

# Salacgriva case. Round goby

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**A SYSTEM APPROACH FRAMEWORK FOR  
COASTAL RESEARCH & MANAGEMENT**



## The round goby *Neogobius melanostomus* (Pallas, 1814)

- **One of the most problematic invasive fish species in recent years in Europe. It has proliferated from its native Ponto-Caspian region to several European river systems including their mouths and coastal brackish waters.**
- **First observed in the Baltic Sea in Gulf of Gdansk, in 1990, likely arrived via ship ballast water (review by Sapota 2006).**



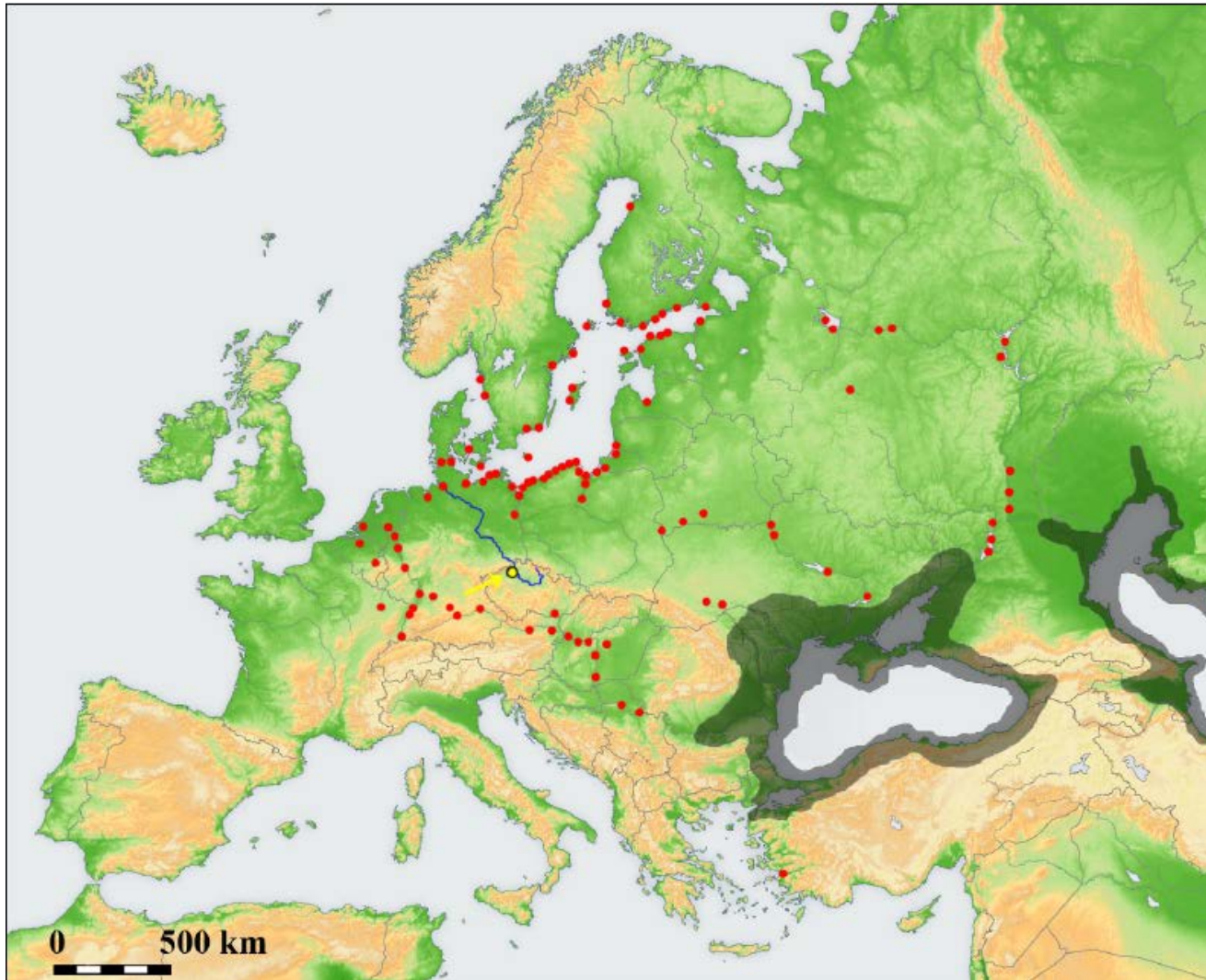
# The round goby *Neogobius melanostomus*

