/m^2$; maximum biomass: 500 $g/m^2$. | **143** |
| **Odra mouth (Roztoka Odrzanska)**<br>Area: 26.3 $km^2$; zebra mussel average biomass: 408 $g/m^2$; depth range of highest abundance: 2-4 m, average biomass in the depth range of highest abundance: 522 $g/m^2$; maximum biomass: 1700 $g/m^2$. | **10 740** |
| **Lower Odra**<br>Area: 14.3 $km^2$; zebra mussel average biomass: 207 $g/m^2$; depth range of highest abundance: 0.5-2 m, average biomass in the depth range of highest abundance: 210 $g/m^2$; maximum biomass: 1100 $g/m^2$. | **2 955** |
| **Lake Dabie**<br>Area: 56.8 $km^2$; zebra mussel average biomass: 705 $g/m^2$; depth range of highest abundance: 2-3 m, average biomass in the depth range of highest abundance: 1130 $g/m^2$; maximum biomass: 4500 $g/m^2$. | **35 238** |

According to the estimation presented, the current zebra mussel standing stock in the Odra estuary is close to that reported almost 50 years ago by Wiktor. However, this study found no similarly large, compact beds and similarly high densities of the zebra mussel, which suggests that the zebra mussel individuals are scattered and a considerable part of the biomass is accounted for by individuals living outside the "mussel beds". The particularly abundant zebra mussel aggregations observed in Lake Dabie and in the Odra mouth are a very efficient biofilter that is very important for the quality of water discharged by the Odra into the Szczecin Lagoon. On the other hand, the total Odra estuary zebra mussel population which, according to Wiktor's estimates, is theoretically capable of filtering the entire volume of the estuary's water within 36 days, is important for the quality of water both in the estuary itself and in its discharge into the Baltic Sea.

**Total standing stock 146 164**

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**Total, zebra mussel, standing stock: 146 164 Tons**

*Ecological Questions* 9/2008: 103–111

doi: 10.2478/v10090-009-0025-9

# A drastic reduction in abundance of *Dreissena polymorpha* Pall. in the Skoszewska Cove (Szczecin Lagoon, River Odra estuary): effects in the population and habitat

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## Skoszewska Cove - 2001

Area: 20.75 km2
Depth – up to 4 meters

Zebra mussel:
Average biomass: 1 070 g/m2
Maximum biomass: 8 700 g/m2
Standing stock: 22 197 Tons

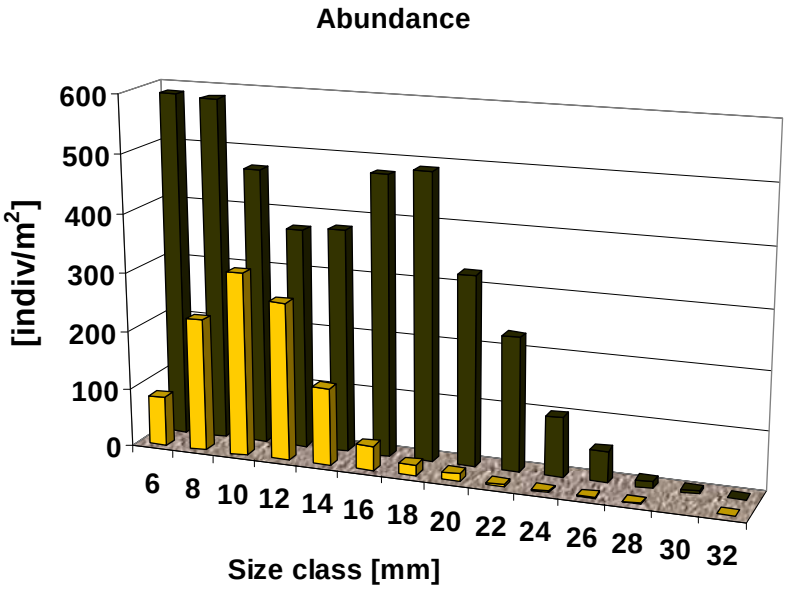
Theoreticaly capable of filtering the total volume of the Cove within 2.36 days

