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VALSTS PĒTĪJUMU PROGRAMMA  
KLIMATA MAIŅAS IETEKME UZ LATVIJAS ŪDEŅU VIDI

# **WP3: Climate Change Impact on Freshwater Ecosystems and Biological Diversity**





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## **DP3**

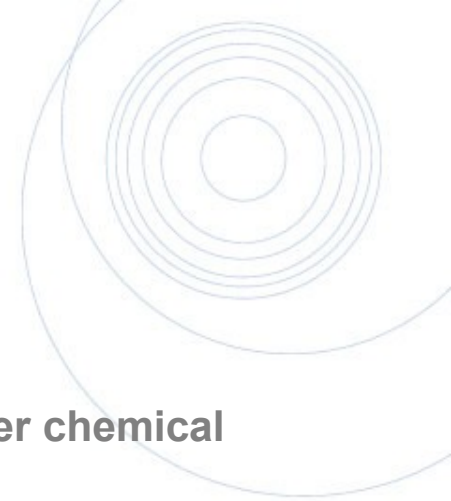
### **MAIN TASKS:**

- **To assess the changes in freshwaters biodiversity in connection with climate change factors (climate-biodiversity);**
- **To study out hydroecological parameters (representative species, qualitative and quantitative structure of cenoses) – climate change indicators, and to analyze elements of different trophic levels (algae, benthic invertebrates, fish) (climate change indicators).**
- **To characterize and forecast the potential character of changes in water chemical composition and its impact to biota with the special emphasis to organic carbon (fluxes-climate-biota).**



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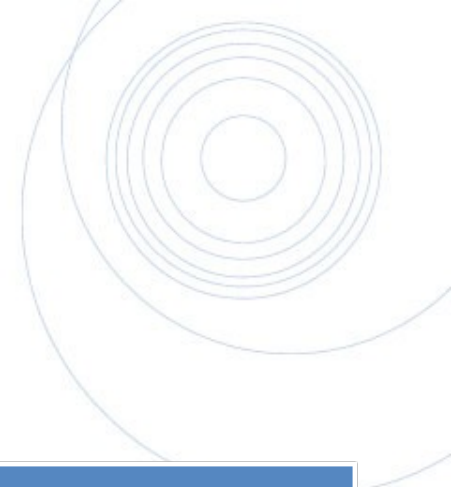
### **DP3: researchers and their research directions**

- **Gunta Sprinģe – WP co-ordinator**
  - **Agrita Briede – climatology**
  - **Ilga Kokorīte, Valērijs Rodinovs – environmental science: the water chemical composition, long-term data analyses, modelling, GIS**
  - **Linda Eglīte, Jānis Šīre – environmental chemistry: chemical analyses and assesment of organic carbon fluxes**
  - **Ivars Druvietis – algology: long-term changes in phytoplankton cenoses; the investigations of algal drifts, the assesment of algae- climate change bioindicators.**
  - **Elga Parele, Agnija Skuja – zoobenthos; long-term changes in zobenthos cenoses; the assesment of benthic organisms - climate change bioindicators, investigations of insect larvae drift**
  - **Laura Grīnberga – aquatic macrophytes: changes in cenoses, the assesment of higher vegetation as climete change indicators.**
  - **Jānis Birzaks – the assesment of ichthyocenoses in running waters: changes in species composition and structure; changes in salmond smolts production, migration time and intensity;**
  - **Ēriks Aleksējevs - the assesment of ichthyocenoses in lakes: the changes in fish species cenoses structure and growth**
  - **Andis Mitāns – the impact of climate changes to aquacultures (breeding, growth, dynamics of fish pathologies) izmaiņu ietekmi uz akvakultūrām.**
- + students



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DP3 **realization time** - 38 months

2006 – XI; XII

2007

2008

2009



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## **DP3: expected results**

- **The assesment of changes in freshwater species biodiversity in connection with climate change and the selection of the most appropriate inland surface waters bioindicators of climate change for the assesment of water quality;**
- The understanding of climate change impact to water chemical composition and its influence to the structure and functions of hydrobiocenoses;
- The understanding of the role of organic carbon to freshwater biota. The assesment of population dynamics in the situation of climate change,
  - Prognosis of the changes in composition of ichthyocenoses due to climate change (an example of the River Salaca basin).