(photo G.Sigajevs)





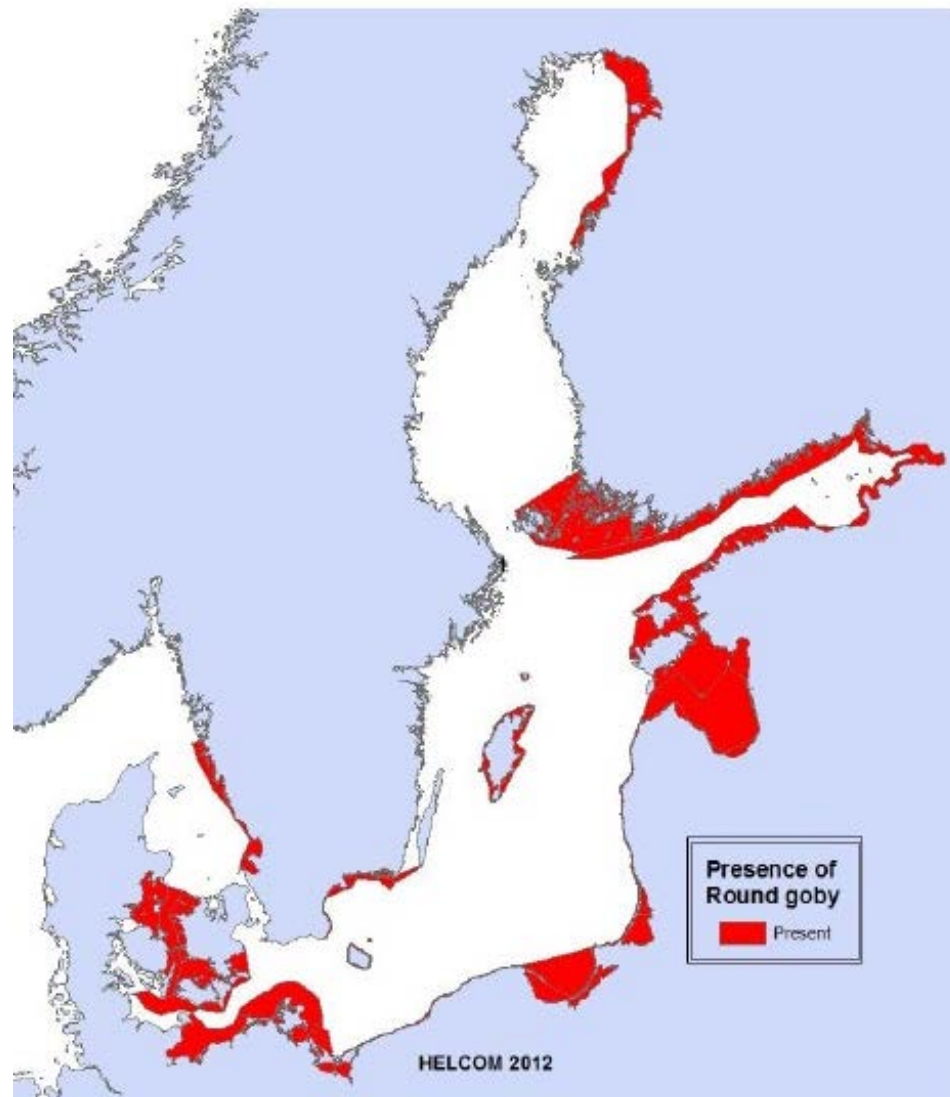
# Native range (grey) and current distribution ( Kornis et al., 2012)