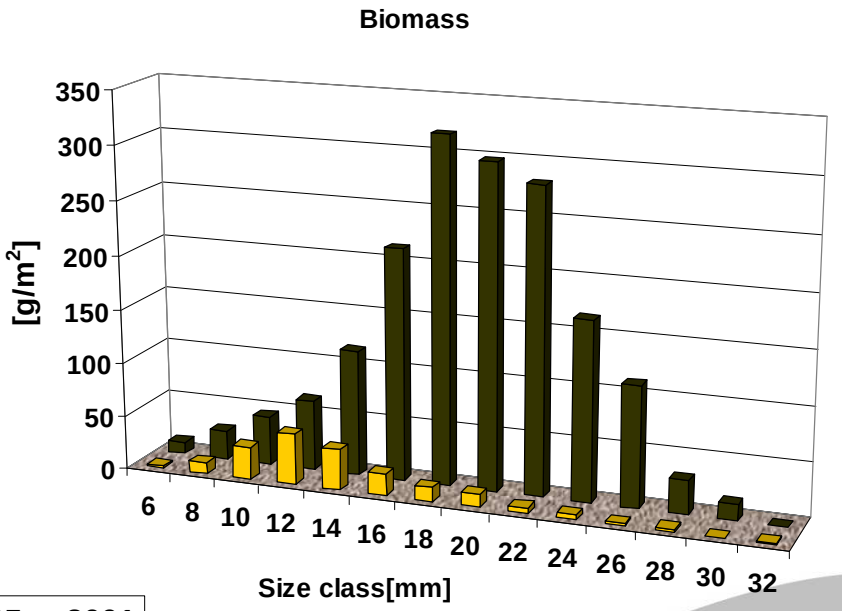
## Skoszewska Cove – 2005

**Zebra mussel standing stock: 2 392 Tons (2001: 22 197 Tons)**

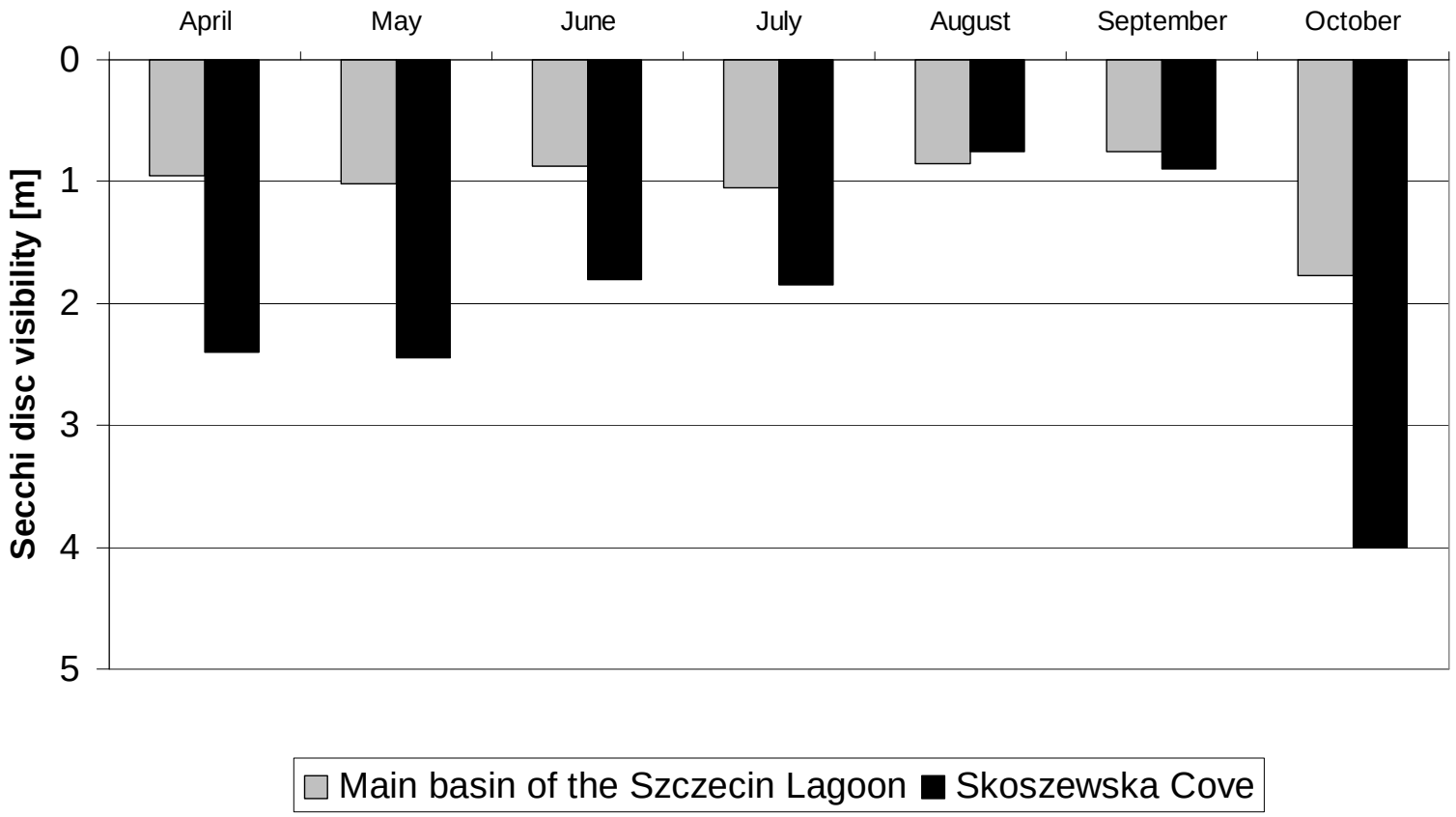
**Population was reduced by factor 9.3**

