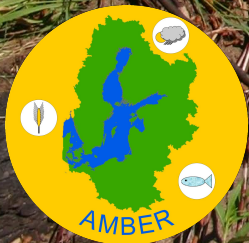
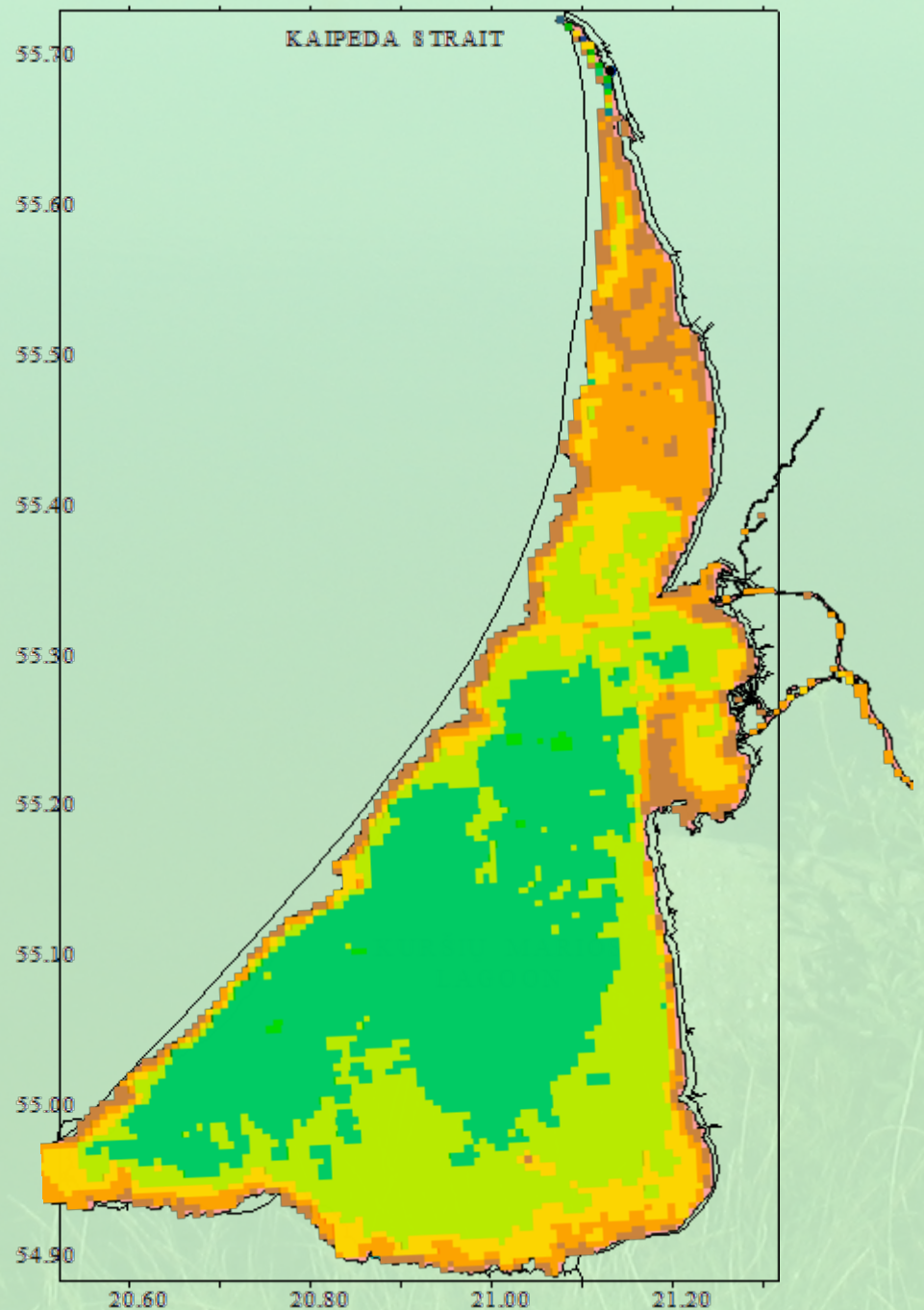
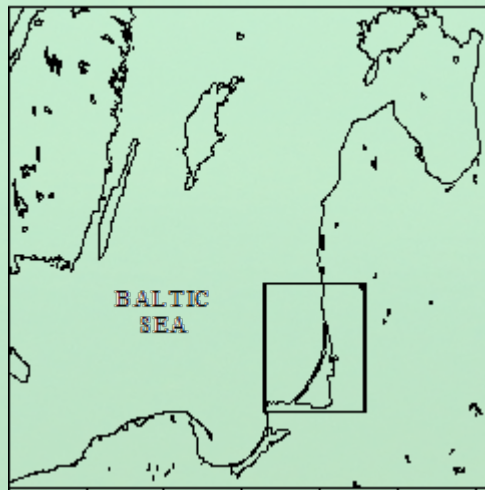