# Invasion trend.

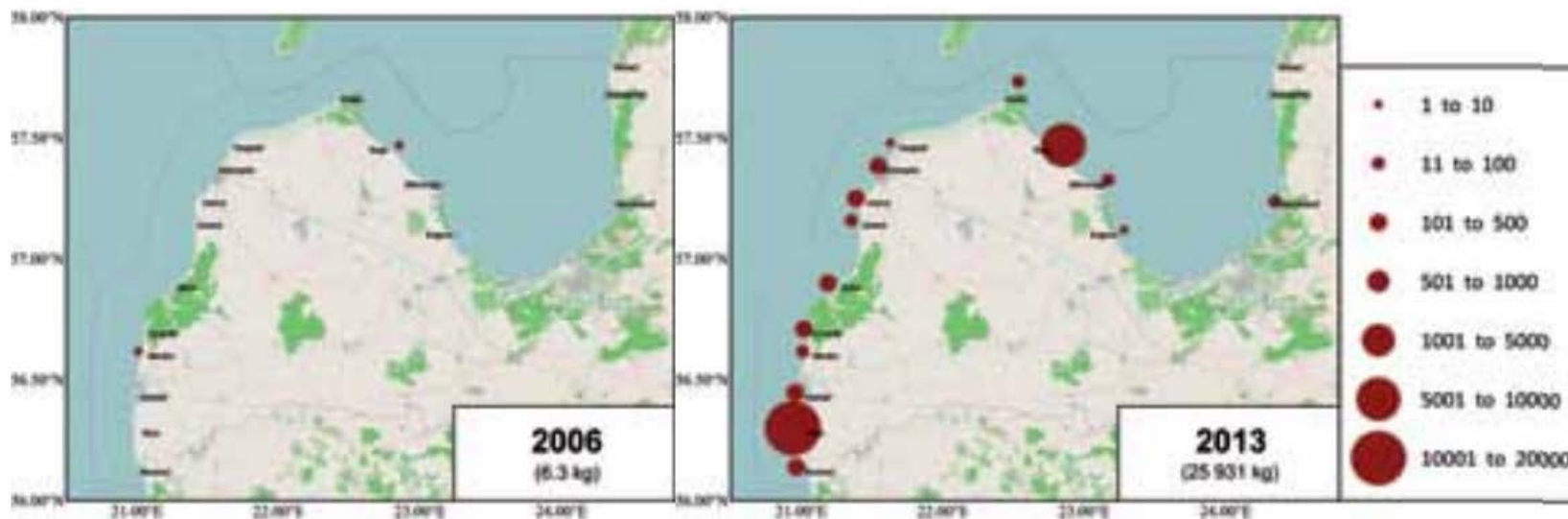
<http://www.helcom.fi/baltic-sea-trends/environment-fact-sheets/biodiversity/abundance-and-distribution-of-round-goby>