**No significant changes were observed in the reference area (Szczecin Lagoon)**




2005 2001


April
May
June
July
August
September
October
0
1
2
3
4
5
Secchi disc visibility [m]
Main basin of the Szczecin Lagoon
Skoszewska Cove

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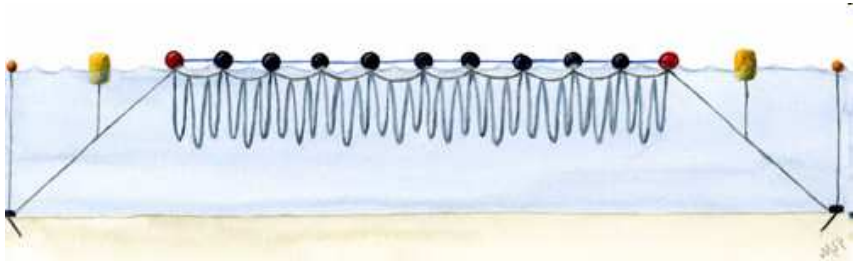
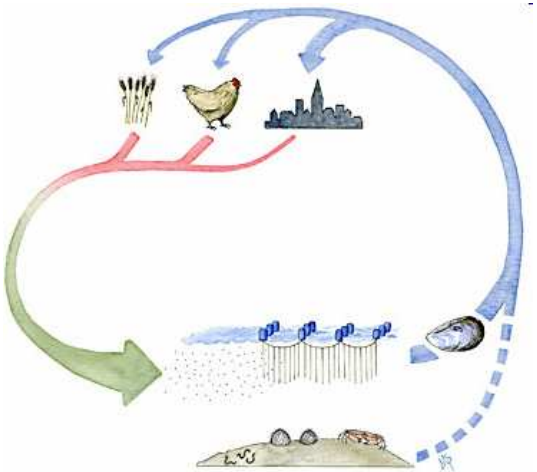
# Mussel farming





# Water Zebras - Water quality improvement using zebra mussels

- Ernst Moritz Arndt Universität Greifswald – leading partner
- University of Szczecin
- Sea Fisheries Institute in Gdynia

*Interreg IVa*

| Journal of Coastal Research | SI 56 | 1459 - 1463 | ICS2009 (Proceedings) | Portugal | ISSN 0749-0258 |
|---|---|---|---|---|---|

# Mussel Cultivation to Improve Water Quality in the Szczecin Lagoon

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**ABSTRACT**

STYBEL, N., FENSKE, C. and SCHERNEWSKI, G., 2009. Mussel cultivation to improve water quality in the Szczecin Lagoon. Journal of Coastal Research, SI 56 (Proceedings of the 10th International Coastal Symposium), 1459 – 1463. Lisbon, Portugal. ISSN 0749-0258.

