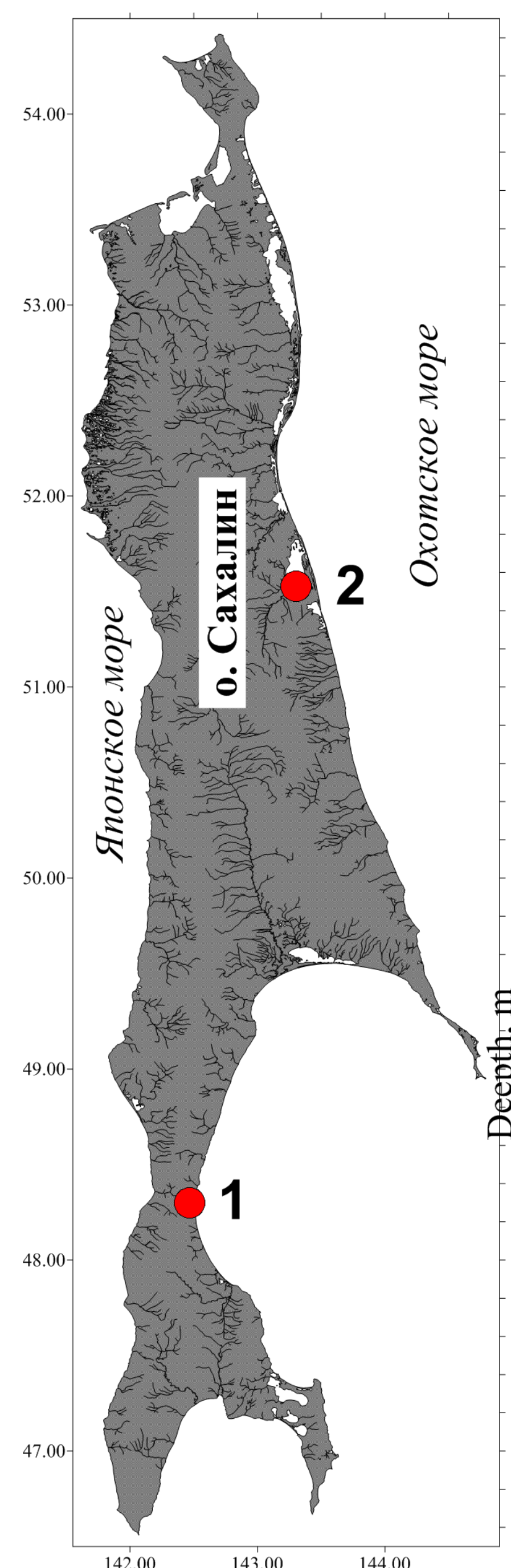


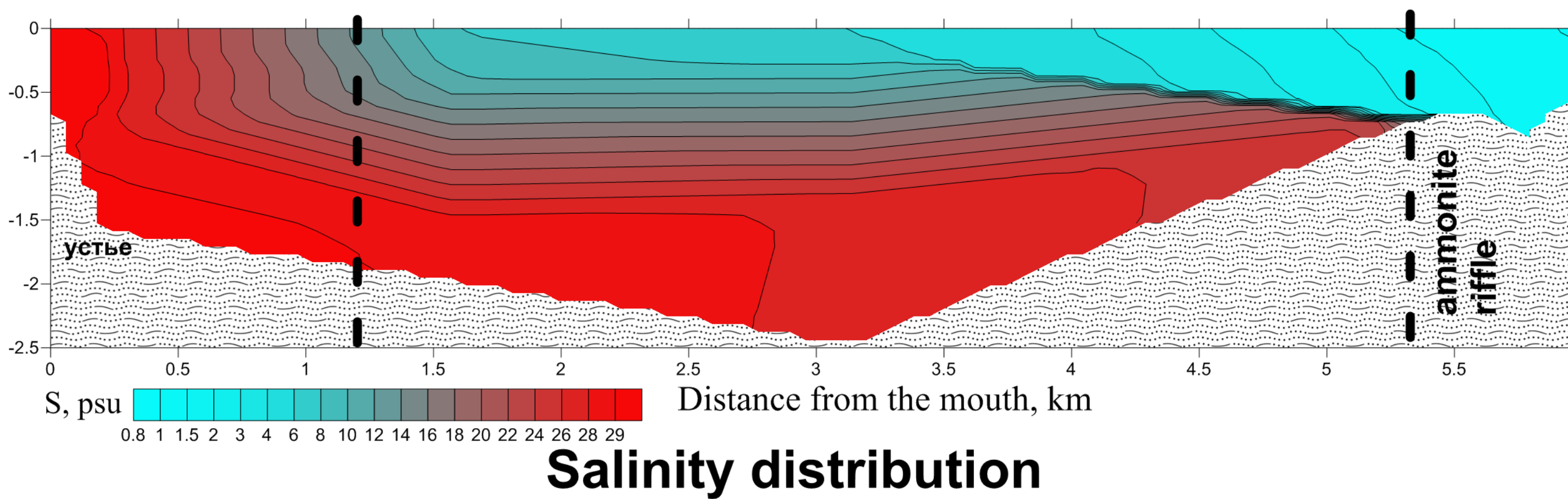
# Macrozoobenthos of river estuaries of Sakhalin Island