# Distribution of Round goby in catches 2006. and 2013.

Knospina E., Putnis I, 2015





# Round goby

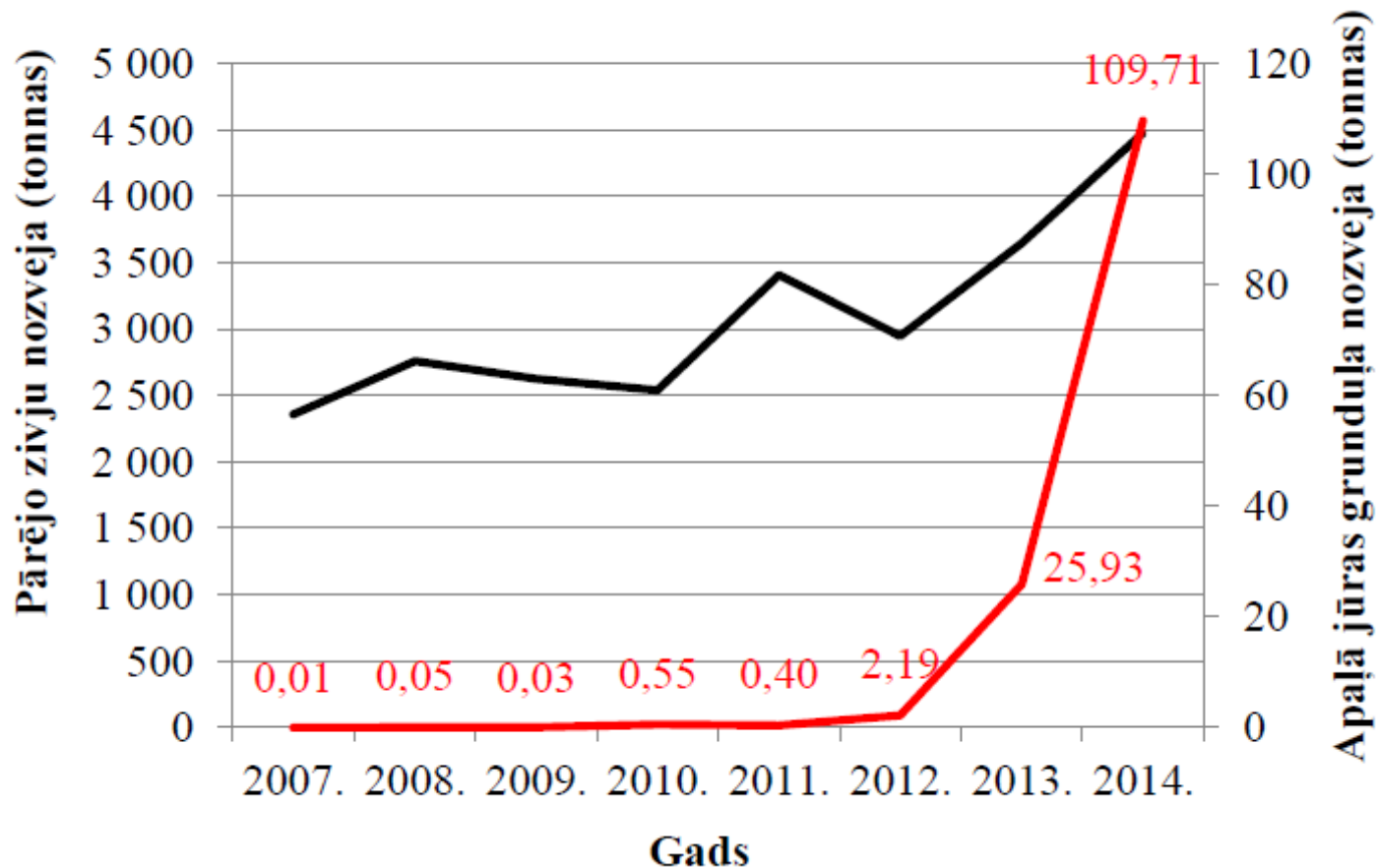
photo A.Urtans





# Total commercial catch of Round goby (red)

(Institute of Agrarian economy Latvia, 2015)







## Current period and prospects for 2017

- **2015. - 160 – 200 t**
- **2016. - catch 500 t**
- **2017. - forecasts  
about 1000 t**





# Feeding activity and diet composition of Round goby.

( Skabeikis, Lesutiene, 2015.)

- investigated in the south-eastern Baltic Sea, in the Lithuanian coastal waters during May-October 2012 .
- Feeding activity of round goby varied depending on the body size, sex and stage of the reproduction period. The gut contents of < 50 mm specimens were dominated by zooplanktonic and meiobenthic organisms, whereas larger individuals (50–99 mm) shifted to amphipods and mollusks.
- Individuals of the intermediate 100-200 mm length had a variable diet, changing depending on the season; in spring they mostly preyed on *Macoma balthica*, in summer – on polychaetes, while in autumn the contribution of *Mytilus trossulus* and fish considerably increased in their diet.
- Diet composition of individuals  $\geq 200$  mm was relatively constant in the course of the study with substantial preference to *M. balthica*. These findings imply that benthic fauna, particularly a newly settled generation of epibenthic mollusks in autumn is under strong predatory pressure of the round goby



## Role in the food web

- Round goby is a mussel feeder, feeding also on arthropods, and therefore competes with flatfish and eelpout (Sapota, 2006).
- According to the review (Kornis et al. 2012), the mussels comprise 65-89% of the diet of Round goby.