# Macrophytes in the Szczecin Lagoon

*PRACE MORSKIEGO INSTYTUTU RYBACKIEGO. Tom 15, Seria A*

UDC 597.587.9 : 591.134

*Anna Garbacik-Wesołowska*

# ROŚLINNOŚĆ ZALEWU SZCZECIŃSKIEGO

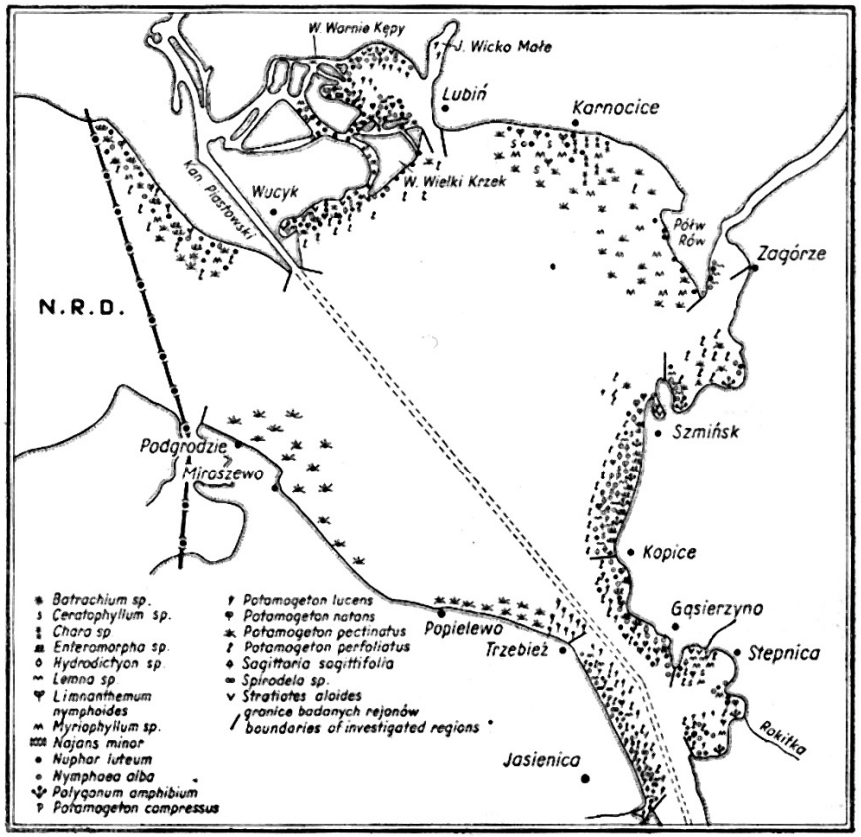
## РАСТИТЕЛЬНОСТЬ ЩЕЦИНСКОГО ЗАЛИВА

## VEGETATION OF THE FIRTH OF SZCZECIN

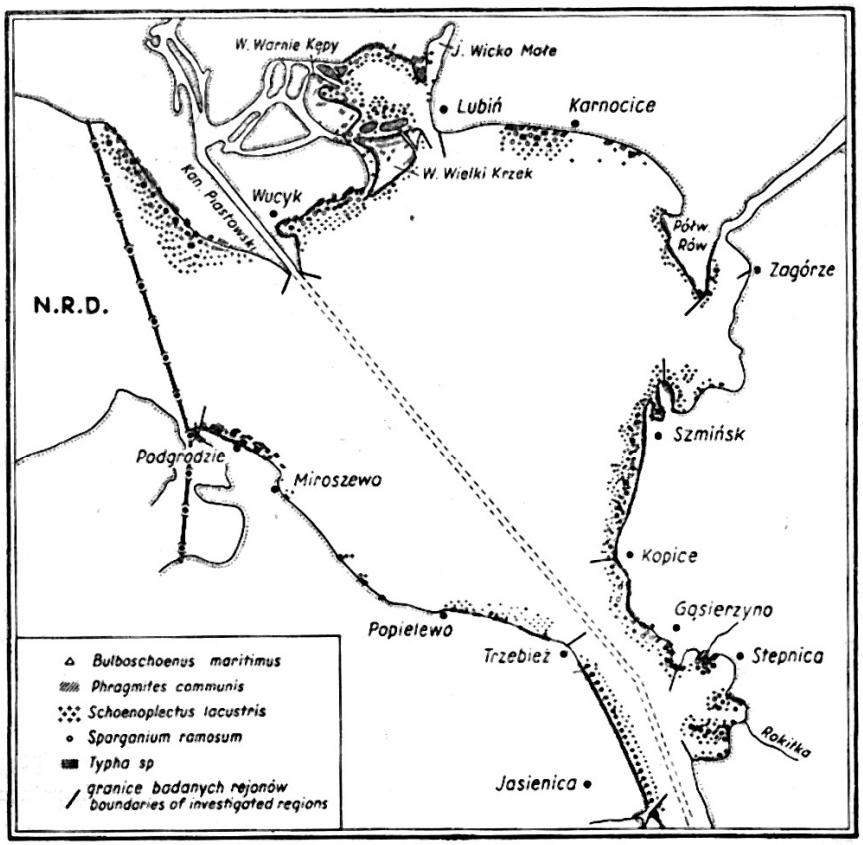
**Abstract.** This paper aims at determining the species composition of plant communities — phytocoenoses, their distribution and extension in the parts of the Firth of Szczecin belonging to Poland. The scrutiny of this topic is of certain importance considering that the areas, on which these plant species occur are spawning grounds for numerous fish species and also their feeding base.

Plant species characteristic for brackish—waters have not been detected in the Firth of Szczecin.