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## Output - presentations

- **1st Scientific conference of The North Vidzeme biosphere reserve “Economical, sociological and historically-cultural aspects of nature protection”, Valmiera, November 23-24, 2006:**
  - J. Birzaks: The development of the Salaca River diadromous fish stocks and fisheries management option.
- **65th scientific conference of University of Latvia. Geography. Geology. Environmental Science. Riga, February 6, 2007:**
  - A. Skuja: Dynamics of Trichoptera daytime drift in the most representatives biotopes of Latvian small streams (the results of pre-investigations);
  - E. Parele: The analysis of long-term observations of zoobenthos organisms structure of the Lake Engures.



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- **4th International Conference „Research and conservation of biological diversity in Baltic Region”, University of Daugavpils, 2007, April 25-27:**
  - A. Skuja: The spatial distribution of the caddisfly Trichoptera communities in the microhabitats of Tumsupe stream in Latvia.
  - J. Birzaks: The river fish communities structure- results of biodiversity monitoring.
- **The 3rd International ASTRA conference “Climate change and waters”, Riga, May 10-11:**
  - Druvietis, I. et al: "Long-term assessment of hydroecosystem of the River Salaca, North Vidzeme Biosphere Reserve, Latvia"



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- **ASLO Aquatic Sciences meeting. Santaphe, Newmexic, USA, February 04-09, 2007:**
  - I. Kokorite, M. Klavins, V. Rodinov (2007) Flows of dissolved organic matter from territory of Latvia in conditions of changing environment. Book of abstracts p.98
- **16th European Vegetation Survey, Roma, Italy, March 22 -26, 2007:**
  - L. Grīnberga: Impacts on aquatic vegetation under climate changes in Latvia: case study of the river Salaca
- Participation in the **exhibition** “Garden. Flora. 2007”: I. Druvietis, E. Parele, A. Skuja (climate-change impact to freshwater flora and invertebrates)





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## Output - publications

- Parele, E. (2007) The analysis of long-term observations of zoobenthos organisms structure of the Lake Engures. In: UL 65 scientific conference. Geography. Geology. Environmental Science. Book of abstracts, Riga: 309-319.
- Skuja, A. (2007) Dynamics of Trichoptera daytime drift in the most representatives biotopes of Latvian small streams (the results of pre-investigations). In: UL 65 scientific conference. Geography. Geology. Environmental Science. Book of abstracts, Riga: 327-328.
- Skuja, A. (2007) The spatial distribution of the caddisfly Trichoptera communities in the microhabitats of Tumsupe stream in Latvia. In: 4th International conference “Research and conservation of biological diversity in Baltic region”. Book of abstracts. Daugavpils: 110.
- Birzaks, J. (2007) J. Birzaks: The river fish communities structure- results of biodiversity monitoring.. In: 4th International conference “Research and conservation of biological diversity in Baltic region”. Book of abstracts. Daugavpils.
- I. Kokorite, M. Klavins, V. Rodinov (2007) Flows of dissolved organic matter from territory of Latvia in conditions of changing environment. Book of abstracts ASLO Aquatic Sciences meeting. Santaphe, New Mexico, USA, February 04-09, p.98

+ prepared articles for Acta of University of Latvia (3), SEFS (2)



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Other outputs:

**Two Doctor's dissertations 😊**

**Field sampling:**

- 16-17. 01.2007: warm (chemical and biological samples)
- 21.02.2007: -20 0C
- 21-22.03.2007: +15 (butterflies, geese, larks, roes...)
- 23.-24.04.2007: warm
- The next sampling: 21-22.05.2007