➤ *Macoma balthica* and *Mytilus trosullus*.





## Role in the food web

- **Studies in the Baltic Sea have identified a dietary overlap between the round goby and the flounder, *Platichthys flesus* (Linnaeus, 1758), and documented a negative correlation between their abundances (Karlson et al. 2007; Järv et al. 2011).**
- **The round goby also predated on eggs of commercially valuable fish (Fitzsimons et al. 2006), reduces the density of benthic invertebrates, which are shared prey with numerous native species (Lederer et al. 2008)**

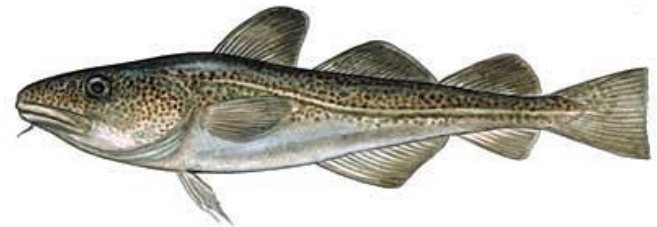




# Eat or be eaten

- *Gadus morhua*, Latvijas zivis, 1998
- *Phalacrocorax carbo*

- **Round goby is the main food item for cod and perch in the Gulf of Gdansk (Almquist et al. 2010). The species is also an important prey item for Great cormorant and Grey heron, contributing locally up to 60-95% of the prey number (Bzoma 1998, Jakubas 2004).**





# Threats

- From the environmental point of view, the decrease in the population of blue mussel and other crustaceans:
- will increase eutrophication,
- reduce water transparency and level of oxygen,
- affects the conditions of the spawning of herrings and other species of fish spawning near the coast.



# Next stop Salacgriva?





# Appropriate substrate

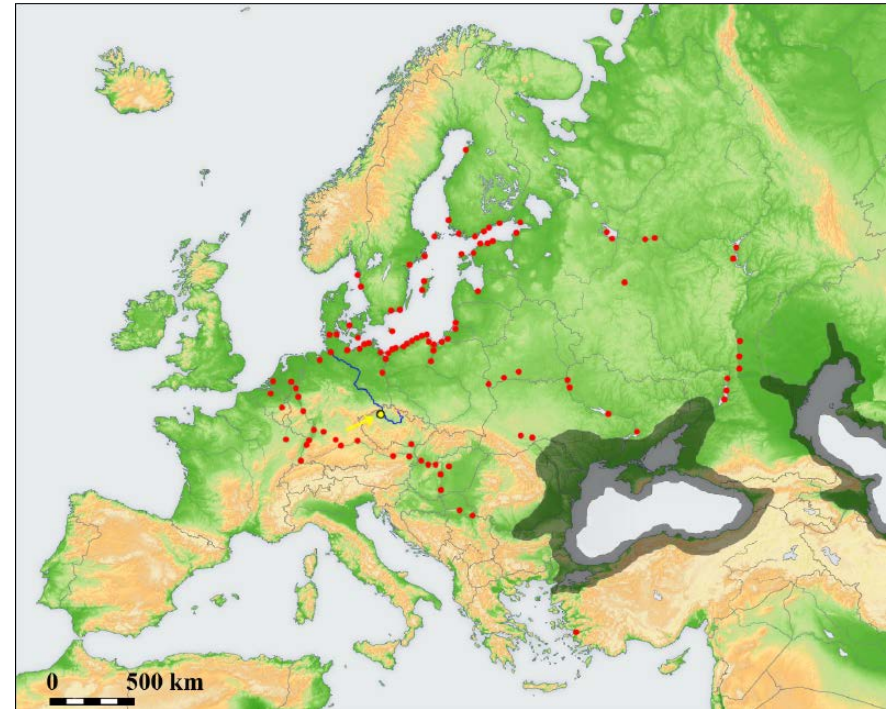
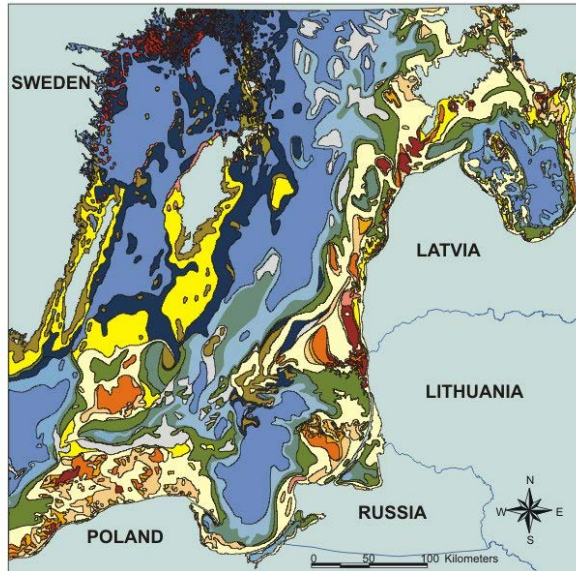
Source: Gelumauskaite, L.-Y., Grigelis, A., Cato, I., Repecka, M. & B. Kjellin (1999): LGT Series of Marine Geological Maps No.1  
SGU Series of Geological Maps Ba No. 54.

