2010 - 2013

Ivars Putnis
Gunta Rubene

Klaipeda 2011

- Latvian Institute of Aquatic Ecology

LHEI

↔

- Institute of Food Safety, Animal Health and Environment

BIOR
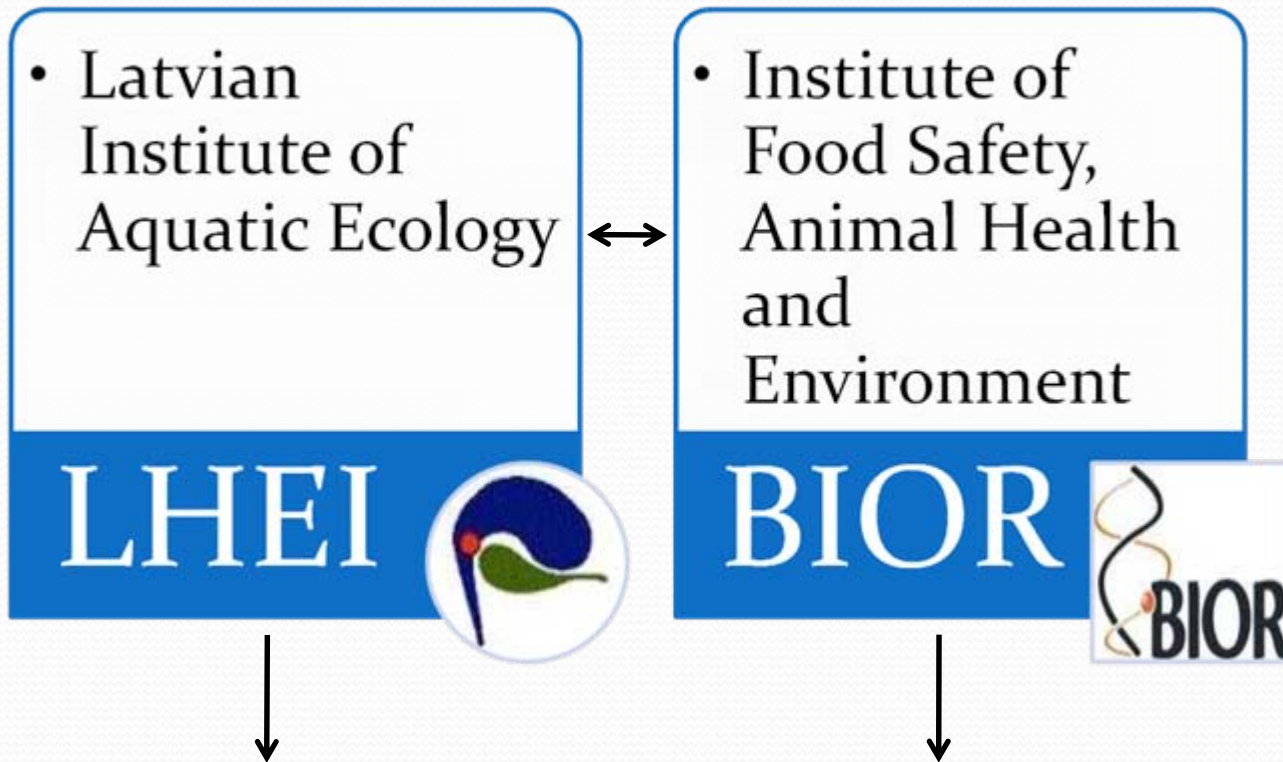
Development of a mechanistic model of the Gulf of Riga ecosystem in support of efficient national policy to ensure the protection of the Baltic Sea and to promote the sustainable use of its ecosystem