N budget and eutrophication management in the Baltic lagoon: beyond the drainage basin nutrient load reduction measures

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Area: 1584 km²

Volume: 6.2 km³

Max depth: 5.8 m

Mean depth: 3.8 m

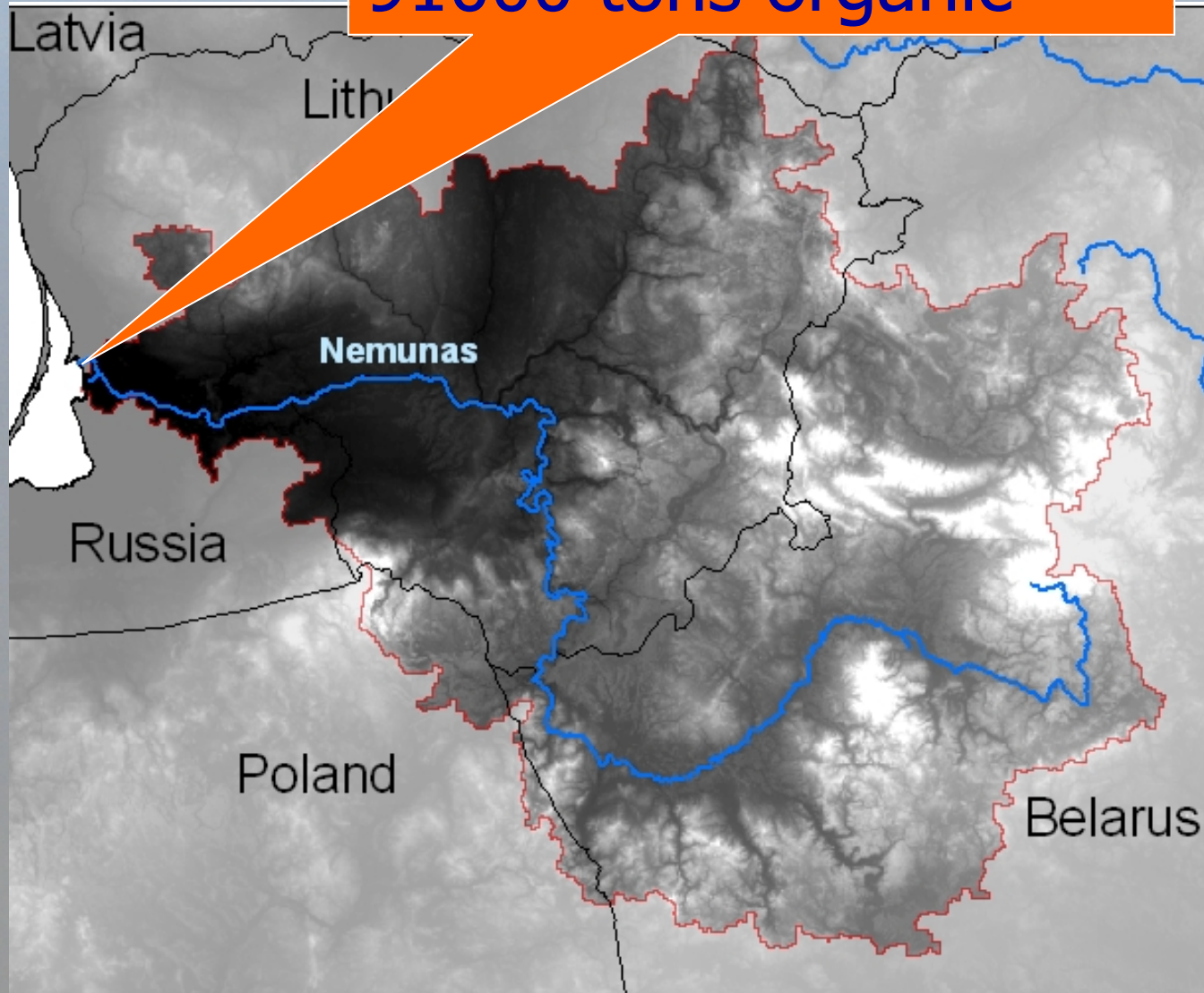
Salinity: 0-8 psu



The drainage basin

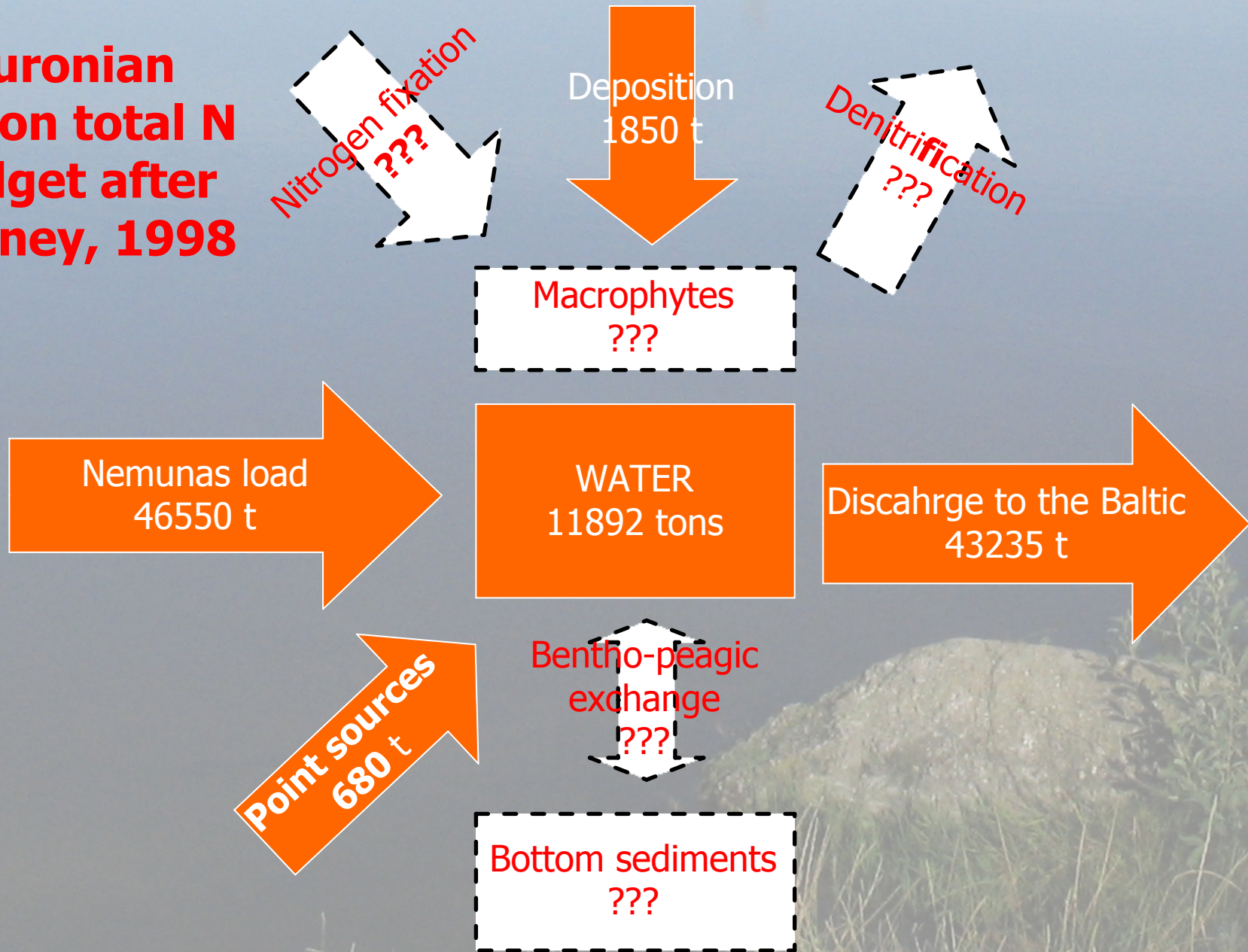
Up to 50000 tons N
3000 tons P
91000 tons organic