## Legend

- Pebble (100-10 mm)
  - Gravel (10-1 mm)
  - Coarse and medium sand (2-0.2 mm)
  - Coarse sand (1-0.5 mm)
  - Sand (1-0.1 mm)
  - Coarse aleurite (0.1-0.05 mm)
  - Medium sand (0.5-0.25 mm)
  - Fine sand (0.25-0.1 mm)
  - Fine sand (0.2-0.06 mm)
  - Coarse silt (0.06-0.02 mm)
  - Fine aleurite mud (0.05-0.01 mm)
  - Pelitic mud (>70% <0.01 mm)
  - Aleurite pelitic mud (50-70% < 0.01 mm)
  - Clay of the Baltic Ice Lake, the Yoldia Sea, and the Ancylus Lake
  - Gyttja clay and clay gyttja (Litorina and Post-Litorina Sea)
  - Crystalline bedrock
  - Sedimentary bedrock
  - Mixed sediments
  - Glacial deposits (till)
- Original Scale 1 : 500 000



Project prepared by  
Baltic Sea Research Institute Germany  
EU-Project CHARM  
[http://www.dmu.dk/1\\_Viden/2\\_Miljoe-tilstand/3\\_vand/4\\_Charm/charm\\_res/charm\\_data\\_res.html](http://www.dmu.dk/1_Viden/2_Miljoe-tilstand/3_vand/4_Charm/charm_res/charm_data_res.html)  
[http://www.io-warnemuende.de/.....](http://www.io-warnemuende.de/)