LIMOD

ERAF
EIROPAS REGIONĀLĀS ATTĪSTĪBAS FONDS

Structure
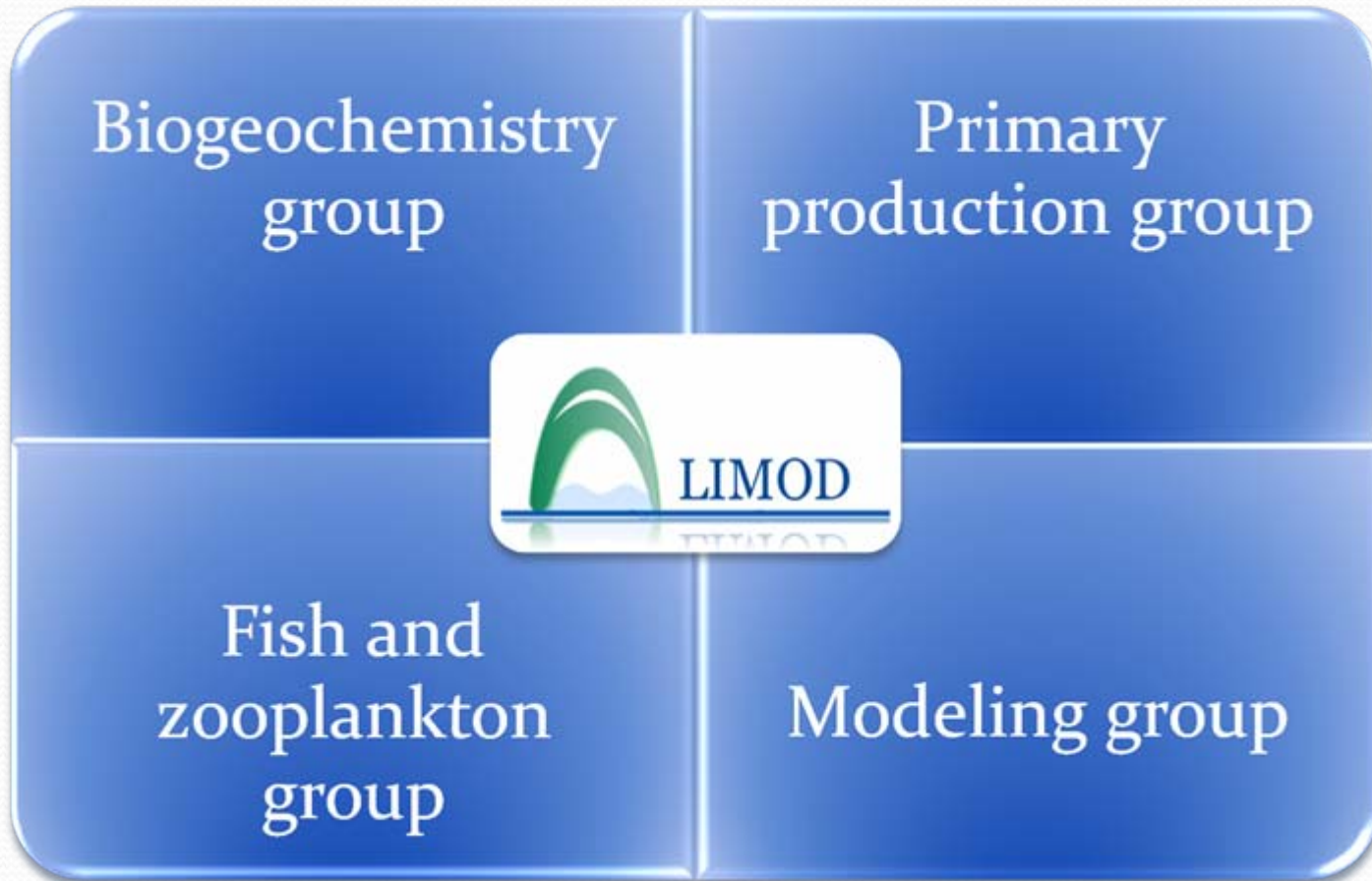
The Gulf of Riga

- Surface area – 16 330 km²
- Volume – 424 km³
- Max. depth – >60 m
- Average depth – 26 m

(HELCOM, 1996)

Datasets for the Gulf of Riga 1980 →

- Hydrology (temperature, oxygen, salinity)
  - Monitoring data (February, May, August, October)
- Phytoplankton
  - Monitoring data (April – October)
- Zooplankton
  - Monotoring surveys (May, August, October)
- Pelagic planktivorous fish
  - ICES assessment data
  - Hydroacoustic survey (July since 1999)
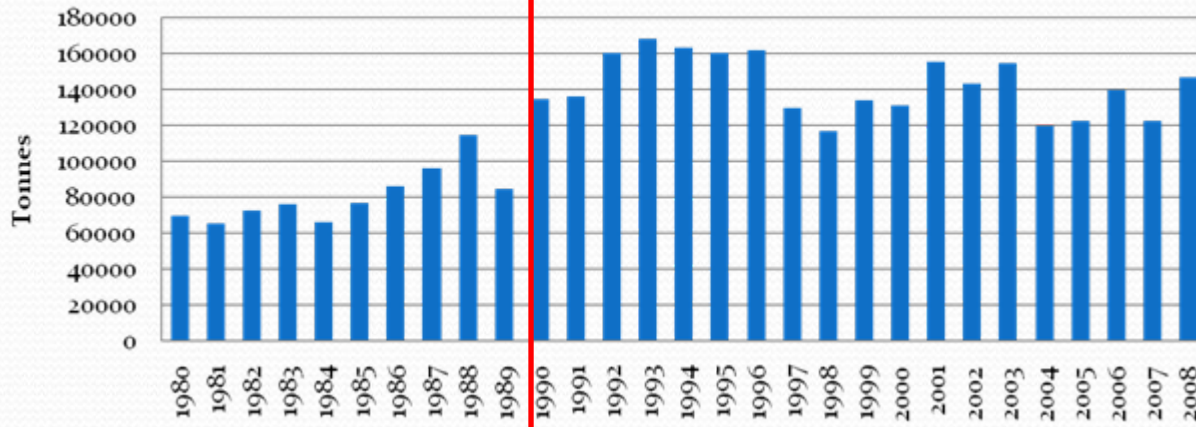
Additional data from LIMOD project activities (2011 – 2013)