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1) "Whole" estuaries of the southern part of the island



Salinity distribution

River estuaries in the southern part of the island are characterized by a complete set of estuarine elements in terms of water salinity: upper estuary (oligohaline zone); middle estuary (mesohaline zone); lower estuary (polyhaline zone). The boundaries between parts of the estuary are the  $\alpha$ -horohaline boundary (5–7 psu) and the  $\beta$ -horohaline boundary (22–26 psu). The mesohaline zone is indistinct. The water column in it is two-layered.

24 species of benthic invertebrates and cyclostomes form the species composition of macrobenthos in the estuary of the Manuy River. Species richness varies insignificantly across the estuary, from 4 species/section in the upper part to 9 species in the lower part. A decrease in species richness was noted at the border of the lower and upper estuarine zones. This corresponds to the provisions of the theory of critical salinity.

A decrease in macrobenthos density was noted from section 1 at the river mouth to section 5 (the boundary between the lower and upper estuaries) from  $808 \pm 162$  ind./m<sup>2</sup> to  $16 \pm 2.8$  ind./m<sup>2</sup>. In the upper estuarine zone, the index increases sharply, reaching a maximum ( $1384 \pm 160$  ind./m<sup>2</sup>) in section 8.

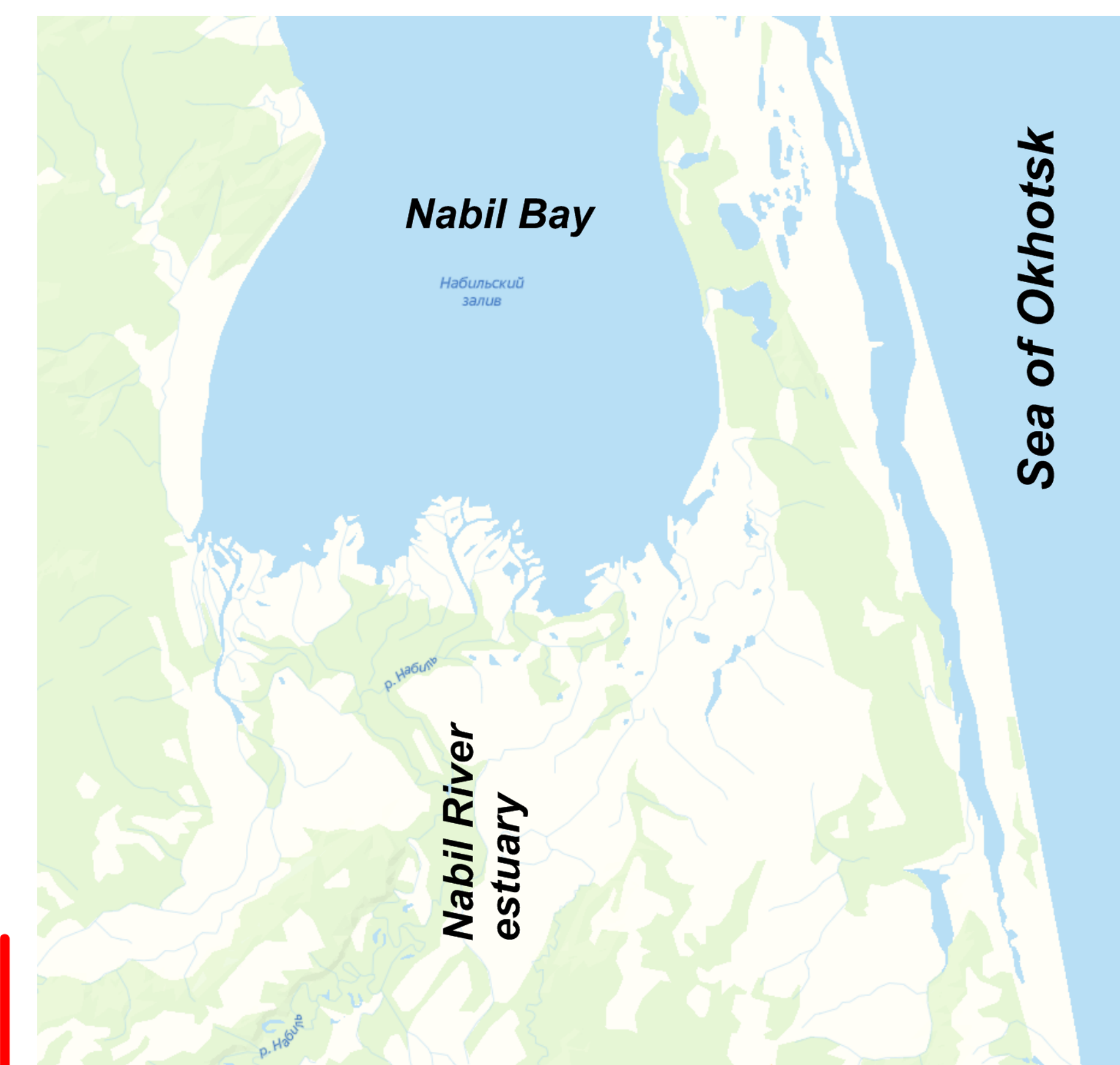
There are two peaks in the distribution of total biomass along the estuary. The first one is confined to the area of the lower estuary in section 4 ( $4.381 \pm 0.589$  g/m<sup>2</sup>), the second one is noted in the upper estuarine zone (up to  $28.950$  g/m<sup>2</sup> in section 7). The area of critically low biomass  $0.076 \pm 0.015$  g/m<sup>2</sup> falls on section 5.