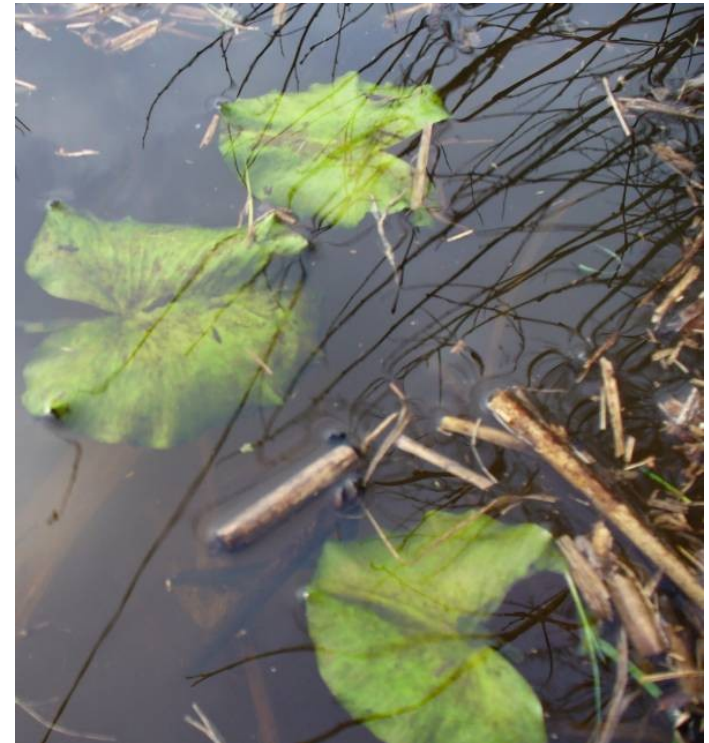




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- **Field trip to the River Salaca basin in January 2007**







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- **Field trip to the River Salaca basin in February 2007**



The Lake Burtnieku



The River Salaca



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- **Monthly sampling of organic carbon and phytoplankton**
- **Sampling of benthic invertebrates/phytoplankton spring-time drift (spring -May)**
- **Sampling of salmonids (May)**



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## Activities for 2007

Tasks - activities	I	II	III	IV
<b>3a Climate_biodiversity</b>				
Collection of data of phytoplankton and zoobenthos	X	X		X
Statistical processing of fishery data (the Lake Burtnieku)	X			
Hydrobiological and ichthyological field studies		X	X	
The treatment of collected samples			X	X
Publications on climate change impact to freshwater ecosystems		X		X
Reporting at conferences	X			



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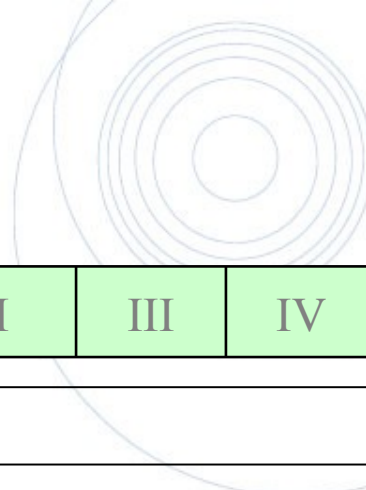


Tasks - activities	I	II	III	IV
<b>3b fluxes_climate_biota</b>				
Sampling and analyses of water chemical composition, including organic carbon; and phytoplankton	X	X	X	X
Development of water composition long-term data and their analyses	X	X	X	X
Reporting				X



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Tasks - activities	I	II	III	IV
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**3c - climate change indicators**

Data on cold-water fish species distribution and occurrence in Latvian lakes	X			
Data analyses of salmonid smolts	X	X		X
Data on salmon and lampreys growth and maturation in sea-period	X	X		
Data on aquacultures in connection with dynamics of climate change factors	X	X		X
Seasonal investigations of benthic invertebrate and alagae drift		X	X	X
Reporting	X	X		





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## Co-operation

- For the assessment of TOC in diffuse runoff from agricultural territories (monitoring), monthly sampling was done in 3 streams:
  - *Vienziemīte*: drainage field and small catchment;
  - *Mellupīte*: experimental field, drainage field and small catchment;
  - *Bērze*: drainage field and small catchment.



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## The River Salaca – climate change impact ???