- Monthly zooplankton surveys (April – October)
- Monthly pelagic fish stomach samples (April – October)
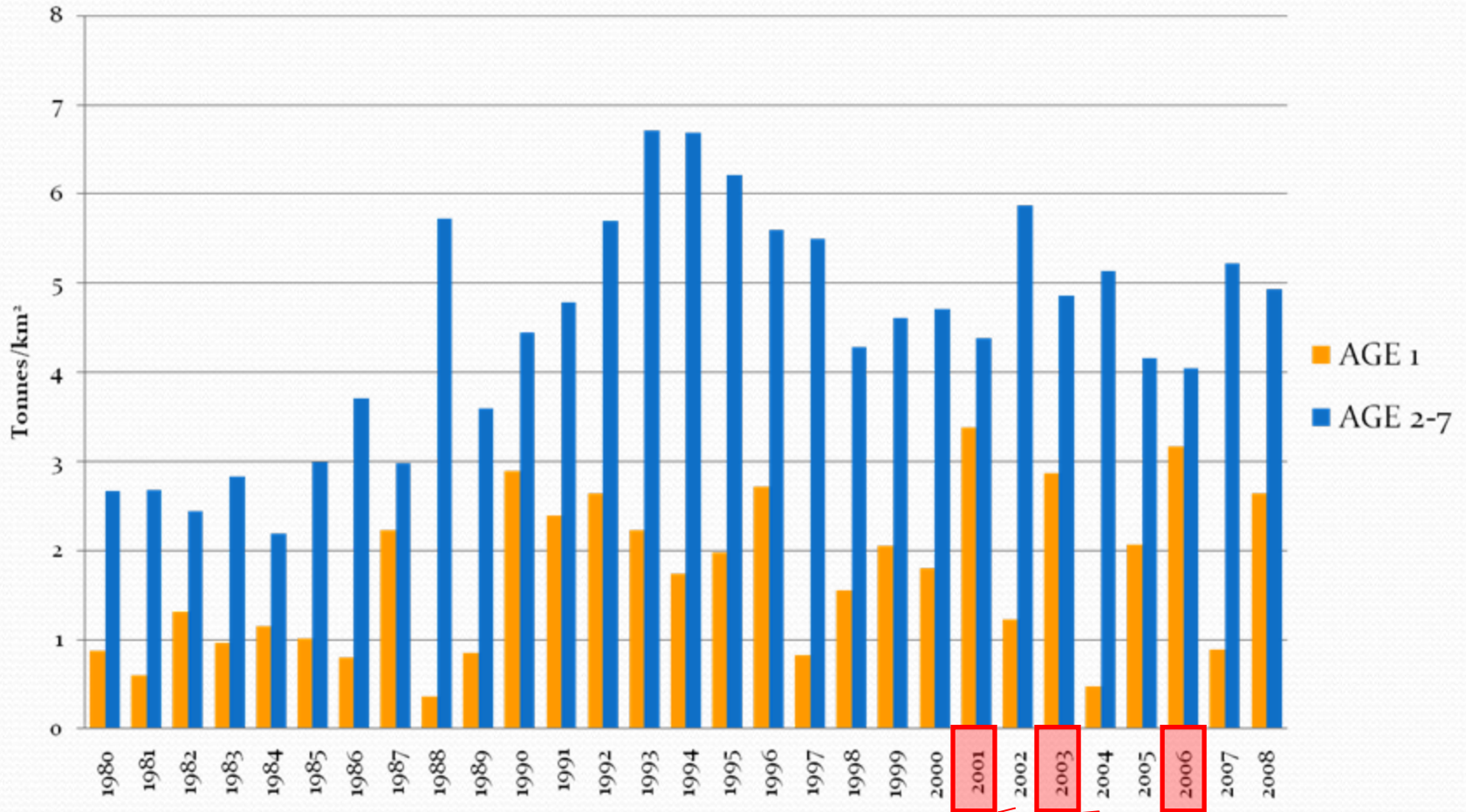
Gulf of Riga herring recruitment