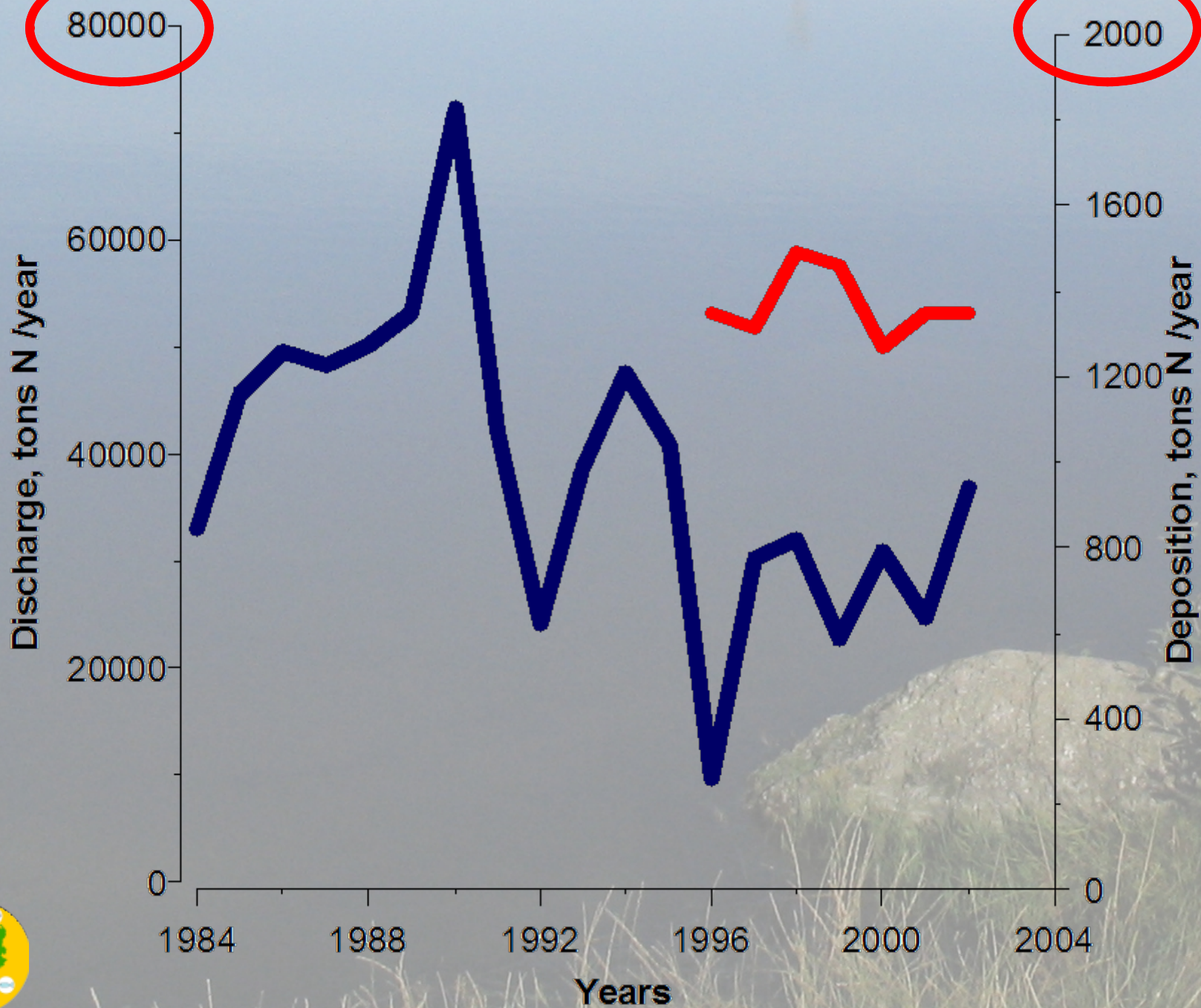
drainage area:
460 km² – 98%
to the Nemunas River



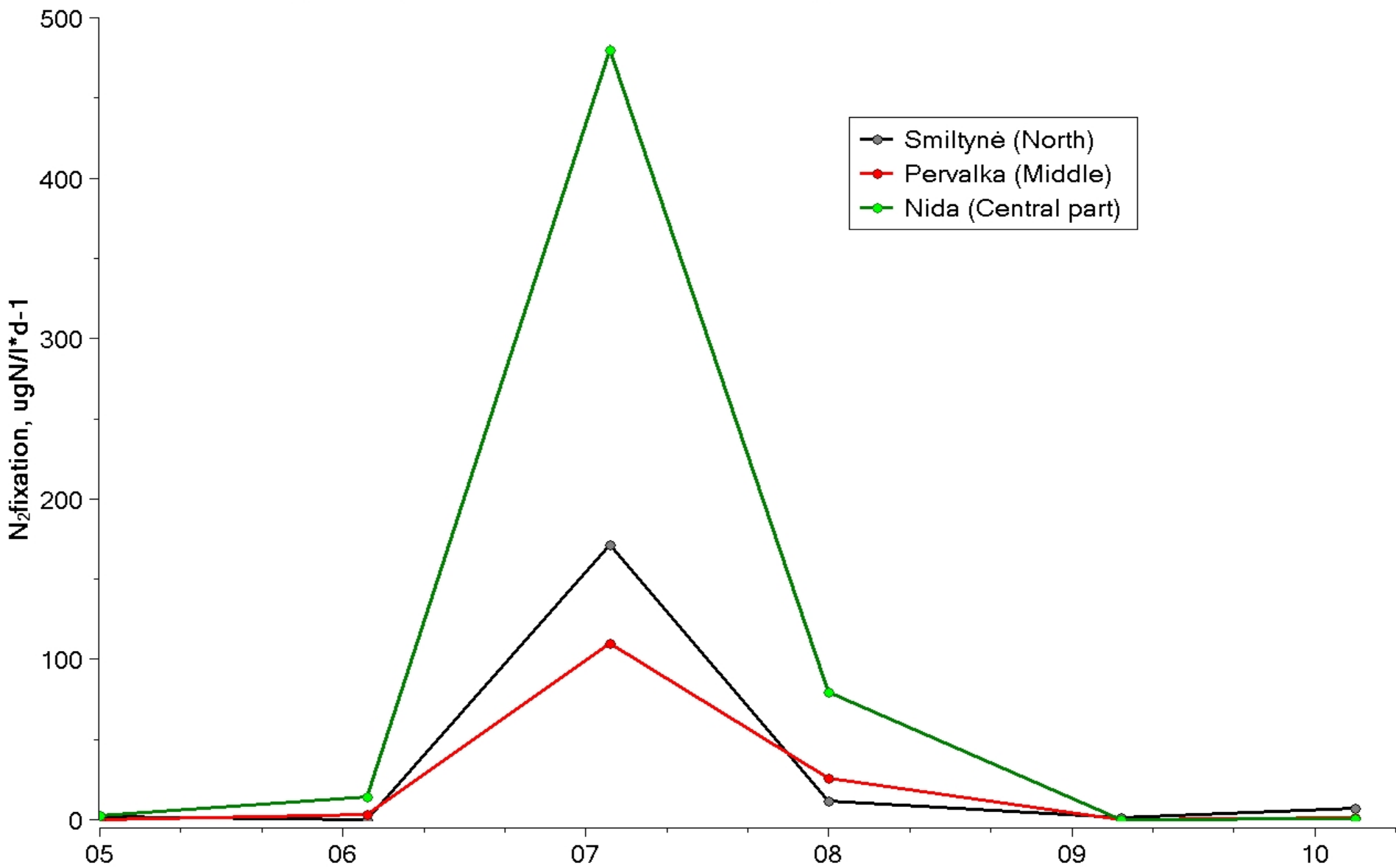
The Nemunas basin covers 75% of the Republic territory. The Nemunas length - 937 km. Basin area – 97 923,8 km².