The boundary between the meso-, polyhaline lower estuary zone and the oligohaline upper estuary zone, according to biological indicators and indices, stretches for several hundred meters.

Four benthic communities were identified by various methods of cluster and ordination analysis, regardless of the method of analysis. Two communities are confined to the upper estuarine zone: the *Eogammarus kygi* community and the *Neomysis awatschensis* community. One community of *Hediste japonica* was noted throughout the lower estuarine zone. This community gives way to the community of *Haustorioides* at the mouth of the river.

Gathering detritivores (Br) form the basis of biomass and macrobenthic production at the river mouth; collecting detritophages – sestonophages (Dt, Su) are most significant in the lower estuary zone; collecting detritivores – macrogrinders – scavengers (Dt, Br, Sc), collecting detritivores (Dt) and ground feeders – collecting detritivores (De, Dt) are the key trophic groups in the upper estuary zone.

An increase of the daily production of macrobenthos was noted in the upper part the lower estuary and upper estuary zones, both.



2) Oligohaline estuaries of the northern part

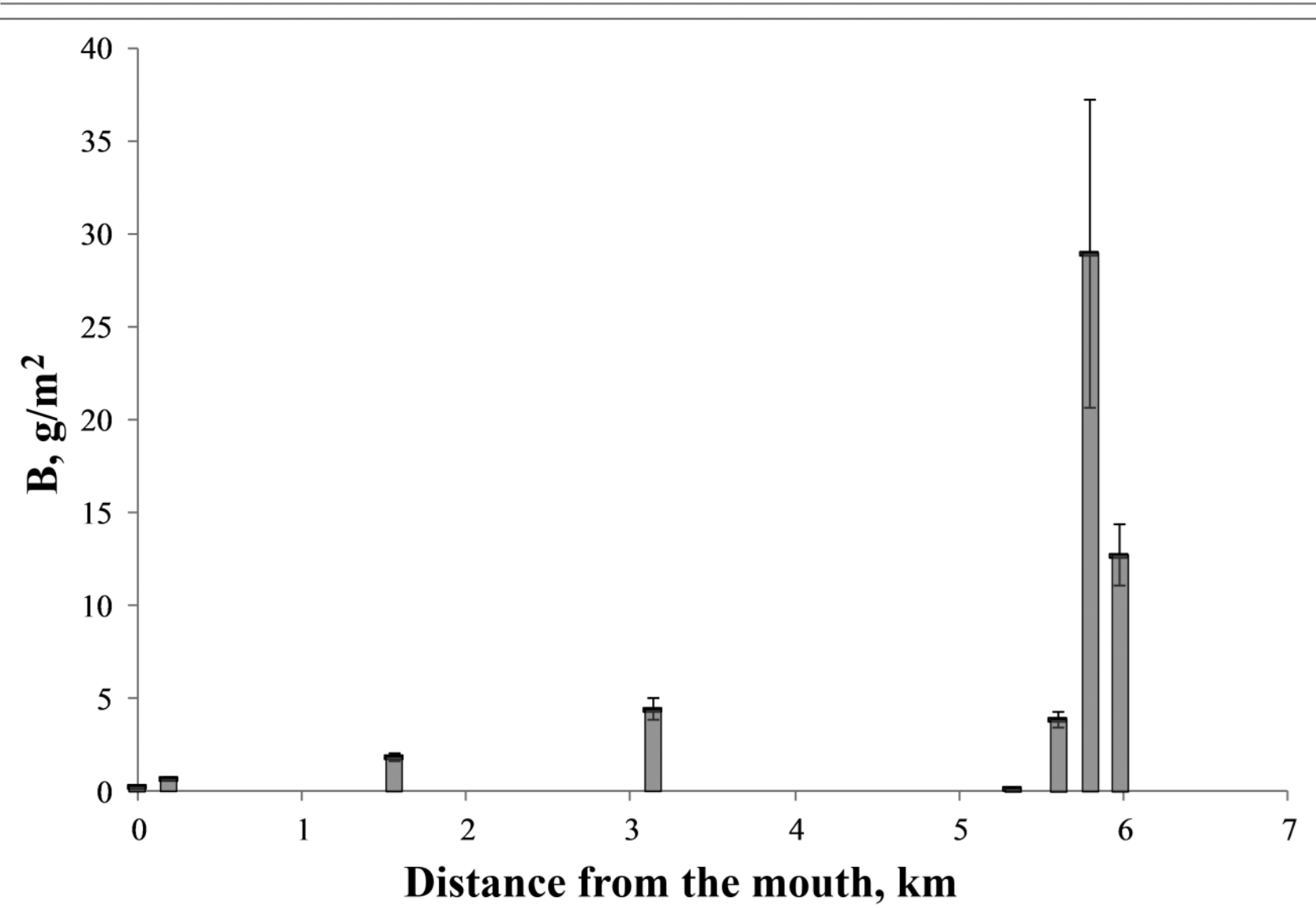
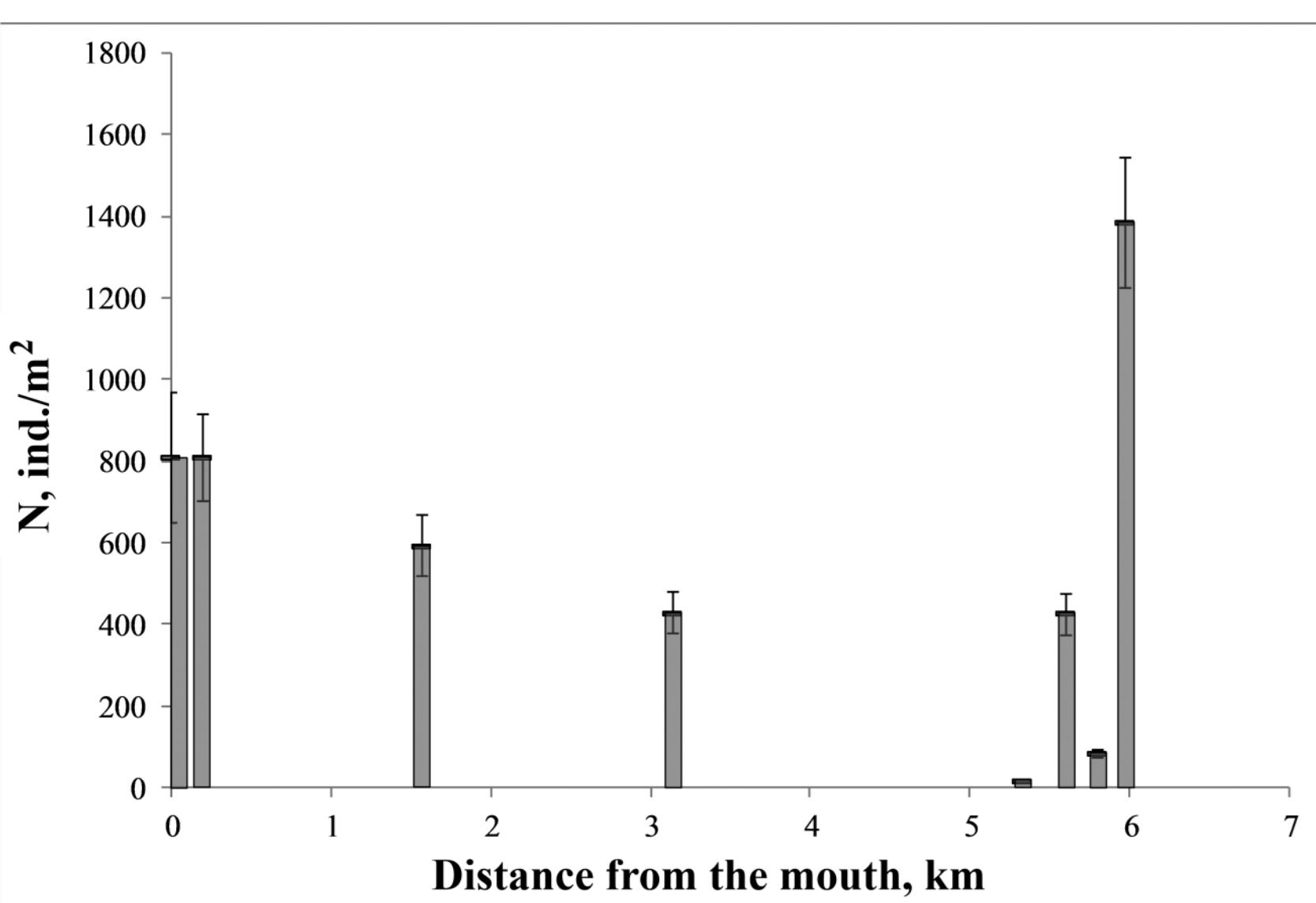
The rivers of the northern part of the island flow into vast lagoons, which play the role of the mesohaline and polyhaline parts of the estuary. River estuaries proper are represented only by oligohaline zones.