Gulf of Riga herring total biomass
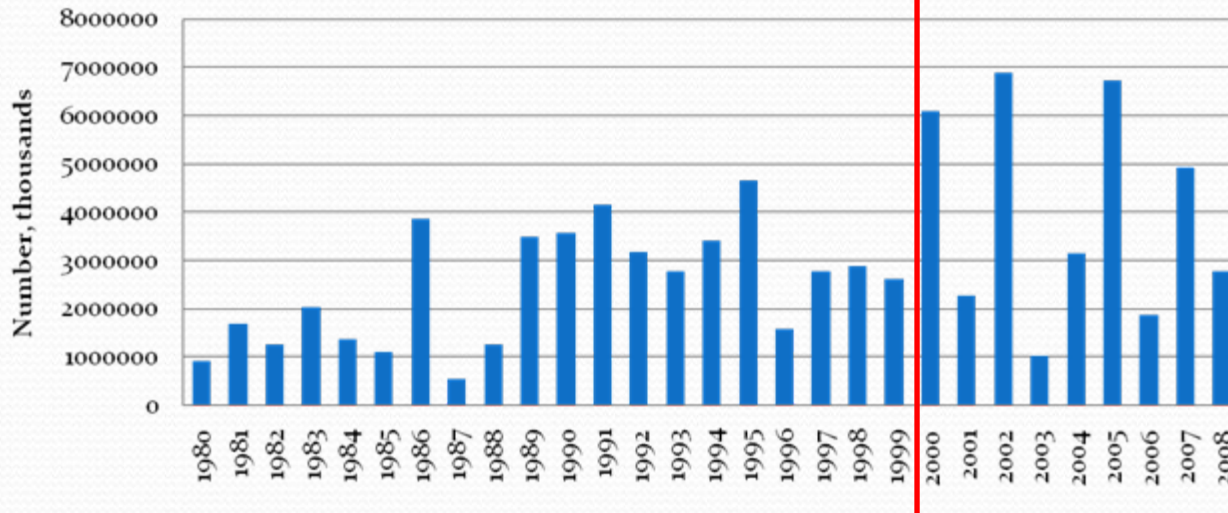
Time period for model?
Seasonality?

(ICES, 2010)

Herring biomass at 1. May

Impact of previous generation?

Ecopath model for the Gulf of Riga
Functional groups

	Group name
1	Herring adult
2	Herring age 1
3	Sprat
4	Mysids
5	Eurytemora
6	Acartia
7	Other copepoda
8	Podon
9	Evadne
10	Bosmina
11	Rotatoria
12	Phytoplankton
13	Detritus

Planktivorous fish (multi – stanza?)

Macrozooplankton

Mesozooplankton

Phytoplankton

Detritus

+
- Cod
- Smelt
- Stickleback
- Perch

Ecopath model for the Gulf of Riga
Diet composition

	Prey \ predator	1	2	3	4	5	6	7	8	9	10	11
1	Herring adult											
2	Herring age 1											
3	Sprat											
4	Mysids	0.0150										
5	Eurytemora	0.410	0.330	0.150	0.100							
6	Acartia	0.140	0.205	0.189	0.100							
7	Other copepoda	0.200	0.180	0.0410	0.100							
8	Podon	0.0250	0.0500	0.200	0.100							
9	Evadne	0.100	0.120	0.200	0.100							
10	Bosmina	0.01000	0.0150	0.0200	0.100							
11	Rotatoria	0.100	0.100	0.200	0.100							
12	Phytoplankton				0.100	0.900	0.900	0.900	0.900	0.900	0.900	0.900
13	Detritus				0.200	0.100	0.100	0.100	0.100	0.100	0.100	0.100
14	Import	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	Sum	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	(1 - Sum)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(Modified from Lankov et al. 2010)

Ecopath model for the Gulf of Riga
Ecotrophic efficiencies

	Group name	May 2000 – 2008		August 2000 – 2008		May 2001, 2003, 2006	
		Biomass in habitat area (t/km²)	Ecotrophic efficiency	Biomass in habitat area (t/km²)	Ecotrophic efficiency	Biomass in habitat area (t/km²)	Ecotrophic efficiency
1	Herring adult	4.812	0.582	4.121	0.680	4.428	0.617
2	Herring age 1	2.057	0.381	1.887	0.415	3.140	0.363
3	Sprat	0.500	0.333	0.500	0.333	0.500	0.333
4	Mysids	0.100	0.770	0.100	0.659	0.100	0.709
5	Eurytemora	2.174	0.287	2.727	0.252	1.136	0.685
6	Acartia	1.823	0.160	1.214	0.215	1.437	0.360
7	Other copepoda	0.728	0.432	3.388	0.082	0.532	0.673
8	Podon	0.0920	0.937	0.513	0.156	0.0329	0.936
9	Evadne	0.607	0.332	0.0508	0.890	0.0840	0.920
10	Bosmina	0.0286	0.966	3.295	0.008	0.00346	0.925
11	Rotatoria	2.342	0.072	0.238	0.635	0.351	0.541
12	Phytoplankton	87.08	0.266	24.69	0.251	69.35	0.146
13	Detritus		0.032		0.030		0.017

Discussion