**1969, field work - 1967**




**Rys. 6.** Rozmieszczenie roślinności miękkiej na Zalewie Szczecińskim
**Fig. 6.** Distribution of the „soft" vegetation in the Firth of Szczecin




**Rys. 7.** Rozmieszczenie roślinności twardej na Zalewie Szczecińskim
**Fig. 7.** Distribution of the „hard" vegetation in the Firth of Szczecin

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**2000 – 2001**

**Disappeared:**

- ***Bulboschoenus maritimus***
- ***Limnanthemus nymphoides***
- ***Chara sp***

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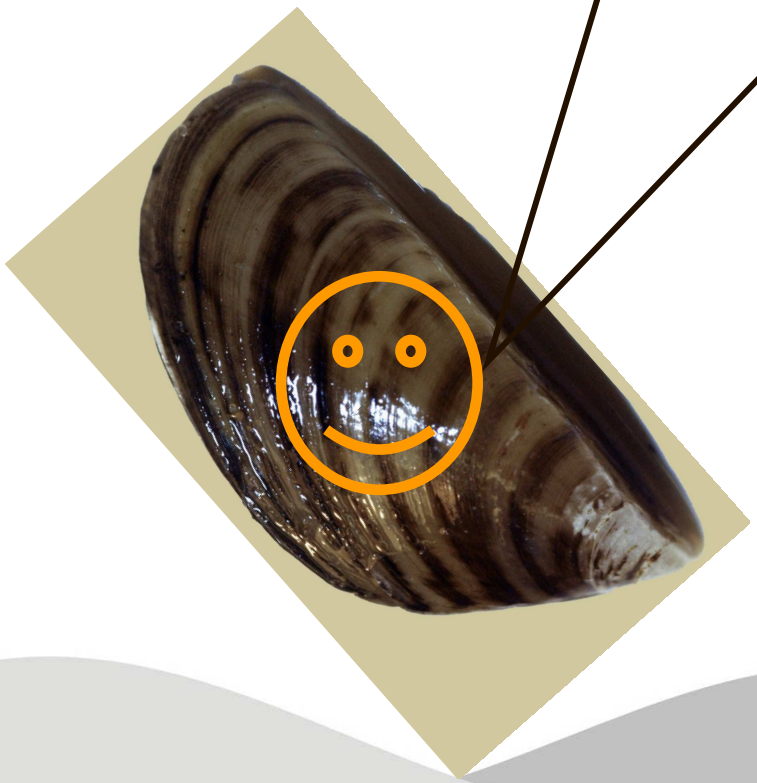
# Thank you for your attention



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