The basis of the species composition of the benthos was formed by Diptera, represented by various species of chironomids (16 species out of 33 encountered) and Oligochaeta (5 species). Diptera and Cumacea formed the basis of the total density (48.0 and 34.1%, respectively).

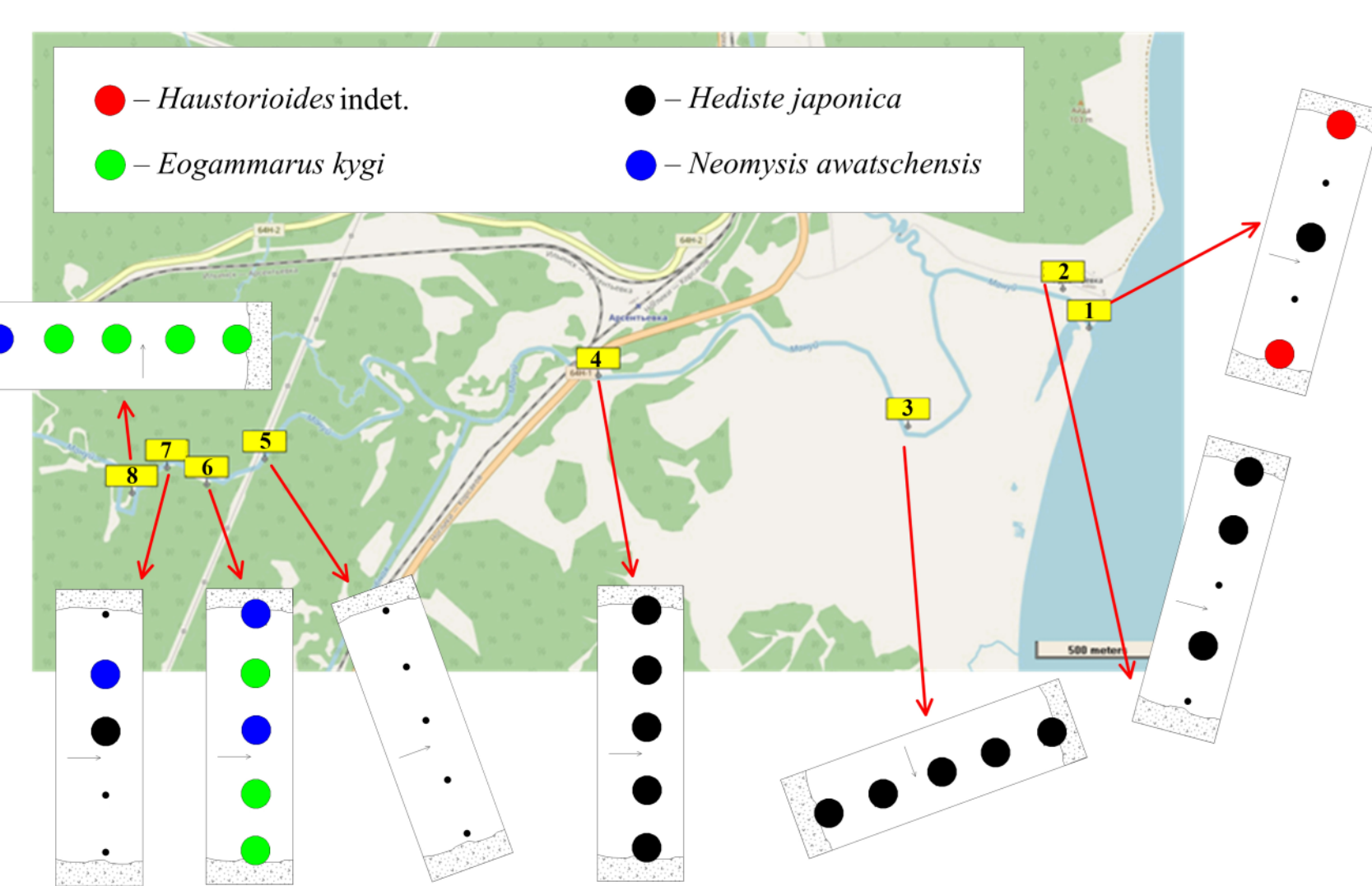
Gastropoda prevailed in terms of biomass (40%). *Cincinna tymiensis* is dominant in terms of biomass (36.6% of total zoobenthos biomass).