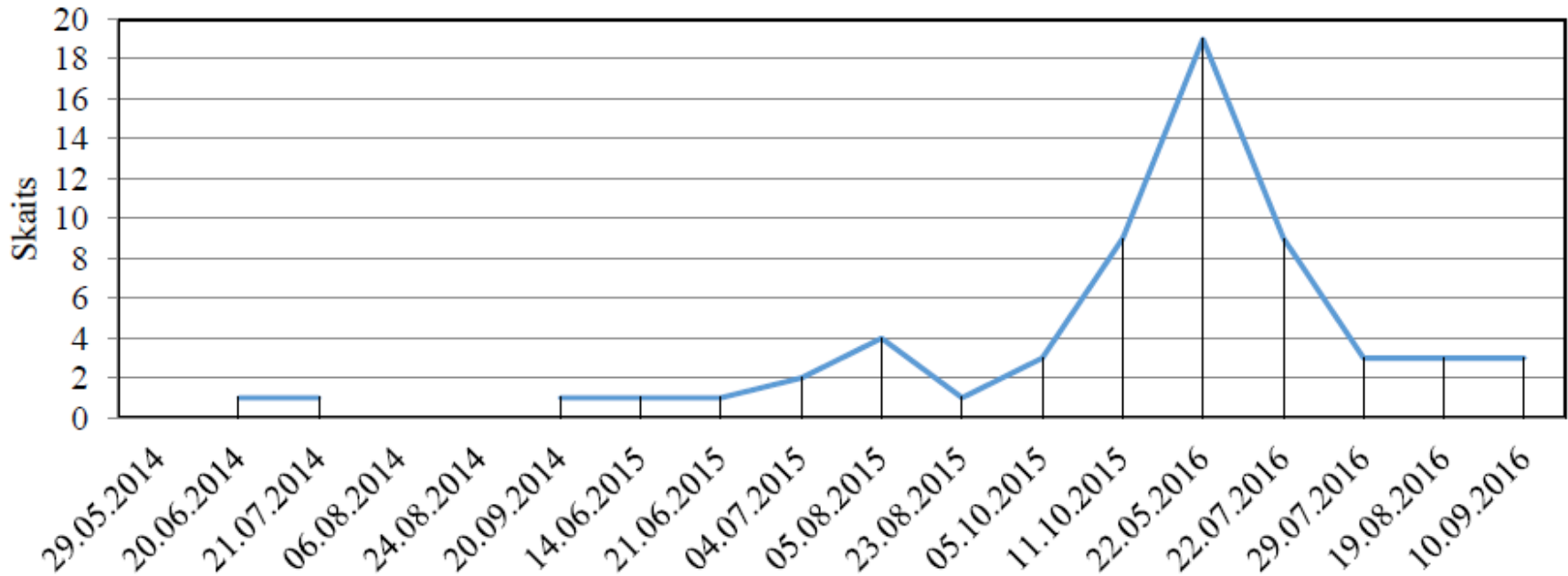






# Spread of Round goby in Salacgriva in scientific catches

M.Pliks, 2017





# Management possibilities



# Management approaches Prevention methods

- No prevention methods have yet been attempted.
- Control of ballast waters and the improvement of the state of local populations of predators should be considered as the best prevention methods.



## Eradication, control and monitoring efforts

- Except for the Azov Sea case, there are no examples of effective eradication of Sea Round goby .
- In the Azov Sea Round goby population went extinct due to the abnormal increase of salinity and the removal of other elements of the biocenosis (Corkum et al. 2004).





## Recommendations or comments from experts and local communities

- The first and most important defence against Round goby should be the prevention of its spread through transport into new regions.
- When established, Round goby is very difficult to eradicate.
- It is important to raise awareness among anglers about the negative consequences of deliberate transport of the species, used as live bait, to new water bodies, both marine and fresh water.



## Economic and societal effects

- Traditional food. Round goby is not important for the local fishery, but in the future could be commercially exploited.
- The population size would allow the start of commercial exploitation, but established consumption traditions prevents it.



## Leisure time. Anglers.

Round goby is the main catch of near shore, shallow water angling, but decreases anglers' success in catching flounder.





## Alternatives. Fish flour

- Price for ready fish flour about 1,6 eur/kg
- To be economically viable, raw fish for Fish flour must be provided for about 10 – 15 eurocents per kilogram.







# Fishing for consumption

- Fishing gobies at sea is a hard work, especially when fishing with nets; it only pays off when the price is no less than 0.50 eurocents per kilogram (real price 0,30 – 0,70 eurocents, depending from amount and regularity of supply)



# Consumption

Photo A.Urtans





# Different solutions: The Ukraine, Russia, Bulgaria

(Institute of Agrarian economy Latvia, 2015)





# European Funds?

- European Funds has been applied for fishermen fishing at sea (groups of producers) that catch sprats and herrings





# Thank You!