Curonian lagoon total N budget after Swaney, 1998





Daily nitrogen fixation rates seasonal dynamics at 3 stations in 2005



After Paškauskas et.al., in preparation



**Total N Budget
revised**

(for 2000-2007)

**Nitrogen fixation
to 3956 t (2005)**

Deposition
1493 t

Denitrification
???

Nemuna
26820 t (19...)

**EXCESS
of 6000-10000
tonsN/year !!!**

Charge to the Baltic
23420 t

From the Baltic
1463 t

Point
680

**Bottom sediments
Upper 5 cm
983575.8 tons**



Total N Budget revised

(for 2000-2009)

Nitrogen fixation
up to 3956 t (2005)

Deposition
1493 t

Denitrification
~14000

Nemunas load
26820 t (1996-2002)

Macrophytes
9365 t

WATER
9920 t

Discharge to the Baltic
23420 t

From the Baltic
1463 t

Point sources
680 t

Benthic-peagic
exchange
???

Bottom sediments
Upper 5 cm
983575.8 tons



Programme to improve the water quality in the Curonian lagoon (part of the BSAP)

- Approved in 2006 by the Lithuanian government
- **Nitrogen** load reduction by **14%** and **phosphorus** loads by **6%** (according to the targets of the BSAP by 2010)



SCENARIO

Baseline: calibrated on the real data for 1999-2000 (includes both “dry” and “wet” year) NPZD model (Razinkovas et. al. 2008)

Load rediction scenario

- Hydrometeorological and discharge data as for 1999-2000
- **Nitrogen** load reduction by **14%** and **phosphorus** loads by **6%** (according to the targets of the BSAP by 2010)



RESULTS:

1. Relative decrease in water column characteristic values

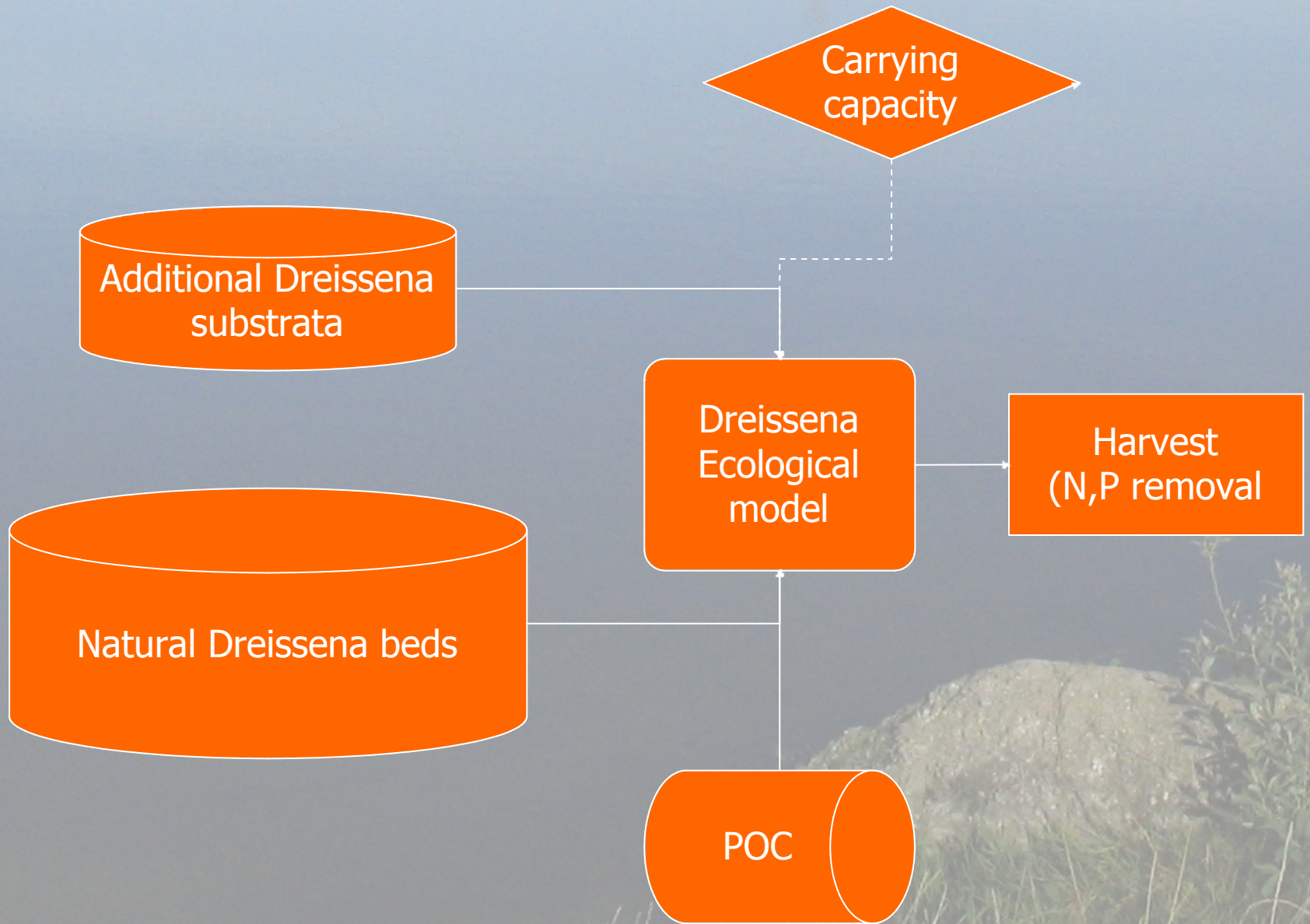


After Razinkovas et.al., 2008



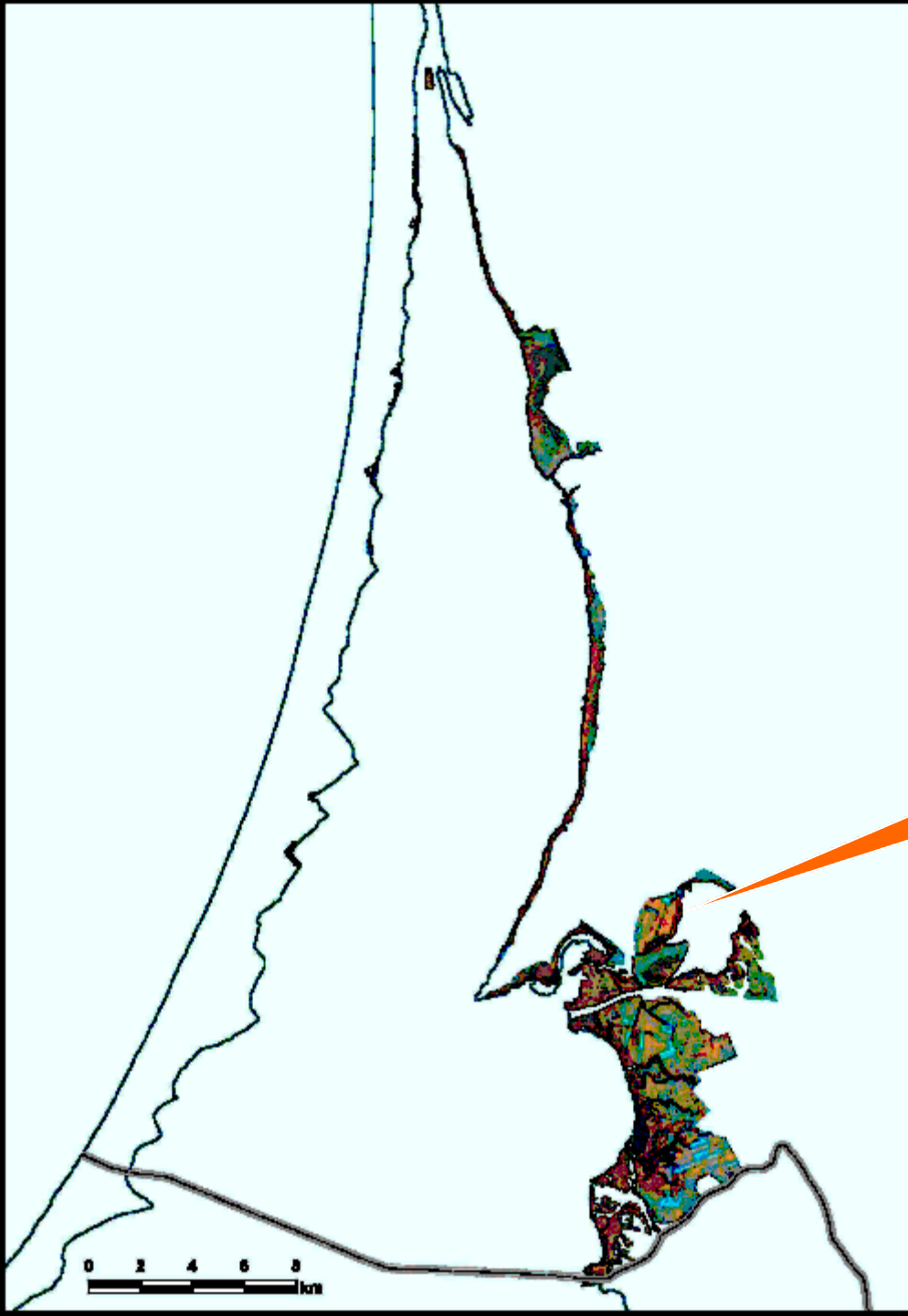
ZEBRA MUSSEL FARMING



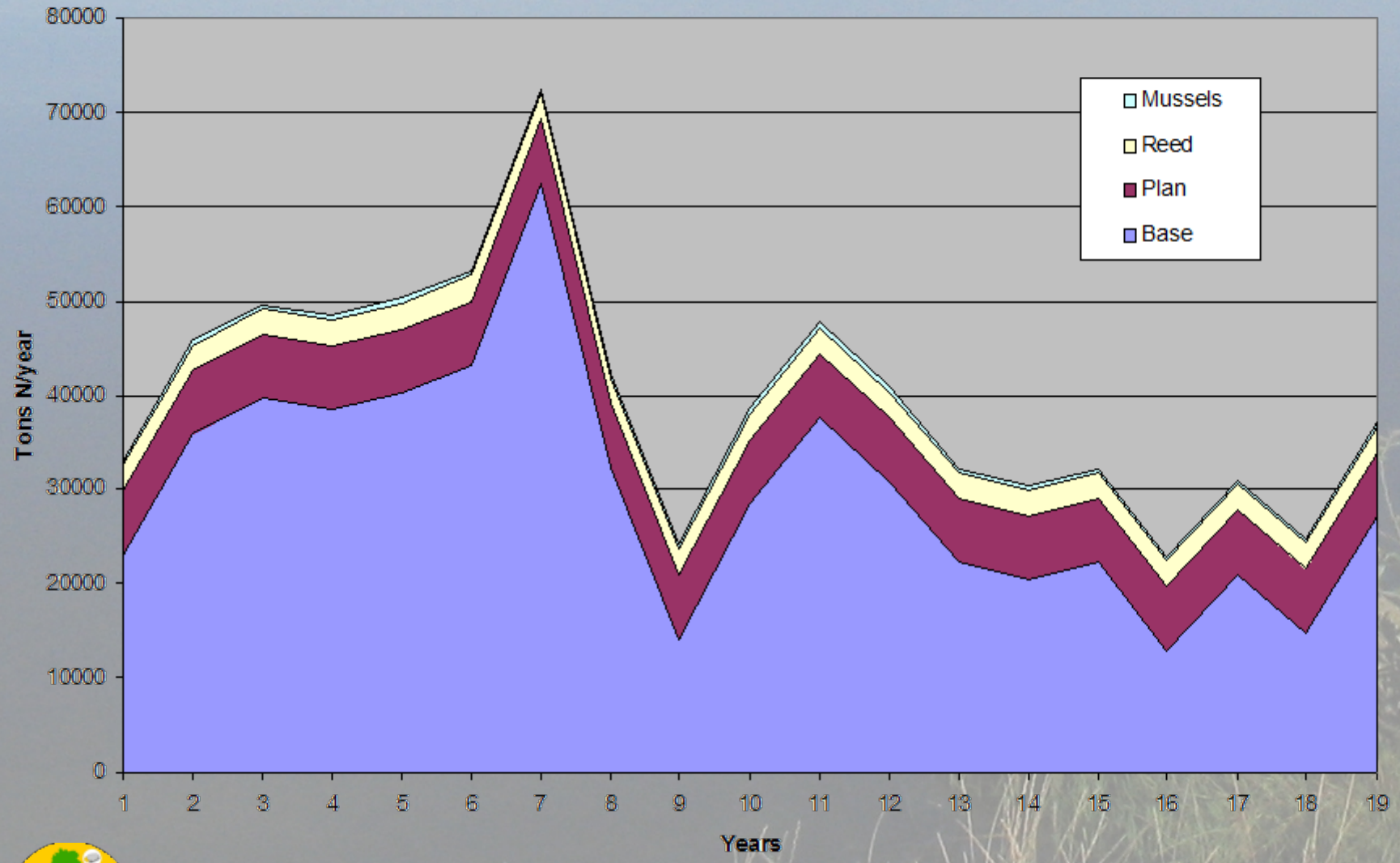


REED BED HARVESTING

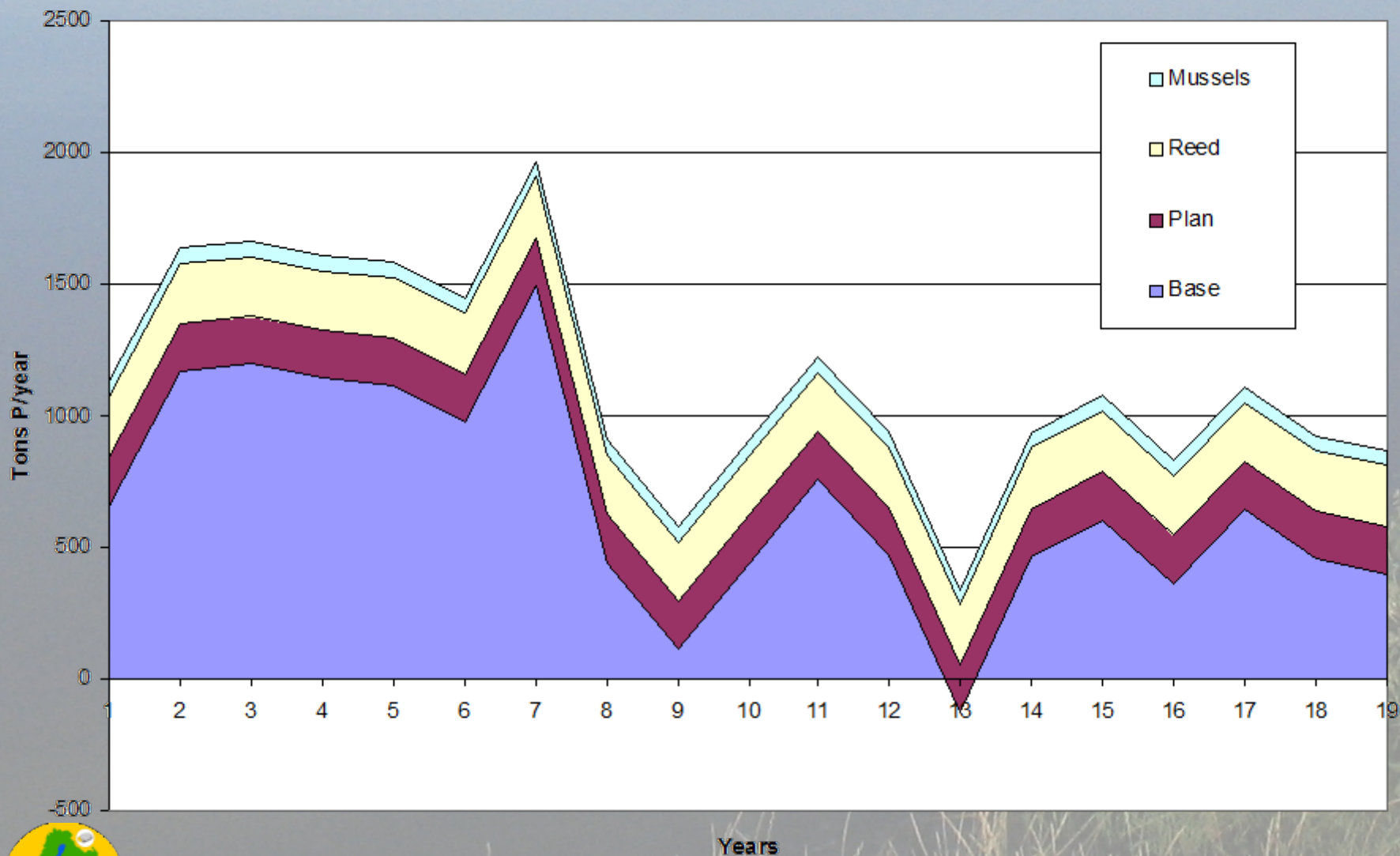
Potential reed beds for harvesting - calculation from the satellite image



Different measures for N reduction



P reduction measures



CONCLUSIONS

- Recalculated and corrected N budget for 2000-2008 is significantly lower than earlier estimates.
- The recently obtained denitrification rates gap the N balance inconsistency making the Curonian lagoon a nitrogen sink.
- Proposed nutrient reduction programme in the watershed will not change drastically the water quality in the Curonian lagoon
- Internal measures are quite limited, but could bring some positive effect in terms of phosphorus reduction, which appears to be more important than nitrogen



Thank you