Integral indicators of abundance:  $1588 \pm 178$  ind./m<sup>2</sup>,  $2.745 \pm 0.449$  g/m<sup>2</sup>. Weighted average indicators of benthos abundance:  $1619$  ind./m<sup>2</sup>,  $2.337$  g/m<sup>2</sup>.

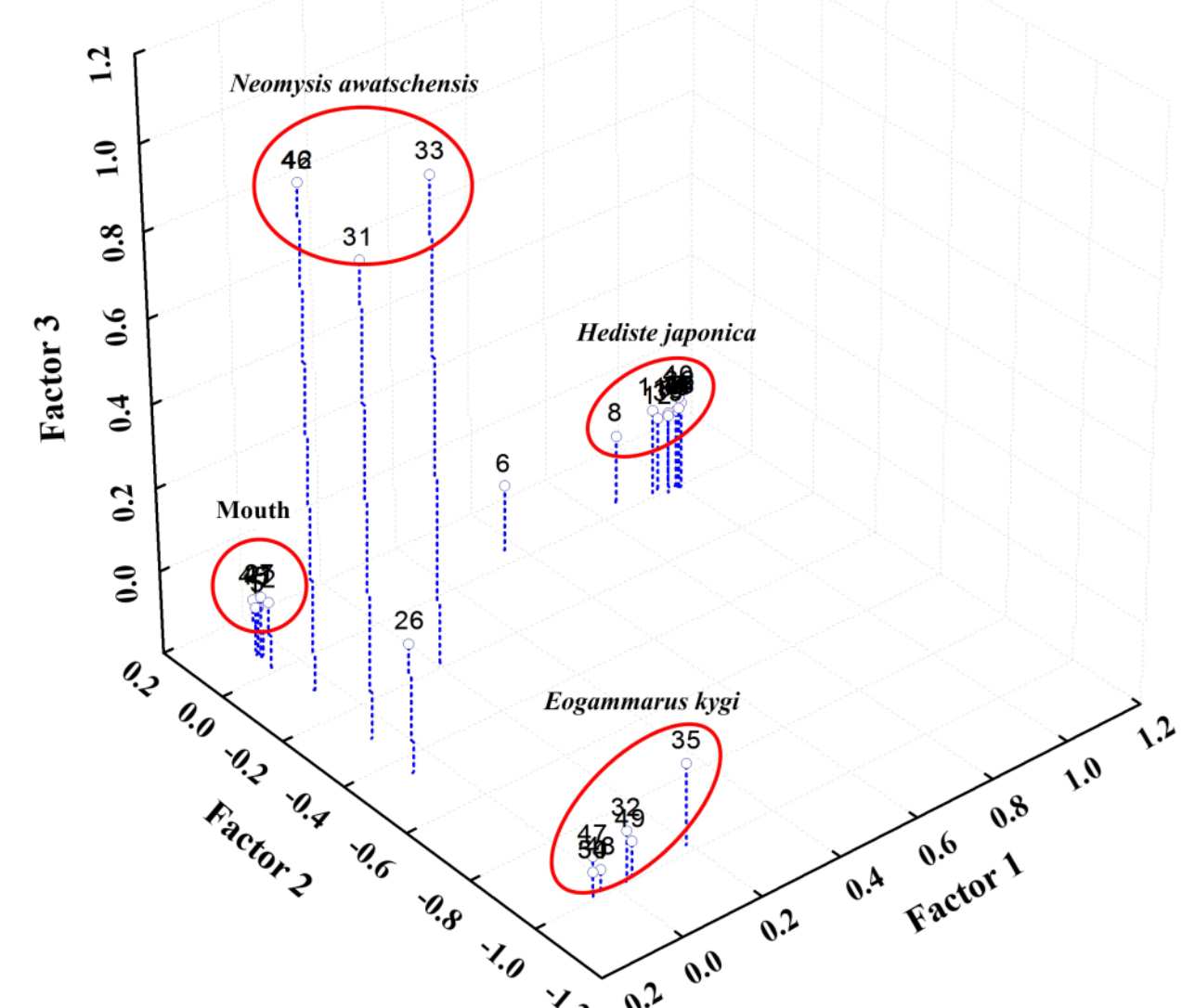
An increase in abundance was noted on the accumulative slope. A separate maximum of biomass was recorded at the maximum depth of the fairway.



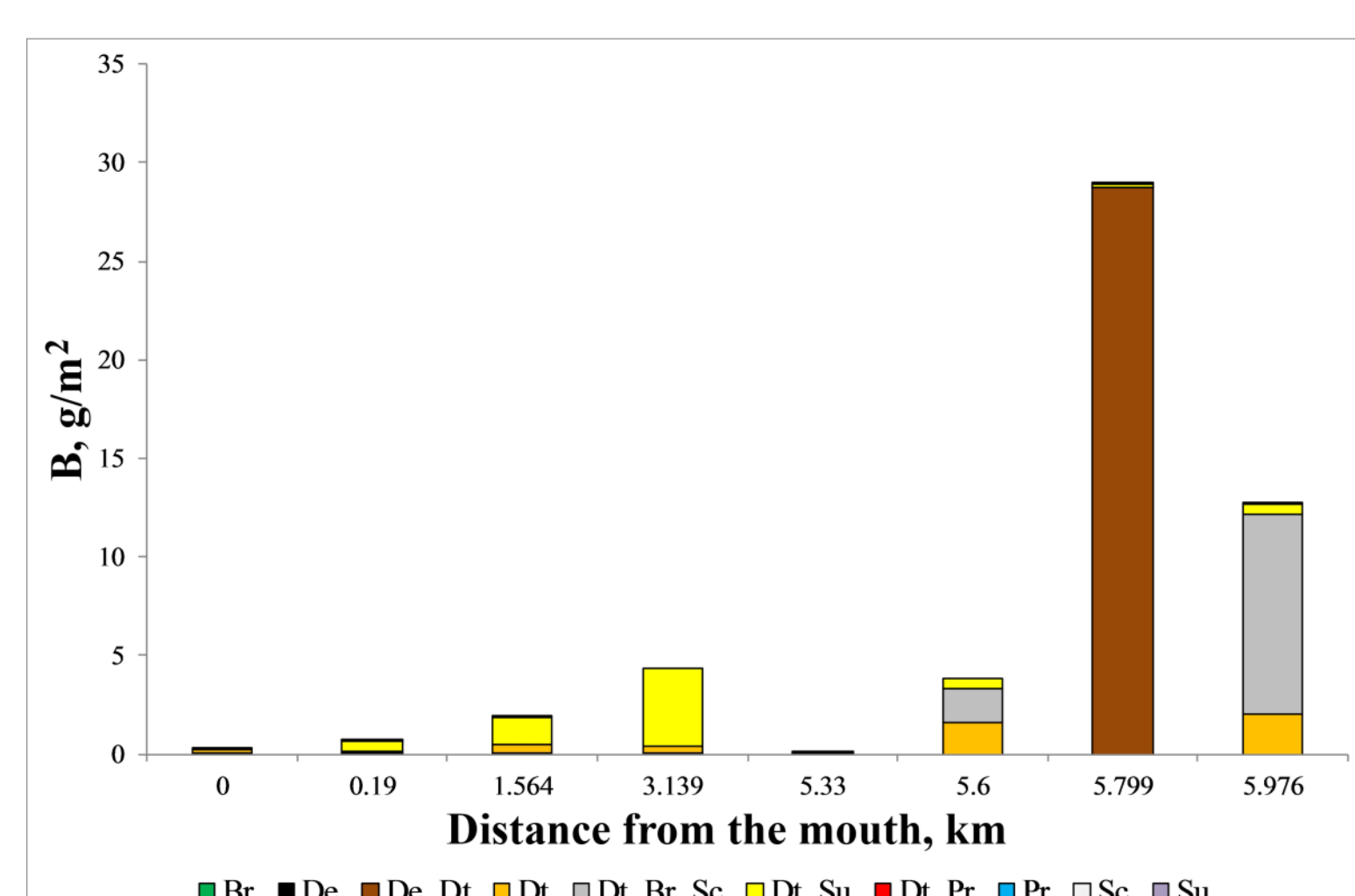
Changes of the density (up) and biomass (down) of the macrobenthos along the estuary of Manuy River



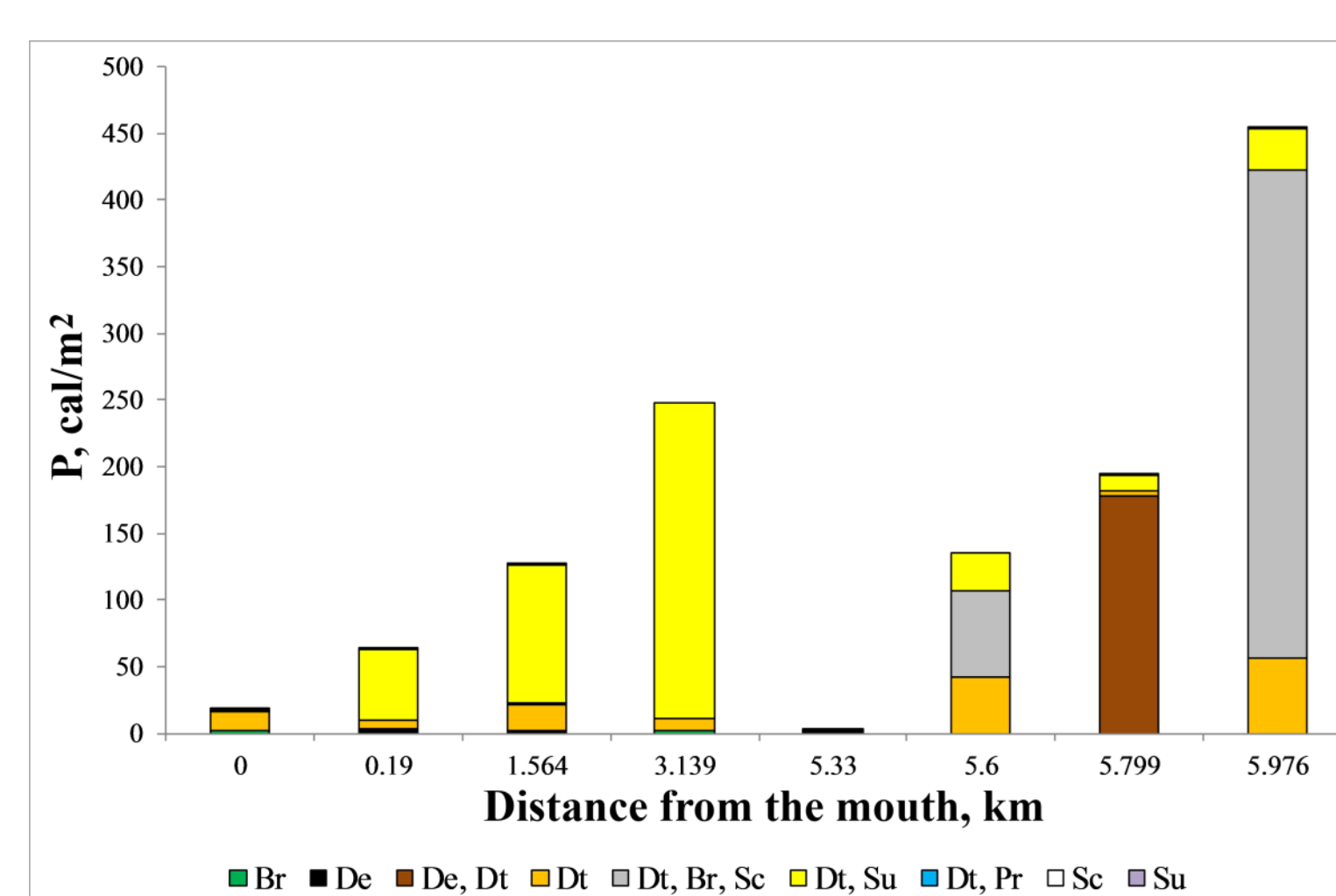
Distribution of the main macrobenthos communities in the Manuy River estuary



An ordination plot of the similarity of benthic stations by the main components method



Biomass changes (B, g/m<sup>2</sup>) of trophic groups along the estuary of Manuy River



Changes of production (P, cal/m<sup>2</sup>) of macrobenthos and its constituent trophic groups along the estuary of Manuy River